UNIVERSITY FOR DEVELOPMENT STUDIES

ASSESSMENT OF THE USE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING OF AGRICULTURE SCIENCE IN SENIOR HIGH SCHOOLS IN THE SAGNARIGU MUNICIPALITY

FACULTY OF EDUCATION

MPHIL AGRICULTURE SCIENCE EDUCATION

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DECLARATION

I hereby declare that this thesis is the result of my work and that no part of it has been presented for another degree in this University or elsewhere, with exception of references to literature, which have been duly cited and acknowledged.

…….. ……

ABDUL-MUMIN WUNAM, IBRAHIM (STUDENT) **DATE**

I hereby declare that preparation and presentation of the thesis was supervised following the guidelines on supervision of thesis laid down by the University for Development Studies.

…… ……

PROF. IBRAHIM MOHAMMED GUNU (SUPERVISOR) **DATE**

ABSTRACT

The study examined the use of audio-visual materials in teaching and learning of agriculture science in senior high schools in the Sagnarigu municipality. The research adopted a cross-sectional survey design for the study using the quantitative method approach. The Andrew Fisher's sample size determination method was applied to generate the sample size of 268 for the study. Data for the study was collected using questionnaires, and analysed using SPSS version 22. Descriptive and inferential statistics, such as frequency, chi-square, and regression were used to present the data. The study found that, 99.2% of the respondents agreed that the use of audiovisual materials increase students' interest in the agriculture science learning process. The challenge of the respondents were the difficulties in accessing audiovisual materials in the schools for effective teaching and learning process to occur. The study also found that Overwhelming majority of the respondents (92.3%) confirm that the audiovisual materials are available, even though they are inadequate to be properly use in order to serve its intended purpose. The study therefore concludes that the use of audiovisual materials in the teaching and learning of agriculture science helps in facilitating easy understanding of the subject in the senior high schools sampled for the study. This research therefore recommends that, the Ministry of Education (MoE) and the Ghana Education Service (GES) should formulate and implement a policy that makes the use of audiovisual materials compulsory in all senior high schools that study any practical related courses for easy understanding by the students.

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DEDICATION

This thesis is dedicated to my mother, Hajia Zeinabu Abubakari.

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ABBREVIATIONS

Almaktum Senior High School	MAKISS
Audio-visual	AV
Business College International	BIC
Business Senior High School	BISCO
Continuous Professional Development	(CPD
Ghana Education Service	GES
Heads of Departments	HODs
Kalipohini Senior High School	KALISCO
Ministry of Education	MoE
Northern School of Business	NOBISCO
Senior High Schools	SHS
Standard Deviation	StdDev
Statistical Package for the Social Sciences	SPSS
Sub-Saharan Africa	SSA
Tamale Islamic Senior High School	TISSEC
Tamale Senior High School	TAMASCO

Teaching and Learning Material	TLMs
University for Development Studies	UDS

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There is widespread recognition of the need to find and implement solutions that increase the effectiveness and efficiency of agricultural research in order to maximize crop and animal production (Rubio et al., 2020). The use of audio-visual materials in the teaching and learning process is encouraged. These audio-visual materials are educational materials that can convey meaning without relying solely on vocal symbols or language. Diorama or dramatizing an event or procedure are two examples of audiovisual components in education (Ayinla, 2016).

The Agriculture Science education is design to educate students for additional study and professional prospects in the agricultural industry. From the first year of school to the last, the agriculture curriculum is much focus on practical application. It is one of the vocational disciplines offered in senior high schools, and it should be able to stimulate creativity, enhance cultural heritage, and prepare students to be productive and self-employed (Sadiq et al., 2017).

However, there is an urgent need for broad-based agricultural training that will provide agricultural students with scientific, vocational, and technological skills that will allow them to work in a variety of agricultural sectors using audiovisual materials (Ajani et al., 2015).

As an instrument for effective teaching and learning, audiovisual materials are currently running through the educational system for effective communication and

information delivery to improve the acquisition of knowledge (Aluko et al., 2014). One of the possibilities of information and communication technology is that it has a huge impact on learning by the introduction of audio-visual materials to knowledge acquisition. This has developed into a variety of resources and equipment that can be used to support augment teachers' efforts to ensure that students learn effectively (Tairu, 2018).

Audio-visual material is a medium that combines sound and images. This is because it combines both audio and visual media. They are instructional media that correspond to the advancement of this era of science and technology (Mahdi, 2022). The audio-visual materials provide flexible visual representation, used in a specified way by its designer/manufacturer. It is also a physical visualization of real or abstract ideas, which is developed using psychosocial and cognitive principles (Fuady & Mutalib, 2018).

The goals of the agriculture science curriculum are to arouse and sustain students' interest in the art of practice, teach them basic agricultural knowledge and manipulative abilities as well. This also prepares the students for further studies and taken agriculture as a profession future (Sadiq et al., 2017).

The audio-visual materials are highly significant to the average learner, which helps them to obtain a proper understanding of the lesson in terms of various impressions recorded by the eye, ear, touch, and other senses. This helps students to learn more easily and quickly than the verbal explanations alone (Ashaver & Igyuve, 2013).

Furthermore, it has been demonstrated that using a variety of senses to convey knowledge helps learners remember more information, and the intensity of the experience encourages recall and retention by engaging social, affective, and cognitive senses (Okedeyi et al., 2015).

According to Auwal (2013) the kind of teaching approach is critical to the effectiveness of the teaching and learning process within the Senior High Schools. Where teachers must choose and employ a wide range of teaching tactics in order to be successful in their lesson delivery. However, the demonstration and discussion methods, in which efficient use of audio-visual resources is a factor, are the most appropriate ways for teaching practical-oriented subjects like Agricultural Science.

Education and the skills attained through education affect the level of employment chances available to the youth and their earning potential (Stephen, 2012). Advances in digital technologies have enormous prospects for the African agricultural sector to be transformed. The widespread usage of mobile phones in Sub-Saharan Africa has made it easier to incorporate it into the SHS study of Agriculture Science (Suwadu, 2020).

It is worth noting that teaching and studying Agricultural Science, like any other fundamental scientific concept, develops problem-solving abilities of learners as it based on observed occurrences, as well as improve explanation and comprehension (Antwi et al., 2017). This is accomplished by enabling students to participate in the practical components of agriculture science lessons conducted on the field and in the laboratory, which is aided by the use of audio-visual

materials in the absence of some basic laboratory tools and equipment (Ali et al., 2013).

An individual's five senses, particularly seeing, hearing, and touching, are the entry way to successful learning, delivering a maximum understanding of the knowledge obtained by the individual (Ayinla, 2016).

According to Al-Maroof et al. (2022), people recall 10% of what they hear, 20% of what they read, and 80% of what they see and do. This demonstrates the significance of using audio-visual aspects into farm science teaching and learning in senior high schools.

1.2 Problem Statement:

While agriculture science is an important subject in Senior High Schools, pursuing it is often cumbersome as student struggle to understand certain concepts and principles due to the complexity of the subject. This highlights the need for effective teaching methods that can enhance students understanding and retention of the subject matter. The use of audiovisual materials in teaching has been suggested as a possible solution this problem (Kwegyiriba et al., 2022).

However, based on the available literature, there is no study on the use of audio-visual materials in teaching and learning of agriculture science in Senior High Schools in the Sagnarigu Municipality. Therefore, this study aims to assess the use of audio-visual materials in teaching and learning of agriculture in Senior High Schools in the Sagnarigu Municipality.

The primary objective of this research is to determine whether the utilization of audiovisual resources in Agriculture education positively impacts students' learning outcomes, engagement levels, and overall comprehension of the subject matter. This study also seeks to identify the challenges faced by teachers and students in the implementation and integration of audiovisual materials into the existing curriculum. By exploring these factors, the research aims to provide valuable insights into the potential benefits and limitations of using audiovisual materials for teaching Agriculture in senior high schools.

1.3 Objectives of the Study

1.3.1 General Objectives

The study's broader goal is to investigate the use of audio-visual resources in educating and learning agricultural science in senior high schools in the Sagnarigu Municipality.

1.3.2 Specific Objectives

The study sought to achieve the following specific objectives in:

1. To assess the availability of audio-visual materials for teaching and learning Agriculture Science in the Senior High Schools in Sagnarigu Municipality.
2. To examine the level of usage of audio-visual materials in the teaching and learning process in the Senior High Schools in Sagnarigu Municipality.

3. To ascertain the benefits of using audio-visual materials in teaching and learning of agriculture science in the Senior High Schools in Sagnarigu Municipality.

4. To investigate the factors that affect the use of audiovisual materials in agricultural science learning and teaching.

1.4 Research Questions;

The following questions were addressed in the study;

1. How available are audio-visual materials for teaching and learning of agriculture science in senior high schools?
2. What is the level of usage of audio-visual materials teaching in the teaching and learning of agriculture in the Senior High Schools in Sagnarigu Municipality?
3. What benefits do teachers and students derive from using audio-visual materials in studying of agriculture science?
4. What factors affect the use of audio-visual materials in teaching and learning of agriculture science in senior high schools?

1.5 Significance of the Study

The study's significance may be impactful on knowledge acquisition, academics, policy making, and implementation. This will help future researchers in comprehending the principles underpinning the ideas discussed in the study.

Following the identification of the impediments to the most efficient use of audio-visual resources in schools, efforts will be undertaken to minimise the effects of

the impediments and encourage adequate utilisation of the available resources in SHS. Human resources will also be increased in the agriculture sector, which will eventually improve agricultural productivity. If the Ghana Education Service (GES) and school officials adopt and implement the findings in senior high schools, the issue of unemployment in the Sagnarigu Municipality and Ghana as a whole would be addressed.

The findings of the study could also assist teachers, government and Non-governmental Organizations (NGOs) in acquiring printed and non-printed tools for Senior High

1.6 Scope of the Study

The study focuses on the effectiveness of using audiovisual materials in teaching and learning Agriculture Science in some of the Senior High schools within the Sagnarigu Municipality that study's Agriculture Science as a course.

However, findings of this research can be used to address the barriers of studying all science-related disciplines at Senior High Schools throughout the Sagnarigu Municipality and Ghana at large.

The study is also limited to the evaluation of audio-visual aids in teaching processes, their effectiveness, and capacities in easing the flow of information between Agricultural Science teachers and students.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents appropriate literature for the study. The study's theoretical framework, conceptual framework, and empirical review of agriculture science teaching and learning, the level of usage of audiovisual materials in schools, an assessment of the benefits of using audiovisual materials in the teaching - learning activities, and factors influencing the utilization of audiovisual materials in agriculture science learning in senior high schools are all examined.

2.1. Theoretical Framework:

The theoretical framework is the focal point of the research and is linked to the research issue being investigated. However, it is the foundation upon which all research is built. As a result, it influences the research design and data analysis strategy of a researcher (Atkins et al., 2017). The theoretical framework also influences the type of data gathered for a particular study. This serves as a guide for researchers in situating and categorizing formal theories in their research. Which positions research in a scholarly and academic context (Adom et al., 2018).

The dual coding theory:

In 1971, Allan Paivio of the University of Western Ontario proposed dual-coding theory, a cognition theory. Paivio's hypothesis was based on the idea that developing mental images improves learning. According to Paivio, a person can

expand on previously learned material through two methods: verbal associations and visuals.

Information represented with regard to the dual coding theory is using both sensory imagery and linguistic information (words or verbal). Where the verbal system contains visual, auditory, articulatory, and other modality-specific verbal codes (Kiefer & Harpaintner, 2020).

These mental code representations are used to organize sensory data so that it can be acted on, stored, and retrieved later. However, Imagery and verbal information are processed differently and through separate channels in the human mind, resulting in distinct representations for information processed in each channel (Schunk, 2014).

To recall information, both visual and verbal codes can be used. Assume someone has saved the stimulus idea "dog" as both the word "dog" and an image of a dog (appearance, sound, smell, and other sensory information). When asked to recall the stimuli, the person can recall either the word or the image separately, or both at once. When the word is recalled, the image of the dog remains and can be recovered later. The ability to code stimuli in two different ways increases the likelihood of remembering that item when compared to simply coding the input in one way (Clark & Paivio, 1991). So how is the theory relevant to your work?

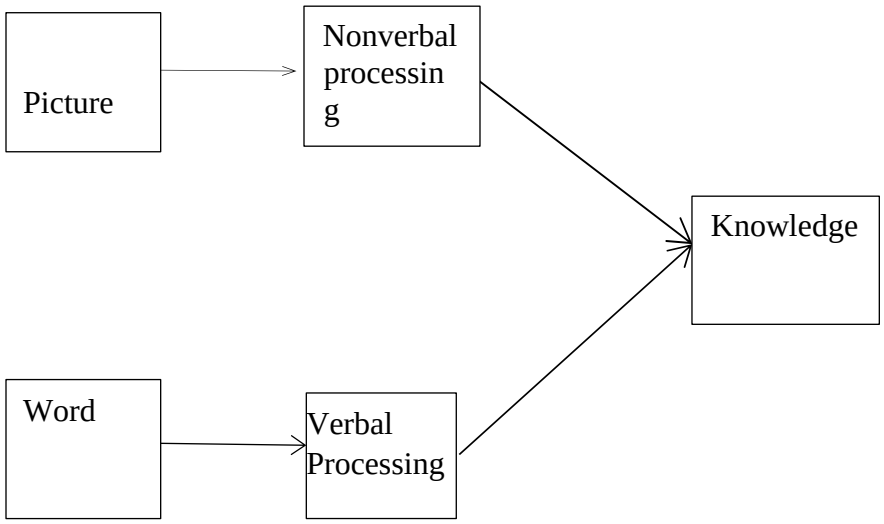
Conceptual Frame Work Adopted from the Dual Coding Theory:

A conceptual framework is a structure that the researcher believes best explains the natural progression of the phenomenon under investigation. It is linked to the

concepts, empirical research, and important theories used in promoting and systemizing the researcher's knowledge (Adom et al., 2018).

Nonverbal manifestations of shapes include sensory-specific images, environmental sounds, actions, skeletal or visceral sensations associated with emotion, and other nonlinguistic objects and events. Such imaginable representations, rather than being random symbols, are equivalent or perceptually similar to the events they represent (Clark & Paivio, 1991).

Figure 1: A CONCEPTUAL FRAME WORK ADOPTED FRPM (CLARK & PAIVIO, 1991)



2.2 Availability of Audiovisual Materials

The effective use of available audio-visual materials in the teaching and learning process at senior high schools improves and increases the rate of learning. This allows for teachers to engage in other tasks such as curriculum preparation, lesson note compilation, and other academic related activities (Ho et al., 2018). However, the available audiovisual materials allow students to experience

concepts, which makes learning more real in the field of agriculture science. (Abubakar et al., 2021).

The audio-visual materials are instructional gadgets that are utilized in the classroom to facilitate and motivate teaching and learning. Examples of these materials include; mobile phones, computers, filmstrips, projectors, radio, television, etc (Grade, 2019).

Nations all over the world are realizing the value of audiovisual materials or resources. The International Federation of Library Associations stated unequivocally that audiovisual (AV) materials should not be considered as extraneous extras, but rather as essential components of a fully integrated library service. Since the essence of the library is to serve the educational needs of members in the community (Bozkurt, 2020).

Non-print materials have the potential to reach out to segments of the public for whom traditional print-based materials have little impact, such as those who are hesitant to use the printed word or those with visual or other disabilities to improve the teaching and learning of agriculture science (Oghenetega & Sarah, 2014).

The provision of audiovisual materials to achieve effectiveness in educational delivery and supervision in the school system, as well as their gross inadequacy and underutilization, explain the need to enhance and supplement sense organ deficiencies, as well as reinforce the capacity of dominant organs in the process of education and learning. The basic materials such as a computer, projector and

television are not always available in many senior high schools for educational delivery (SamKayode et al., 2020).

Audiovisual materials, such as radio broadcasts and television shows, break down geographical barriers when paired with recording devices, allowing instructional programs to be recorded, stored, and replayed for training and educational purposes. This allows knowledge to be distributed to a wider geographical audience to improve agricultural science education (Ho et al., 2018).

In this age of technological innovation, the question of how to employ students in learning agriculture science is more vital than the content that should be taught. This implies that no matter how exact the teacher's subject knowledge of matter selection is, he will be unable to fulfil his instructional goals if he does not apply proper and effective methods and procedures to teach it. (Şahin et al., 2016).

According to Alenizi (2015), audiovisual materials have been used to make lessons more engaging for both students and teachers. Which provides an opportunity for Senior High Schools to improve their teaching and learning process. This indicates that, among all the learning tools available to man, auditory and visual materials create a correlation of hearing and seeing that increases total learning.

Text files, photographs, video, audio, relevant links to various websites, and quick access to search engines available on the internet are examples of audio or visual processing, storage, creation, modification, and remembering resources. These materials are believed to saved teachers time and help in creating innovation and

motivation, as the introduction of pictures by teachers is worth than just describing a concept (Chen et al., 2020).

By overcoming distance, language, and culture barriers, and utilizing various internet-connected devices, audiovisual materials provide direct exposure to all human knowledge, anytime and anywhere in order to improve the studies of agriculture science in senior high schools (Tairu, 2018).

The availability of appropriate teaching and learning resources is critical for the effective teaching of any practical concept in Agricultural Science. However, students' attitude towards the subject is hugely influence by the resources available for the teaching and learning. Therefore, the lack of these resources such as the audio-visual materials at the SHS may have a significant impact on the students' performance in Agricultural Science (Darko et al., 2016).

Computers, films, slides, transparencies, projectors, photographs, audio/video CDs, tape recorder/player, video cassette recorder (VCR) & video cassette player (VCP), and other examples may be used as aids for educational materials aimed at both the senses of hearing and sight, and may be used in classroom instruction, library collections, or the like (Chukwueke & Oluwabunmi, 2022a).

Using the available audio-visual materials for learning and teaching is a way of demonstrating a practical lesson to students. However, demonstration teaching approach refers to a type of instruction in which the teacher acts as the main character and the students observe and act afterwards. The teacher gradually demonstrates to the students what they are expected to do at the end of class by

teaching them how to do it and describing the systematic procedure for completing the task (Noah E, 2013).

Agricultural science is a hands-on course that requires practical education and application through the use of effective demonstration tactics. This is accomplished through the explanations of the teacher while the learner observes using the audio-visual tools (Diise et al., 2018).

Furthermore, the availability and effective use of audiovisual materials in the agriculture science classrooms promotes and raises the rate of learning, freeing up time for instructors to engage in other tasks such as curriculum creation, lesson note compilation etc. This allows teachers and students to experience concepts, which makes teachings and learning of agriculture science more accessible and broadening the scope of experience (Abubakar et al, 2021).

Effective utilization of the audio-visual resources in teaching and learning will shift the method of teaching from "teacher-centered method" to a more inventive and enhanced method known as "child-centered method". The child-centered technique engages students as active participants in the classroom by encouraging joyful learning through the use of audio-visual materials and other instructional methods (Chidimma Ojobor et al., 2020).

Television, radio, and various projectors with sound capabilities are examples of available audio-visuals. Television and radio broadcasts are another great learning resource for improving farm science courses in Senior High Schools. These audio-visual materials are capable of ensuring effective teaching and learning in

order to improve skill development and retention among students. (Milosevic, 2017).

When the audio-visual materials are effectively used, they help in the acquisition of knowledge and hold the attention of students in throughout the learning process, which is valuable in agricultural science studies (Owusu, 2020).

According to Milosevic (2012) the world we live in today is continually evolving because of technological advancements that shape our daily routine and have become an inextricable part of our existence. These possibilities happen so quickly that it's sometimes impossible to recognize them and react appropriately in time.

Practitioners of Agriculture who teach Agriculture Science courses, on the other hand appear to be on a never-ending search for advances in science and technology to meet the needs of their students. Therefore, an available high-tech achievement must be incorporated into the classrooms, as well as modernize the Agriculture Science lessons, to provide students with significant professional input and up-to-date knowledge of Agriculture (Emils Kilis et al., 2022).

Integrating technology into classroom studies, on the other hand, begins when a teacher designs classes that incorporate technology into meaningful and relevant procedures. Infusions of technology into learning environments have grown exponentially over the last two decades, in tandem with the accelerating rate of inventions and innovative applications to maximize agricultural production (Keller, 2016).

Incorporating audiovisual resources into the curriculum entails using them to teach academic subjects and encourage thinking skills in students, as well as assisting the teacher in creating a collaborative learning environment for effective Agriculture Science teaching (Tang & Intai, 2018b).

2.3 The Level of the Usage of the Audiovisual Materials in Teaching and learning of Agriculture Science

Agricultural science is not only a valuable form of education for those who get it, but it is also beneficial to everyone in society and Ghana as a whole. And no country can improve its food production and raw materials without using agricultural knowledge (Naab et al., 2013). The objectives of agriculture science education are to improve and maintain students' interest in the practical, as well as to enable them to gain basic information and manipulative abilities in study of agriculture science. This can be achieve depending on the kind of materials used in teaching and learning of the subject (Sadiq et al., 2017).

Agriculture is undeniably the lifeblood of the majority of developing countries, including Ghana. Where the major contributors to the country's Gross Domestic Product (GDP) is the agriculture sector. This sector employs more than 60% the country's economically active population. Which include; farmers, farm laborers, agricultural produce traders, and agricultural processing company employees. (Darko et al., 2016).

Moreover, if teachers used words along with audio-visual materials, students will be able to better understand the concept of agriculture science with much ease. This makes students more attentive, motivated, and interested as compared to that

classroom session that is in functions without the use of audio-visual aids. As a result of the number of times that teachers used audio-visual materials in their lesson delivery is a factor that enhances proper use of the material to improve the studies of agriculture (Tang & Intai, 2018).

Furthermore, as the world becomes more digitalized, the chalkboard method of teaching and learning of agriculture science is being phased out. Where the lessons can be delivered more effectively to students using the audio-visual materials (Screven et al., 2017).

As a result of overcoming distance, language, and cultural barriers, as well as utilizing multiple Internet-connected devices, AV resources enable access to all human knowledge, anytime and anywhere, in a friendly, multi-modal, efficient, and effective manner (Chukwueke & Oluwabunmi, 2022a).

In addition, teaching is a complex process that tries to change a learner's behavior for the better; this is feasible when the teaching is simple, effective, and engaging. This is achieved with the numerous models, approaches, and techniques which makes the teaching process more effective using the audio-visual materials (Noah Ekeyi, 2013).

As a result of the complex nature of teaching in recent times for which science and technology that has entered the field of education to make it more accessible and easier. Where various hardware and software are used to teach students, which include the audio-visual materials as equipment that are employed in the classroom to facilitate learning (Prem, 2018).

However, learning agriculture science is clearer and more concrete because the use of audio-visual materials helps to activate and utilize the individual student's five senses, which include seeing, hearing, touching, tasting, and smelling (Akraam & Malik, 2017).

Computers, both as a component of audiovisual materials and in their applications, altered the nature of most occupations, including agriculture. From computerized milk collection and seed estimation techniques to weather forecasting and automated farmland assessment, computers have transformed farming practices (Mamun, 2022).

Significant changes in crop husbandry and animal husbandry have resulted from technological advancements, resulting in a massive increase in production capacity. Where computers as a component of the audio-materials have most commonly been used to replace human effort and intervention in traditional farming machinery and other equipment (Pawan et al, 2022).

Furthermore, agricultural support functions such as machinery delivery, fertilizer production, and raw product production have been successfully automated. Which indicates the need for students to learn agriculture science using the audio-visual materials (Ulloa Salazar & Díaz Larenas, 2018).

The effectiveness of experiential understanding can be interpreted as a treatment in the learning process. Where students' emotions and attitudes can be influenced by images or visual symbols. The enjoyment of students when reading pictorial or moving text demonstrates the effectiveness of learning through visual media (Al-Maroof et al., 2022).

Audiovisual materials in the learning process can generate new desires and interests, as well as motivate and stimulate learning activities, and have a psychological impact on students. This will significantly improve the effectiveness of the learning process, message delivery, and lesson content in accordance with curriculum requirements (Fuady & Mutalib, 2018).

The Agriculture Information System (AIS) is a computer-based information system that contains all of the interconnected data that farmers can use to manage information and make policy decisions. Radio, television, cellular phones, computers, tablets, networking, hardware and software, and satellite systems are examples of audiovisual materials that aid in the facilitation of farming activities. When used properly in senior high schools, audiovisual material will be an effective solution to problems that impede agricultural industry development (Saidu et al., 2017).

According to Ali et al, (2016) mobile phones, radio, and television were the most important modes of communication for farmers seeking agricultural knowledge and information. Radio was a popular mode of communication in remote areas, broadcasting many agricultural programs, while television was also important in developing countries for disseminating agricultural information. This assist in bridging the gap between farmers and buyers.

Teachers interpret policy documents and simplify them for effective delivery at the school level, so the assignment of implementing education policies falls on their shoulders. Teachers' willingness and capacity to integrate new ideas, such as integrating audiovisual materials into agriculture science education and learning

in senior high schools. This helps to motivate learners' interest in the class activity and foster knowledge of what they are being taught in the classroom (Sam-Kayode et al., 2020).

Audio-visual materials presented in both audio and visual formats improve comprehension and retention, which aids in teaching and learning. This audiovisual access to knowledge is one of the options provided by information and communication technology, which has now had a significant impact and can be used as a tool for successful education and learning (Olajumoke & Kayode, 2022).

Learning gains new dimensions as a result of technological advancement, allowing it to move beyond the traditional classroom setting and chalk-and-talk methodology. Since it is widely recognized that the traditional chalk and talk approach cannot meet the evolving needs of the teaching and learning process, audiovisual instructional resources are increasingly being used to supplement traditional classroom education (Saidin et al., 2015).

Audiovisual materials, such as radio broadcasts and television programs, broke down geographical restrictions, allowing curriculums in agriculture science to be recorded, stored, and independently verified for training and educational purposes. This radio and television altered the way audiovisual materials were displayed by allowing learning resources to be transmitted to larger geographical audiences (Ho et al, 2018c).

According to Nallusamy et al. (2015), effort to bridge the technology gap and facilitating proper use of audiovisual materials in agriculture science learning and

teaching is possible. There is a growing need to bridge the gap between those who are fortunate enough to play an active role in the various types of online education and those who do not have access to the same materials in the teaching and learning process. However, government policies are more important in lowering the price scale of audiovisual materials or in subsidizing the applications required to run the e-learning mode.

Tape recorders are audiovisual materials in education that are used to play back which was before audio lessons or activities to a class in order to provide demonstrative audio materials in the perspective of live lessons or activities. These could be brought in by the teacher or improvised, or they could be measured off-air. These recordings have been used successfully in teaching farmers and other agricultural sectors about new methods of maximizing production. The tape recorders can be used effectively in the teaching and learning of agriculture science in the Sagnarigu Municipality's senior high schools (Juliana, 2017).

With the emergence of social media and its implications for communication, there is increasing evidence that video and multimedia content, tools, and streaming abilities are successfully involving learners in new forms of learning. Many students now use online social networking to carry out their daily personal interactions and to learn through that medium (Phoong et al., 2020).

A large proportion of students use social media from the moment they wake up, providing them with up-to-date information on agriculture science studies and other related issues. In general, social media enable people to create personal

social networks and groups with shared interests in the activities they participate in (Joseph et al., 2016).

Audiovisual materials are created using systemic, coordinated, personality-oriented, integrated, and technological approaches. A systematic approach entails viewing audiovisual technologies as action systems, a student's personality as a system of personality sphere components (Nallusamy et al., 2015)

Personalization of audiovisual technology requires the teacher to consider the individual characteristics of the students. Hence, using an integrated approach allows audiovisual materials to be presented as an integration of studying and teaching forms, activities, methods, tutorials, forms of educational information content, and representation (Pisarenko, 2017).

Agriculture Science instruction provided at the SHS should serve as a foundation for future agricultural studies. Where the Ministry of Education has collaborated with key stakeholders to develop the content of the general agriculture syllabus in order to provide students with skills and knowledge through the use of audiovisual materials. This will help students to work on their own or seek employment in agricultural establishments with the knowledge and practices learned in school (Sadiq, 2013).

Audiovisual materials in science education are not new. An animated video used to deliver Engineering Drawing to University students revealed that the materials have a significant opportunity to enhance student visual representation and thus the quality of learning in senior high school. Similarly in undergraduate medical courses, the use of audiovisual materials revealed a preference for PowerPoint

slides introductions over overhead projectors, as well as the significance of high-quality audiovisual aids for effective learning (Saidin et al., 2015).

Recent studies have been survey-based, with few empirical attempts to demonstrate the effectiveness of audio-visual aids in learning. Where research on the use of audiovisual aids in language teaching emerged to receive more attention than research on teaching science (Tang et al, 2018c).

The principal objective of education must be to guide students toward self-learning and lifelong learning, which audiovisual materials can do by enhancing individual students' learning capacities, resulting in a memorable learning experience. Whereas the primary goal of agricultural science is to foster inquisitiveness, and activity-based learning fosters critical thinking, reasoning, creativity, and the development of an inquisitive mind. Hence an effective use of audio-visual materials is encouraged to maximize the production of crops and animals (Akraam & Malik, 2012).

Learning is an active and interactive process on the learner's part. This has become more plausible over the years that a learner does not need to be physically present inside a classroom. Learning has become participatory even within the confines of a classroom. The audio-visual materials enabled this phenomenon to the learners (Mamun, 2022).

The modern world is an era of information explosion to the point where even social networking sites with trending data can contribute to the sincerest piece of academic learning and research. This necessitates the reason for students to

develop a rigorous digital skill for learning agriculture science at the SHS (Nallusamy et al., 2015).

According to (Cawthera, 2019) indicates that, in the twenty-first century, wealth creation will become increasingly knowledge-based. If a country is to be globally competitive, its workforce must be capable of utilizing and harnessing the benefits of audiovisual materials. If the educational system fails to prepare people for this, the country's needs will not be met. However, if tomorrow's leaders are unable to fully capitalize on the advantages of audiovisual materials, the population will suffer as a result.

The presentation aids in the transmission of psychomotor skills to pupils and can be a motivator in the classroom. This teaches students to be effective observers, stimulates hands-on learning, and demonstrates how to manage tools, equipment, and materials (Aliyu, 2020).

Agriculture education is both hands-on and engaging. Its scope and breadth could not be contained within a single field of study. It is highly inter-disciplinary, with concepts and approaches from one domain interconnected with those from another. Field trials are as important in agricultural education as field visits and field documentation. Where the use of audio-visual materials will be greater advantage to the agriculture sector (Nallusamy et al., 2015).

The agriculture science education program is designed to motivate and assist students in becoming intellectually informed in agriculture, as well as to produce competent and effective agriculturists with good mastery of content and methods. Where the subject combination of students had no effect on their academic

achievement of agricultural concepts, despite the fact that some studies revealed that subject combination has an effect on students' academic achievement. This can be control by integrating audio-visual materials into the studies of agriculture science at SHS (Olajumoke & Kayode, 2022).

Agriculture science teaching and learning in senior high schools should expose students to practical knowledge that will help them develop the necessary skills, abilities, and principles for agricultural production in the country (Naab et al., 2013).

The students are encouraged to develop an interest in and awareness of the opportunities available in the agriculture sector, to broaden their understanding of agriculture and its relevance at the household and national levels, and to demonstrate that agriculture is a profitable and dignified profession that aims to improve the learners' knowledge and skills. (Jonah, 2015).

Education is made up of two parts: inputs and outputs. Inputs are human and material materials, whereas outputs are the educational process's goals and outcomes. Audiovisual materials, for example, are essential for teaching any subject in the school curriculum (Bel-Ann Ordu, 2021)

A well-planned and imaginative use of audiovisual aids in lessons should help to supplement the inadequacy of books while also arousing students' interest by giving them something practical to see and do while also helping to train them to think for themselves (Juliana, 2017).

2.4 The Benefits of Using the Audiovisual Materials in Teaching and Learning of Agriculture Science;

The revolution of technology has been influential in every aspect of life, where teaching and learning is not an exemption. Therefore, using the audio-visual elements in Agriculture Science studies has distinguished it from traditional methods of instruction. Where the audio-visual materials contributed significantly to the teaching and learning of Agriculture Science, which makes education easier and comfortable (Phoong et al., 2020).

The availability of computers and projectors in most SHS has made it simpler for Agriculture Science teachers to incorporate innovation into their teaching methods. (Abdullah & Mamun, 2014a).

Teachers of agricultural science placed more emphasis on the cognitive domain at the detriment of the other two domains in their teaching process. However, using the audio-visual materials in teaching and acquiring practical information in agricultural science contributes to the development of the psychomotor and the affective domains of the students (Sadiq et al., 2017).

Since both oral and visual manifestations are essential for effective communication in developing countries, the provision of audiovisual materials and associated equipment may be viewed as more important than the printed word (Bajrami & Ismaili, 2016). The availability of audiovisual materials in libraries has increased dramatically as a result of multimedia and computer-based information. Almost every library user or visitor has access to audiovisual, multimedia, and print resources (Oghenetega et al, 2014).

According to Afurobi et al, (2015) audio-visual materials allow teachers to investigate, negotiate, and communicate with others, which has the potential to improve lecture-teaching method of the Agriculture Science. And when these technologies are employed to promote learning, it allows students to participate in activities that provide understandable results. Hence, students can collaborate on content development and interact with peers through virtual experience.

It is critical to consider the learners' learning styles when using audiovisual materials in the learning process. Such as students who learn best by seeing and students who learn best by touching and feeling tangible or physical objects. Therefore, when characteristics of learners are considered, the primary learning method is identified as visual, which is the design in which a student learns visually (Shabiralyani et al., 2015a)

Students learning with Audio-visual materials have a strong visual sense and think primarily in terms of images. This made the students to recognize objects, distinguishes sizes and shapes, and perceives depth with ease. Therefore, the audiovisuals help students the most, which makes it easier to recognize or associate images with key vocabulary (Ulloa et al, 2018).

However, because of the nature of practical involvement during the study of agriculture as a course in SHS, students must see and hear everything that is involved in the teaching and learning of agriculture science using audiovisual materials (Prem, 2018)

One of the fundamentals of audiovisual materials is that effective teaching which necessitates the use of an appropriate method by the teacher. Audiovisual

materials should have distinct educational values and help students to achieve specific learning goals (Ashaver & Igyuve, 2013).

Using audio-visual materials to teach is an effective approach to keep students' attention on the lesson for the entire class period. Where students find it engaging when provided with photos relating to the subject and naturally focus on the teaching process of agriculture science(Bajrami & Ismaili, 2016). In addition, when the teacher integrates audio-visual materials in the educational process, it helps the personality development of students, which gives them the chance to speak, think and act without fear in the study of agriculture science (Alenizi, 2015).

Ready-made computer applications are available in the farm animals farming industry for tracking animals and storing and analyzing data such as age, health records, milk production, offspring productivity, and reproductive cycle status. This is commonly referred to as herd recording. Students in senior high schools must have this knowledge in order to maximize production in the country's agriculture sector (Pawan et al, 2022).

Students' low performance in agricultural science external examinations has been ascribed to their inability to deal with the practical parts of the exams. Since the audiovisual materials can open many senior high school students' minds and hearts to current practical or psychomotor learning of topics in agriculture, far more than the use of charts in classrooms(Noah Ekeyi, 2013).

The nature of the materials to be used determines the teaching approaches that support student-centered activities for improving thinking in agricultural science.

Certain aspects, such as what, when, and how to teach the topic, are critical to the effective teaching of practical agricultural science (Sadiq et al., 2017).

The availability of educational resources such as the audio-visual materials in the learning and teaching of agricultural science at SHS is one of the elements to success in academic achievement and participation. Where audiovisual materials are concrete or physical materials that provide sound, visual, or both to sense organs during the teaching and learning process. (Padhi, 2021).

Educational resources provide students with a self-directed, learner-controlled, and personalized learning environment. Students did not assimilate for a longer period of time, resulting in a low learning outcome in their academic achievement (Shute & Rahimi, 2017).

The inappropriate use of audiovisual materials as of the key components of the educational resources in senior high schools has resulted in a low application of agricultural science knowledge and related practical subjects for the growth and development of most African countries (Olajumoke & Kayode, 2022).

Audiovisual materials are applied to reinforce ideas and concepts learned in the classroom. This help with the development, imagination, and observation of the teacher's and students' abilities. Where imaginations are not self-sustaining, rather, they serve as training aids. This means that the audiovisual materials help to supplement or reinforce learning (Juliana, 2017).

The formation of pleasant psychological conditions is one of the most essential areas for any agriculture science learning efficiency, in which visualization is

critical. Meanwhile, in contemporary teaching activity, teachers' attention to students' figurative-emotional spheres is insufficient (Pisarenko, 2017).

The idea of moving from explanatory and illustrative pedagogics to a structurally new direction in training theory serves as a catalyst for incorporating visualization into the educational process. The use of imaging results in the creation of a more psychologically comfortable and safe educational environment for students (Keith et al., 2021).

The audiovisual materials, as a component of information and communication technology (ICT), have become an important factor in the development of agriculture science education in the twenty-first century. This transfer of technologies designed to handle information and adapt it to the classroom teaching-cum-learning (CTL) module has grown rapidly and improved (Saidu et al., 2017).

Blackboards, which were once commonplace in classrooms, were eventually replaced by whiteboards and marker pens. Classrooms are increasingly being outfitted with interactive whiteboards that are linked to a computer and projector (Coley et al., 2015).

It should be noted that the chalk and talk mode of teaching is not eliminated, but rather modified through the use of ICT tools in agriculture science teaching and learning (Nallusamy et al., 2015).

Education's integration into real-world issues has long been a source of contention. Students benefit from understanding how to carry out a strategy, why

the strategy works, and where the strategy works. This will help students to learn more effectively if they understand how subjects apply to their future lives in the classroom using audio-visual materials (Auwal, 2013).

Following the results of teachers' roles in assigning values to students' activities, learning and teaching activities become more interesting when instructional materials are used quickly and successfully, particularly in agriculture science classroom settings. And teachers who used audiovisual aids as instructional tools make teaching more engaging and capture learners' attention for effective learning (Phoong et al., 2020).

Audio-visual aids are instructional materials that use images rather than words to convey meaning. This material is also a structure, or body of substance, that can be useful in the teaching and learning process (Sam-Kayode et al., 2020).

Audiovisual materials are not only widely used; they have also been shown to be an effective method of teaching agriculture science to all learners, both inside and outside the classroom. However, teachers will have more opportunities to incorporate online materials and videos into traditional classroom settings, making both learning and teaching more interesting and meaningful (Ulloa et al., 2018b).

Audiovisual materials such as films, TV shows, and songs provide genuine and original input. This can be used to present content, initiate discussion, illustrate a specific topic or content, and in self-study and examination situations in a variety

of instructional and teaching settings, including the classroom (Bajrami & Ismaili, 2016).

Audiovisual resources are now regarded as playing an important role in making teaching and learning permanent. This provides the assistance to facilitate the acquisition, retention, and recall of lessons learned because they appear to induce the magnitude intensity of the entire organism to the situations in which learning occurs (Juliana, 2017).

The audio-visual materials are important in the teaching and learning processes because, after seeing something, most people remember it, and whatever that thing was, it evokes an image at the mention of it and can be freely discussed (Chukwueke & Oluwabunmi, 2022a).

Teachers can use audio-visual materials to make significant changes in the classroom environment and teaching process. Teachers can communicate a topic both verbally and visually in the classroom utilizing audio-visual materials, which helps students to pay more attention in class. These teachers may connect verbal and nonverbal communication, as well as abstract and concrete difficulties (Bozkurt, 2020).

There are some abstract concepts in agriculture science that are difficult to explain orally in which the students may struggle to understand what the teacher is saying since the topic is unclear. However, teachers can use audio-visual materials to help students absorb concepts more quickly (Abdullah & Mamun, 2014).

The use of instructional media in agriculture science teaching and learning helps both teachers and students learn more effectively. This promotes effective communication between students and teachers by improving classroom relationships. It also allows students to remember and recall what they have learnt (Intan et al., 2022).

When audiovisual resources are used as a supplement to traditional methods of teaching and studying agriculture science, the students pay greater attention because the inclusion of audio-visual materials increase their interest and boosts their attention in the learning process. The retention of students is considerably greater when the teacher teaches agriculture science using visual examples and instructional technologies (Khatoon, 2012).

Where slides, videos, filmstrips, and projectors can be used to bring the agriculture of different nations into the classroom, audio-visual tools assist teachers in overcoming physical barriers in presenting subject matter. However, this elicit maximal response of the entire body to the settings in which learning is done, this facilitates the acquisition, retention, and recall of lessons acquired. Where students can acquire communication skills while actively engaged in addressing important challenges in farm science using audio-visual tools (Ikpe, 2018).

In addition, the teaching and learning process stimulate more than one senses of students, which increases both productivity and the durability of learning the agriculture science. Audio-visual materials give students a real sense that keeps

their attention and improves their knowledge of historical events in the agriculture science (Marafa, 2020).

Teachers used the visual and auditory senses to appeal to the mind, which allows agriculture science students to convey knowledge in a more professional and consistent manner. This supports the teacher's efforts and help in the study of textbooks (Owusu, 2020).

According to Bulut, (2019), 83 percent of learning occurs through sight, 11 percent through hearing, 3.5 percent through smelling, 1.5 percent through touching, and 1 percent through tasting. If students actively participate in the learning process and their senses of sight and hearing are engaged, learning, which is defined as long-term behavioral change because of an individual's experience, can be considerably more productive and long lasting.

The integration of audio-visual materials in the teaching and learning process of agriculture science allows students to be stimulated in more than one sense. As a result, vision is one of the most important senses for learning (Chukwueke & Oluwabunmi, 2022).

While some ideas and instructional purposes will be simple for students to comprehend, others will necessitate creative thinking to guarantee that critical learning objectives are accomplished. One strategy to improve lesson plans and give students alternative ways to assimilate agriculture science subject is to use audiovisual materials in the classroom (U. Oghenetega & Sarah, 2014).

Audio-visual materials make agriculture science learning real, living, and vital by cementing the knowledge to be conveyed. All learning is built on the foundation of portraying senses and sensible objects in a way that allows them to be easily appreciated (Owusu, 2020).

The lecture form of teaching is typically one-way, with little or no audience engagement, as a result, there is confusion, information loss, and poor recall among students in the learning process of the subject. However, teaching methods must adapt to match the demands of a modern society that demands students who are capable of functioning, thinking, and making decisions. As a result, the choice of an effective teaching approach is critical to the success of the teaching and learning process of agriculture science (Auwal, 2013).

The teaching and learning process of agriculture science has a direct impact on the practical knowledge of students, in order to maximize agricultural production (Ashaver & Igyuve, 2013).

Today's students are divided into virtual age groups, who interact with video games, online learning, and computerized programming in a variety of settings, including classrooms, Internet cafes, and their own homes. Whereas teachers employ audio-visual tools such as models, video presentations, and PowerPoint slide shows in classroom sessions for the teaching of agriculture as a practical subject to contribute to this part of learning (Abubakar et al., 2021).

The audio-visual materials are extremely important in directing a student's attention to the teacher or the topic at hand. The five senses of a human being serve as a portal to effective learning; seeing, hearing, and touching aid in the

effective acquisition of information and hence knowledge (Akraam & Malik, 2017).

When teachers bring video materials into their classrooms, students can directly acquire a large amount of agricultural background information as well as emotional attitudes toward the learning materials. As a result, they could exercise their autonomy during the teaching and learning process. While watching the video materials, students can try to involve themselves in the imaginative atmosphere created by them and understand the pragmatics of the language used by the characters. In contrast to traditional agriculture science education, which truly employs student-centered teaching strategies (Bajrami & Ismaili, 2016).

As a result of the developmental stages of children, the continuous professional development (CPD) programme for teachers is important for teachers in SHS. Where Senior high school teachers attend such CPD to keep up with the demands of a constantly changing technology used in the educating and acquiring knowledge of agriculture science through the use of audiovisual materials (Osei-Owusu, 2020).

Teachers must contend with astute technologically adept kids, as well as curious students, to increase their professional prospects for advancement at work. At the senior high schools, there are significantly higher demands for teacher CPD in the areas of teaching and learning agriculture science (Kyei & Osei-Mensah, 2019).

Prem, (2018) stated that, when audio-visual materials are used effectively and efficiently in a classroom setting, teaching and learning activities become more engaging. However, audio-visual materials enable a wide variety of sensory

experiences to amplify and reinforce topics provided in a textbook while also developing teaching skills. As a result, audio-visual materials are critical in making teaching and learning process result-oriented, simple, effective and engaging for both teachers and students.

Some children are born with special needs that are not shared by all children. Such condition could be due to a physical problem, developmental delays, learning problems, mental illness, or even youngsters with extremely high intelligence who need to learn agriculture science in senior high school. Therefore, teacher of students with special needs must be familiar with the use of modern technology in the delivery of agriculture science lessons (Sediyani & Hadi, 2017).

Audiovisual materials are important and necessary tools for teaching and learning subjects like agriculture science in order to improve teacher efficiency and student performance. Furthermore, when audiovisual materials are used, both teachers and students are motivated to participate actively and effectively in lesson content areas (Intan et al., 2022).

The use of audiovisual materials facilitates the process of acquiring knowledge and skills as well as the development of confidence of students in the learning agriculture science. These materials are components of the teaching and learning materials (TLMs) that are appealing to the senses of hearing and seeing and are used for practical demonstrations in the classroom to help teachers present lessons to students by allowing clearer explanations of the subject in logical ways (Sam-Kayode et al., 2020).

The audiovisual materials serve as a foundation for planning, structuring, and energizing the syllabus of agriculture science. Since it saves time and energy to improve the performance of teachers in teaching agriculture science (Keith et al., 2021).

The primary goal of agriculture education should be to encourage students to pursue learning, which can be accomplished with audio-visual resources, which boost individual students' learning capacities, resulting in a memorable learning experience. Therefore, integrating audiovisual elements into the teaching of agriculture science improves students' retention (Khatoon, 2012).

The audio-visual materials are extremely useful in supporting agriculture science teaching and learning. It has been created by relying on modern agricultural technology to make learning dynamic, experience-based, and more realistic, because it is exciting, demanding, and encouraging to watch and listen to the practical side of the subject, which makes students grasp the knowledge of agriculture science using the audiovisual materials (Asadi, 2015).

Furthermore, improving the thinking capacity of students, logic, innovative, and the development of an inquisitive mind are all outcomes of activity-based learning, which is the true goal of education. Where the audio-visual materials involve the actions for both the teacher and the students, which keeps them focused and encourages thinking and questioning, resulting in a proper understanding of what is being taught in the classroom (Birinci & Sariçoban, 2021).

The audio-visual material is that which contains messages in an aural form that can only be heard and which can evoke the imagination of the listener. Where still photos (still pictures) and moving images (motion pictures) can be projected to provide a glimpse of each agricultural activity that was photographed (Sediyani & Hadi, 2017).

Audiovisual materials are equipment used in classrooms to help in teaching and learning process of agriculture science by making it easier and memorable more. These materials are the most powerful learning material for effective education and knowledge transmission. As a result, the technological devices have a greater influence and provide a more dynamic information system in Agriculture Science teaching and learning in the Sagnarigu Municipality (Akraam & Malik, 2017).

Audiovisual materials not only pique the interest of teachers and students, but they help clarify the subject matter and make studying more enjoyable. Where the video content of this materials improves the value of the classes by making them more entertaining and the instructional content easier to understand (Keith et al., 2021). The audio-visual elements assist the teacher to clarify, establish, correlate, and coordinate precise concepts, interpretations, and appreciations while also making learning more successful (Milosevic, 2012).

When AV materials are used, students have a lot of freedom to move around, talk, laugh, and comment on what they've seen and heard from the material. As a result, in such circumstances, students will work because they want to work rather than because the teacher asks them to (Ayinla, 2016).

Learning becomes very easy and faster using the audiovisual process in teaching agriculture science than the verbal explanation alone. Which indicates a need for senior high schools to effectively use audiovisual materials in their lesson's delivery (Ashaver & Igyuve, 2013).

Audio-visual resources, unlike professional texts, which might be full of ambiguity, abstract terms, and meanings, can give real examples and remove the doubt from Agriculture Science. This is accomplishing with a film that contains a variety of agricultural practices including both plants and animals. Abstract thoughts that are complemented by actual visual presentations might be made more understandable to the audience in this way (Milosevic, 2012).

The audiovisual materials significantly raise learners' interest and assist teachers in explaining the concepts and theories of Agriculture Science to each student's understanding (Grade, 2019).

The primary goal of incorporating audiovisual materials into agricultural teaching and learning is to provide students with the knowledge, attitude, practice, and abilities required to perform agricultural and farming duties. Training in agriculture skills is also expected to inspire and cultivate entrepreneurial abilities in senior high school students (Diise, Zakaria, et al., 2018a)

Teachers must choose and employ a wide range of teaching tactics to be successful. For teaching practical subjects such as Agricultural Science, demonstration and conversation are the most effective methods (Noah Ekeyi, 2013). Because it can be very useful for explaining topics in class and society, the demonstration technique using audiovisual resources is usually effective in

teaching agriculture sciences, as well as disciplines within vocational and technical education (Auwal, 2013).

Audiovisual materials are said to be advantageous to learning because the human mind's audiovisual processing pathways register pictures, words, and sounds in sensory memory. This is accomplished through the agricultural science cognitive approach of audiovisual education and learning. Where images and texts that gain entry to the eyes and ears, according to the concept, are stored in the visual and auditory modes of short attention span (Chen et al., 2020).

The cognitive perspective resulted in assimilation as learning consolidates, bringing the verbal and pictorial models together with prior knowledge in a lot of influence. Students in rural schools can achieve greater learning potential if the right conditions are in place (Tang et al, 2018c)

Audiovisual materials can influence education delivery and increase access to agricultural science studies. This increase flexibility because learners can access education regardless of time or location. However, the audio-visual materials can also have an impact on how students are taught and learn. Where the integration of audiovisual materials in the classroom is still difficult for some teachers because it requires training and practice (Coley et al., 2015).

A teaching method is to demonstrate things, events, rules, and sequences of activities that are relevant to the subject matter or topic to be taught, either directly or through instructional media (Bel-Ann Ordu, 2021).

The goal of employing a demonstration strategy to educate is to demonstrate the process of an event occurring in accordance with the teaching materials, how they are obtained, and how simple they are for students to understand during the teaching and learning process (Ramadhan & Surya, 2017).

Visual teaching of the subject advocates the use of audiovisual tools to help learners understand abstract concepts in agriculture science. This can be accomplished efficiently by using audio-visual elements in teaching and learning as a means of transferring agricultural science knowledge to students (Dalid & Ode, 2014).

When audiovisual materials are used in the study of Agriculture Science in Senior High Schools, it integrates students' learning in the instructional process, because when students look at a visual model or aid, it is measured as a form of addition to the student's and teacher's knowledge (Grade, 2019).

2.5: Factors Affecting the Use of Audiovisual Materials in Teaching and Learning of Agriculture Science.

Education is the major instrument to the growth and development of almost all countries, which cannot obtain without sustainable investment in human capital through teaching and learning (Apaliya, 2019).

It is critical to emphasize the importance of audiovisual technology in Western educational and research institutions. Despite the importance of AV resources in the teaching and learning process, preliminary observations show that most African educational institutions have little AV resources or do not appear to be adopting the technology at all. Because most of these materials are very

expensive, this is the result of insufficient education funding in Africa (Chukwueke & Oluwabunmi, 2022a)

The use of audio-visual materials in agriculture is hampered by a lack of hardware and software infrastructure, training and skills, and research priorities. Once these barriers are overcome, audio-visual materials usage expands beyond automation and software application (Pawan et al, 2022).

The teaching and learning methods are the keys to an individual's success and advancement in agriculture science education if well planned. As a result, there is a need to use teaching aids, also known as audiovisual resources, to improve effective teaching and learning of agriculture science (Dalid & Ode, 2014).

While it is well understood that adequate audiovisual materials improve learning by offering environment to encourage students to practice what they learn from the study of agriculture science. However, it’s uncertain how the materials can be used to teach agriculture science in senior high schools within the rural communities. Where rural senior high schools face a lack of technological resources to support the use of audiovisual resources in regular in the acquisition of agriculture science (Bel-Ann Ordu, 2021).

Inadequate access to audiovisual materials and services leads to ineffective broadcasting of agricultural knowledge and information using audiovisual materials, which must be addressed. This confirms the existence of these barriers to the use of audiovisual materials in the learning and teaching of agriculture science in the Sagnarigu municipality's senior high schools (Saidu et al., 2017).

To make learning more vivid, logical, realistic, and pragmatic, effective teaching and learning require the use of audiovisual aids and practical activities, which support the sense organs in the teaching and learning processes (Sam-Kayode et al., 2020).

One of the main challenges to the effective use of audio-visual materials is the teacher's inability to effectively use visual aids such as images in their lesson delivery. Where there is a lack of knowledge required to locate relevant photographs and other resources in order to offer appropriate content to their students (Ingavelez-Guerra et al., 2022).

Teachers with little knowledge of the audio-materials are hesitant to introduce new experiments into the standard teaching methods they are familiar to, and as a result, they are unable to select and use the appropriate audio-visual equipment in their classroom (Alenizi, 2015).

Diise, Zakaria, et al., (2018) observed that agriculture science graduates in Ghana mostly lacked the needed skills in basic agriculture practices making them unable to involve in agricultural production as professionals. However, this has been attributed to an ineffective teaching and learning of agriculture science in the senior high schools, unskilled agriculture science teachers and inadequate teaching and learning materials (TLMs) such as the audiovisual materials in the senior high schools.

Another factor influencing the integration of audiovisual materials in agricultural education has revealed that teachers use technology but not to its full potential.

This is despite the fact that technology is more readily available and used in today's classroom (Coley et al., 2015).

When attempting to incorporate audiovisual materials into teaching agriculture science, teachers commonly encountered difficulties such as a lack of resources and poor internet connectivity. This affects the effectiveness of the use of audio-visual materials in agriculture science education (Oyewale et al., 2021).

Investigating the extent at which audiovisual materials affect student learning in rural schools, and the difficulties met in introducing the materials will be beneficial. As a result of inadequate funding, a little is done to overcome these challenges in order to improve the quality of teaching and learning in rural schools. Thereby, closing the success gap between students in urban and rural schools (Tang & Intai, 2018c).

The recent challenges with using audiovisual materials revolve around scientific advances approaches. These challenges are constantly changing and becoming more complex because application methods rely on modern science, technology, information, and communication technologies (ICT) (Ali, 2016). A variety of modern technical support stands alongside a variety of methodological approaches to audiovisual aid application, depending on the conditions and tasks of their application (Shabiralyani et al., 2015b)

The growth of social networks, the internet, and communication networks broadens the opportunities for using audiovisual teaching aids. Where YouTube videos as a social network are used in lectures, training sessions, and lab sessions (Zeleke & Kibret, 2022). Public information sources, according to scientists,

permit learners to extend their learning process and integrate it with their creative and independent activities. (Akhmetshin et al., 2019).

When employing audio-visual material in the classroom, the teacher must always keep the objectives of the lesson in mind. The objective cannot be achieving if the materials are not carefully selected. Language level of the materials may not always be acceptable for the students. As a result, the materials are incomprehensible to the students, thereby raising students' anxiety levels (Intan et al., 2022). Furthermore, audio-visual materials that are unrelated to the subject content may mislead and confuse students. As a result, teachers must exercise caution when selecting audio-visual content for their students (Abdullah & Mamun, 2014).

Due to lack of audio-visual materials in senior high schools, it appears that the current condition of teaching agriculture science generally excludes the use of these tools. Which results into a disconnection between what students' study in senior high schools and what they do as agriculture science students after gradution (Bagheri et al, 2020).

Senior high school students are highly addicted to social media networks, spending more time on them than on academic activities, which negatively affects their academic performance in the studies of agriculture science (Zeleke & Kibret, 2022).

According to Onuoha, (2020) students and teachers cannot see the audiovisual materials as they would in a traditional setting where resources are physically available for browsing and use. Even if these resources were available, this does

not necessarily guarantee access to them; thus, resource availability is not conterminous with resource accessibility. Only when these resources are readily available and accessible can they be discussed.

Teaching entails creating an environment and activities that successfully encourage students to learn. This is improved by technology such as slides, video, and computers, but many classrooms are under-equipped. When the physical and technical conditions in Agriculture Science classrooms are bad, a teacher has no choice but to resign from employing audio-visuals that require technology (Darko et al., 2016).

However, it is self-evident that a secure, comfortable, and appealing classroom enhances learning and aids in the formation of a classroom community. Which is contributory factor to the ineffectiveness of the use of audio-visual materials in agriculture science education (Domin, 2018).

The continuous professional development (CPD) programme, which are designed to be a cyclical lifelong experience after completing the teacher education curriculum has not been sufficiently organized for teachers at the senior high schools to satisfy their needs in agriculture science departments, resulting in insufficient use of audiovisual resources in the teaching and learning process of the subject (Kyei & Osei-Mensah, 2019).

The importance of computers in education and the priority it should be given in the allocation of scarce educational resources is growing at senior high schools, resulting in an insufficient usage of audiovisual materials in the educational process of agriculture (Cawthera, 2019).

There are numerous impediments such lack audio-visual materials and technical support, and inadequate time for planning a lesson, to integrating technology into agriculture science. These difficulties are frequently cited as reasons why teachers struggle to use technology effectively in their lesson delivery (Coley et al., 2015).

The digression of resources for personal gain and at the expense of agriculture science education, has hampered the provision of educational materials to Senior High Schools for proper studies of agriculture and its related subjects. This combined with concept that government property belongs to no one, has resulted in a complete lack of teaching materials and infrastructure (Ikpe, 2018).

Two major constraints have been identified as preventing the successful incorporation of audiovisual materials into agricultural science studies. This includes both technical and psychological elements. While the technical components concern with the degree of accuracy and precision that can be achieved with improved educational resources, the psychological elements concern with the teachers' ability to create resources while providing appropriate learning experiences to their students (Juliana, 2017).

Despite global efforts to promote access to information in all formats, little progress has been made, particularly in most developing countries. However, as a result of challenges such as power failure, machine breakdowns, and a lack of spare parts and technicians, which occasionally stall the effectiveness of technology and information storage and transfer gadgets, such as audiovisual materials in senior high schools. This has greatly affected agriculture science education in the SHS (Onuoha, 2020).

The challenges associated with agriculture science teachers' use of audiovisual materials in SHS include erratic power supply, poor internet services, incompetence of science teachers and students, a lack of maintenance culture, high cost of audiovisual materials, insufficient knowledge of appropriate instructional software packages, and poor audiovisual policy implementation strategies (Marafa, 2020).

While there are numerous advantages to using audio-visual resources in the teaching and learning of agriculture, there are some peculiarities to it, a substantial number of teachers lack proper professional training to use of the audio-visual materials, and this is a key difficulty weighing against the effective use of audio-visual resources (Ho et al., 2018).

Audiovisual materials will not have the desired effect if they are used incompetently, without the required methodological preparation and teaching materials, and in violation of psychological and pedagogical requirements (Owusu, 2020).

Many scientists believe that the effectiveness of audiovisual materials application is determined by factors such as methodological preparation, teacher technical support knowledge, innovation technology application, and teacher innovation (Shabiralyani et al., 2015).

Furthermore, scientists have identified the following challenges that any teacher may face when using audiovisual teaching materials: poor equipment maintenance, inept use of technical means, and the issue of selecting audio and

video content. Some of these factors have had an impact on senior high school teaching and learning (Akhmetshin et al., 2019).

It takes time to develop and implement audiovisual technology in agricultural science education. It should be noted that creating audiovisual materials requires a significant amount of time and effort. Where the teachers are in charge of developing the technology, adapting it to the unique conditions of the educational process, creating the conditions for its successful implementation, and analyzing the results of its implementation (Smutny & Schreiberova, 2020).

The availability and functionality of technical training tools is critical to the successful implementation of audiovisual materials. This type of technology is not possible without the proper equipment implementation. This means that the teacher must have access to the necessary educational technology. It is quite difficult and may present additional difficulties to students (Pisarenko, 2017).

Another significant impediment to efficient teaching material use in teaching is that most educational equipment is either increasingly obsolete or deteriorating and decaying due to a lack of a maintenance culture (Ikpe, 2018).

The broad sense insufficient technical and marketable abilities of agricultural science students clearly show the ineffectiveness of practical skill acquisition due to issues challenging school officials and teachers in the teaching of practical agricultural skills, which inhibits them from successfully engaging in agriculture enterprise (Diise et al., 2018).

It is extremely uncommon to find audio-visual materials that are acceptable for the age group of students. Teachers are frequently unaware of specific audiovisual materials that are best suited for young children, adults, and students in senior high schools. If flashcards or pictorials are fine for elementary children, but a teacher chooses them for senior high school students, they will undoubtedly be inappropriate (Keller, 2016). When using audio-visual aids, teachers underestimate the importance of explanation and instead assume that the aids are self-explanatory. However, the explanation is required at all levels of learning (Khatoon, 2012).

Due to time constraints, a teacher cannot be expected to generate a new collection of images for each subject on the curriculum. This compels the teachers to teach without audio-visual materials, but inspiring a class with just chalk and talk or a textbook alone can be difficult (Domin, 2018.).

However, research have revealed that SHS agriculture students receive relatively little emphasis on practical skill acquisition, severely limiting agricultural students' competency and employability (Naab et al., 2013). Inadequate TLMs, under-motivated teachers, and students' negative attitudes toward agricultural practice have all been blamed for agricultural students' poor training (Sefa-Nyarko et al., 2018).

Inadequate TLMs, ill-equipped school laboratories, school farms and gardens, and inadequate agricultural practice funding all obstruct practical teaching of agricultural science in Ghana's SHSs, but these obstacles are easily overcome with

the use of audio-visual materials in agriculture science teaching and learning (Diise et al., 2018).

Teachers must be skilled in the use of audiovisual technology and its integration into classroom activities in order to improve students' thinking and creativity. Teachers must also learn how to help and encourage their students by holding them accountable for their progress (Tairu, 2018).

Inadequate practical agriculture teaching and learning, inept agricultural teachers, and a scarcity of basic teaching and learning resources such as audiovisual materials all make a contribution to the situation of unskilled agricultural graduates (Diise et al, 2018).

The teacher is crucial to all students' academic advancement, and great attention must be paid to the resources utilized in his or her teaching and learning process, such as audio-visual aids for farm science lectures. Therefore, the ineffectiveness of using the audio-visual materials is as a result of the problems that the teachers in the agriculture science department encounter (Ho et al., 2018).

The factors influencing the usage of audio-visual resources have been investigated from an intellectual standpoint, involving significant practical and technological aspects of Agriculture Science. To be precise, techniques cannot and should not be separated from teaching (Ikpe, 2018).

The audio-visual materials yield the best results when they are used in agricultural science studies with dynamic teaching methods, but many challenges slow down their ability to yield good results (Shute & Rahimi, 2017). Some of the agriculture

science teachers do not have the adequate knowledge and skills to use the materials properly, which leads to inadequate use of the audio-visual materials in the agricultural science department (Screven et al., 2017).

The inadequate audio-visual materials in the school that is required to establish the essential learning setting and environment for skill acquisition is putting students' competency and future employability at risk within the agriculture sector. The value of blended learning, which stresses students seeing and hearing what they have learned, aids in the development of a wide range of agricultural practical skills in students (Diise et al, 2018).

The curriculum design gives no opportunity for an additional activity besides the syllabus, therefore, increases the amount of workload and stress for the teachers who want to add short video sessions about the topic under discussion (Milosevic, 2012).

Senior High Schools in recent times had a significant number of students per stream in each agricultural science class, and with each class having more than one stream. Where computer hard wares and soft wares are insufficient for a class, for agriculture science teaching and learning (Tairu Idris, 2018).

Technical constraints in the schools cause some challenges in using the audiovisual materials due to unavailability of the internet, inadequate computer capacity, poor electrical connectivity, and the incompetence of Agriculture Science teachers in using audio-visual materials for the teaching and learning of agriculture science within the Senior High Schools (Şahin et al., 2016).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methods and processes that was used for the study. It begins with a description of the research design for the study, then proceeds to a research population, sample and sampling technique, research instruments, data collection procedure, and data ethical guidelines. The study's data processing and analysis are covered in the final sections of the chapter.

3.1 Research design

The study adopted a cross-sectional survey design. This was because the study was to be conducted within a short period of time. The cross-sectional design refers to the collection of data on sample at a particular point in time or short period of time in order to collect a body of measurable data in relation to two or more variables, which is then examined to find patterns of correlation (Bryman, 2018).

A quantitative approach was used to collect the data for the study, and a data analysis was performed using chi-square test, frequencies, and percentages. The quantitative approach entails the use and analysis of numerical data to answer questions using specific statistical techniques (Apuke, 2017).

Furthermore, when collecting the data, a questionnaire was employed as the primary tool, which was created to examine and create relationships among the study's important factors. The design's advantage was that it allows researchers to

look at numerous characteristics at once, and the respondents are less likely to quit the study before data is fully collected.

3.2 Study population

The research population included Agriculture Science teachers and students from three senior high schools. These included Tamale Senior High School, Kalipohini Senior High School, and Tamale Islamic Senior High School in the Sagnarigu Municipality of Ghana's Northern Region.

3.3 Sample size determination

The study used Andrew Fisher's formula for determining sample size based on a confidence interval of 0.06 for the data, a confidence level of 95%, which was converted to 1.96 using the Z-score table, and a standard deviation of 0.5. Which was involved in the process of determining the sample size of 268 respondents for the study by taking into account the appropriate study population. Andrew Fisher's formula was used for the sample size determination because a cross-sectional survey design was adopted for the study.

This sample size represents 255 students from all of the Senior High Schools chosen, as well as 13 teachers. Following the calculation of the sample size, multistage and random sampling techniques were used to select the study's respondents.

The sample size was calculated mathematically using the formula:

$$\text{Sample size} = \frac{(\text{Z-score})^2 \times \text{StdDev} \times (1 - \text{StdDev})}{(\text{Confidence interval})^2}$$

Where Z-score indicates the percentage of probability, or certainty, that the confidence interval contains the true population parameter when the researcher draws a random sample many times. It is expressed as a percentage and indicates how frequently the percentage of the population who would choose an answer fall within the confidence interval (Nnodim et al., 2021)

The standard deviation (StdDev) measures a data set's distribution from its mean. When determining sample size, the standard deviation can be used to measure how much the responses will diverge from each other and the mean number, and the standard deviation of a sample can be used to measure the standard deviation of a population. The confidence interval, also known as the margin of error, determines the level of uncertainty in a sampling process as well as the level of uncertainty in each statistic. (Wan et al., 2014).

In summary, the confidence interval indicates how certain the researcher's study findings are of what would be expected to discover if the entire population being studied could be surveyed.

Hence, Sample size = $\frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.06)^2}$

$= \frac{3.8416 \times 0.5 \times 0.5}{0.00358}$

$= \frac{0.9604}{0.00358}$

$= 268.27$

$= 268$

3.4 Sampling procedure

The sample was generated using a convenient sampling and a simple random sampling technique. The sampled schools were first chosen using a convenient sampling technique from the Senior High Schools in the Sagnarigu Municipality. Convenience sampling is a method of sampling where the researcher utilizes a sample which is readily available and they have access to within the study area of the research (Thomas, 2022).

Three out of the seven senior high schools within the Sagnarigu Municipality were sampled as the schools studying Agriculture Science as a course, using the convenience sampling technique. The Senior High Schools sampled were Tamale Senior High School (TAMASCO), Tamale Islamic SHS (TISSEC), and Kalipohini SHS (KALISCO).

A sample size of 268 respondents were chosen using the simple random sampling technique from a target population of 322 respondents, which included both teachers and students in the Agriculture Science departments of the Senior High Schools sampled for the study. Simple random sampling is a probability sampling procedure that allows researchers to select participants for their study at random and without bias (Golzar, 2022).

The sample included 83.2% of the total target population. Although only about 16.8% of the target population was represented among the Agriculture Science teachers and students at the three selected schools, some of whom were National Service Personals, as well as newcomers, who may be unable to provide the necessary data for the study (European Commission, 2019). As a result, such teachers and students were prevented from taking part in the study.

The respondents for the study were chosen based on the proportions of both permanent Agriculture Science teachers and continuing students who take Agriculture Science as a course in school, specifically second year students.

The researcher wrote letters 'A' and 'B' on different pieces of paper and shook them several times in a polythene bag. Prospective respondents were asked to pick a letter at random from a polythene bag after each shake. Those who chose the letter A were chosen for the study. The number of papers with the letter A was the required number for the research, whereas the papers with the letter B were less than the required number of respondents for the research. And those who picked the letter ‘A’ were selected for the research. This was done to provide each prospective research volunteer an equal chance of being chosen.

3.5 Research Instruments

Research instruments are the tools for data collection, which include questionnaire, interview, observation and reading (Godfred Annum, 2017). A self-administered questionnaire was served as the data collection instrument. This is because, the questionnaire is a data collection instrument mostly used in a survey to elicit responses from respondents or research informants for the purpose of collecting data or information.

Two different sets of questionnaires were designed for the selected Senior High Schools, one for students and one for teachers. The teachers' questionnaire focused on how frequently the available audiovisual materials were used in the Agriculture Science department, as well as the benefits of using the materials for teaching and learning Agriculture Science, whereas the students' questionnaire was divided into four sections based on the study's research questions. Closed and open-ended topics, as well as 4-point Likert-type scale rating items, were included in the students' questionnaires.

Several of the scales were rated as strongly agree, agree, disagree, and strongly disagree based on the agreement. Others were rated as highly satisfied, satisfied, dissatisfied, and strongly dissatisfied on satisfaction levels, while others were rated as very frequent, often, not frequent, and not frequent at all on frequency and adequacy levels. The questions were designed to elicit information from students and teachers about the effectiveness of using audiovisual resources in teaching and learning agriculture science in senior high schools in Sagnarigu Municipality.

3.6 Data collection procedures

The process of gathering and measuring information on variables of interest in a systematic manner that allows one to answer stated research questions, test hypotheses, and evaluate outcomes is known as data collection (Muhammad & Kabir, 2016).

The researcher distributed copies of the questionnaire to the students and teachers that were selected. Before administering the questionnaire to the sampled respondents at the planned time, the researcher obtained permission from the selected schools' Headmasters/Headmistresses via letters, and permission was granted.

The goal of the study and the technique for responding to the questions in the questionnaire were communicated to the respondents by the researcher. The researcher did this to assist respondents in gaining better comprehension of the questions so that they could express their own independent opinions on them. The questionnaire was delivered to the respondents by the researcher, who was given an abundance of time (a maximum of one hour, 30 minutes) to complete and return it.

The 268 students and teachers who were selected to take part in the study all completed and returned their questionnaires (a 100% response rate). The distribution and collection of completed surveys from teachers and students took one week in total.

3.7 Reliability:

The extent to which the questions in a survey instrument consistently elicit the same findings when asked in the same situation on multiple occasions is referred to as reliability (Bryman, 2018). The questionnaires were pretested to ensure it was reliable by testing what it was intended to.

3.8 Validity:

The validity of a questionnaire is assessed by determining if the questionnaire measures has what it is designed to measure. It evaluates appearance of the questionnaire in terms of feasibility, readability, consistency of style and formatting, and clarity of the language used (Hamed, 2016). The questionnaire was valid since it included all the items that are essential and eliminate undesirable items to the understanding of the respondent.

3.9 Ethical consideration:

Consent was sought from respondents, and they were given enough information and assurances to participate in the research in order to allow them understand the implications of involvement and make a fully informed, considered, and freely given decision about whether or not to participate without any pressure or coercion.

4.0 Data analysis

The data was analyzed with Statistical Package for the Social Sciences (SPSS) version 2.0. The data was presented using a frequency distributive table, percentages, and Chi-square test. It was analyzed by the use of an appropriate descriptive statistic which allowed the use of numerical values to represent scores in the sample. Descriptive statistics assist in the understanding and description of a given set of data by offering concise observations and summaries about a sample, which can aid in the identification of a study's pattern. It can also be utilized as preliminary data to lay the groundwork for future study by describing basic problems or highlighting critical analyses in more complex studies (Brian and

Emily, 2017).

The data was presented based on the views and opinions of the respondents. They were given numerical scores to highlight the possible relationship in the respondents' responses before drawing the frequency list.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter contains findings as well as a detailed discussion of the findings. It examined the respondents' demographic information, the availability of audiovisual materials, the type of audiovisual material available in the schools, the level of usage of audiovisual material, the method of teaching, and the accessibility of audiovisual materials. Finally, the benefits of using the audiovisual materials and factors affecting the level of usage of audiovisual materials in teaching agriculture.

4.1 Demographic Characteristics of Respondents

4.1.1 Demographic Characteristics of Teachers

This section presents findings of selected demographic characteristics of the teachers sampled for the study. Which include sex, age, course studied at SHS, highest qualification and professional status of the respondents. Finally, the number of years in of teaching at Ghana education service (GES) was also measured to determine the experience of the teachers in the agriculture science department.

The results of the demographic information of the respondents shows that majority of the teachers representing a percentage of 84.6% were male while less than a quarter of them with a percentage of 15.4% were female. Many of the

teachers were also within 30 – 39 age brackets at a percentage 61.5% whiles 38.5% of them were 40 years and above. 84.6% of the respondents studied Agriculture Science at the Senior High School, whiles 7.7% studied General Arts and those who studied General Science back at the Senior High School were 7.7%.

The results indicated that more than half of the teachers at a percentage of 69.2% were degree holders, and less than half of them at a percentage of 30.8% were having their second degrees Whilst none of the teachers were either an HND holder or a PhD graduate.

This means that teachers teaching in these schools have the necessary qualification to deliver quality, efficient and effective service to the students. According to Gyeltshen (2021), teachers' experience and qualifications have a considerable and favorable influence on pupils' academic progress. This is because experienced and qualified teachers would have mastered the topic as well as well-honed classroom management abilities to cope with any type of classroom difficulty. The Table 4.1.1 below shows the demographic characteristics of the teachers in the agriculture science department who were sampled for the study.

Table 1: Demographic Information of Teachers.

Variable	Categories	Frequency	Percentages (%)
Sex of teacher	Male	11	84.6
	Female	2	15.4
Total		**13**	**100**
Age of teacher	30-39	8	61.5
	40+	5	38.5
Total		**13**	**100**
Course studied at SHS	Agricultural Science	11	84.6
	General Art	1	7.7
	General Science	1	7.7
Total		**13**	**100**
Highest qualification	HND	0	0
	Degree	9	69.2
	Masters	4	30.8
	PhD	0	0
Total		**13**	**100**
Teacher status	Professional	13	100.0
	Non-professional	0	0
Total		**13**	**100**

Source: Field Survey, 2022

4.1.2 Number of Years in Teaching Agriculture Science in Senior High Schools

The study's findings indicate the number of years teachers spent in the teaching profession, which can be used to assess teachers' experience in the agriculture science department. The researcher observed that 38.5% of the teachers have spent more years (11-20 year) in classroom as juxtaposed to relatively 30.8% teachers who have spent only a smaller number of year (1-10 years) in the teaching field.

The study's findings are consistent with those of Onyi and Aliyu (2016), who found that teachers with more years of experience in the classroom produced pupils with higher academic achievement. This is because these teachers are able to assist pupils to manage their brains and emotions in class, resulting in higher academic accomplishment.

To be successful, teachers must select and employ a variety of teaching strategies. Demonstration and conversation are the most effective methods for teaching practical subjects such as Agricultural Science. Since it can be very useful for explaining topics in class and society, the demonstration technique using audiovisual resources is generally effective in teaching agriculture sciences, as well as disciplines within vocational and technical education (Auwal, 2013).

The figure 4.1.2 below shows the number of years in teaching in GES by the teachers in the agriculture science department who were sampled for the study.

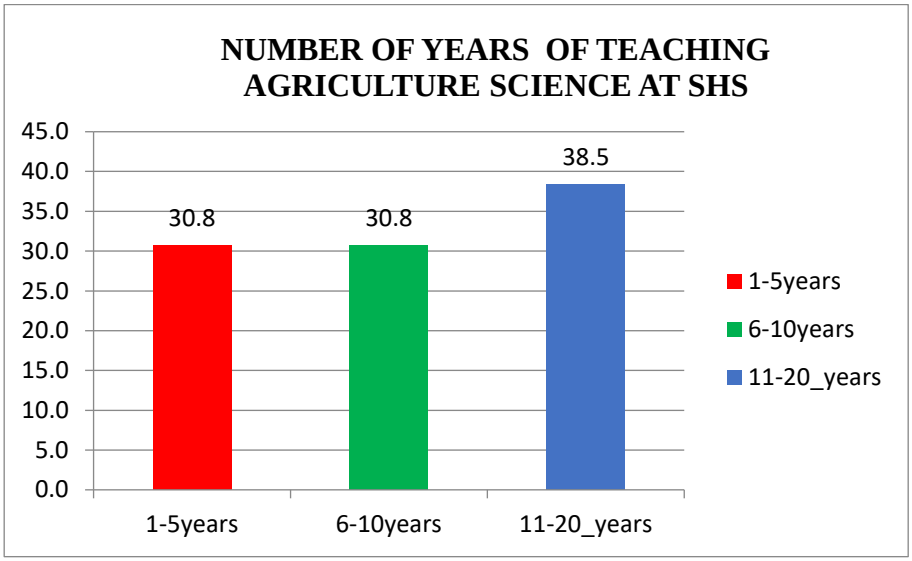


Figure 2: Number of Years of Teaching Agriculture Science at SHS

4.1.3 Demographic Characteristics of the Students

An analysis of student gender distribution revealed that the majority of participants, 60.5%, were males, with the remaining 39.5% being females.

Regarding age distribution, 68.6% of respondents were between the ages of 14 and 17, 31.4% were between the ages of 18 and 22, and none were over the age of 22. This study also found that all the students 100% who responded to the questionnaires were in year two.

Results on the residence of the respondents' shows that 63.1% of them were from urban areas where as the remaining 36.1% of the respondents were from rural areas. This indicates that most of the respondents will find teaching and learning easier with the technology within their environment.

According to Onoyase (2018) parents in the urban areas have the economic power to afford all the educational needs that are needed by their children in the school, such as books and other important learning materials.

In contrast to parents in urban areas, peasant farmers predominate in rural communities, which lack basic amenities such as piped water, electricity, adequate roads, and well-equipped schools. Where rural communities lack adequate educational facilities, which contributes immensely to poor teaching and poor academic performance (Oyewale et al., 2021).

The primary goal of incorporating audio-visual materials into practical agricultural teaching and learning is to provide students with the necessary knowledge, attitude, practice, and abilities to perform agricultural and farming duties. Agriculture practical skills training is also expected to inspire and cultivate entrepreneurial abilities in senior high school students. (Diise, Zakaria, et al., 2018a). The Table 4.1.3 below shows the demographic characteristics of the students in the agriculture science department who were sampled for the study.

Table 2: Demographic Characteristics of Students

Variable	Category	Frequency (%)	Percentage
Sex	Male	155	60.8
	Female	100	39.2
Age	14-18	175	68.6

	18-22	80	31.4
Class	Form 2	255	100
Residence	Rural Area	94	36.9
	Urban Area	161	63.1

Source: Field survey 2022.

4.2: Availability of Audiovisual Material in Teaching and Learning of Agriculture Science

4.2.1 Availability of Audiovisual Material to Teachers

The display of knowledge to be obtained through the viewing experience is referred to as the availability of audiovisuals. It refers to a way of spreading knowledge that is founded on the psychological notion that one has a greater comprehension of what he or she sees, hears, or discusses, while also functioning as a supplement to making learning objectives tangible and effective (Chukwueke & Oluwabunmi, 2022b).

The result of this study presents the availability of audiovisual material in the school using the frequency distributive table and the percentages. Which shows that almost all the respondents agreed that the audiovisual materials are available in the schools at a percentage of 92.3%. Whilst 7.7% of the respondents disagreed that, the audiovisual materials are available in the schools.

This confirms the findings of Diise et al., (2018) in which they noted that, when the available audiovisual materials are used in teaching and learning practical lessons to students, they are able to understand easily instead of using only the lecture method of teaching, which does not exhibit the practical component of the subject.

According to Milosevic, (2017) the world we live in today is continually evolving because of technological advancements that shape our daily routine and have become part of our existence. Where teachers incorporate the available high-tech achievements into their classrooms, as well as modernize the Agriculture Science lessons, to provide students with significant professional input and up-to-date knowledge of Agriculture.

The availability of audiovisual materials to achieve effectiveness in educational delivery and monitoring in the school system, as well as their gross inadequacy and underutilization, explain the need to upgrade and supplement sense organ deficiencies, as well as reinforce the capacity of dominant organs in the teaching and learning process. Basic materials such as a computer, projector, television, and video are not always readily available in many senior high schools. (SamKayode et al., 2020). The table 4.2.1 below shows the audiovisual materials available to teachers for use in teaching and learning agriculture science.

Table 3: Availability of Audiovisual material to Teachers

Variable	Categories	Frequency	Percentages
	Not available	1	7.7
Availability of AV			
	Available	12	92.3

Source: Field Survey, 2022.

4.2.2 Availability of Audiovisual Material to Students

The study results on the availability of audiovisual material in the schools under study using the frequency distributive table and the percentages, showed that 75.7% of the students confirmed that audiovisual materials are available in the schools sampled for the study. Among the total students studied, less than half at a percentage of 24.3% did not confirm to the availability of audiovisual material in their schools.

The accessibility and effective use of audiovisual materials in the teaching and learning process at the SHS, according to Abubakar et al., (2021), helps improve and increases the rate of education, freeing up time for teachers to engage in other tasks such as curriculum preparation, lesson note compilation, and so on.

The audiovisual materials can ensure proper lesson delivery in agriculture, which improves student skill development and retention in the subject. Effective utilization of the audio-visual resources in teaching and learning will shift the

method of teaching from "teacher-centered method" to a more inventive and enhanced method known as "child-centered method".

Through the use of audiovisual materials and other instructional methods, the child-centered technique engages students as active participants in the classroom by encouraging joyful learning (Ojobor et al., 2020). The Figure 4.2.1 below shows the availability of audiovisual materials to students in learning of agriculture science.

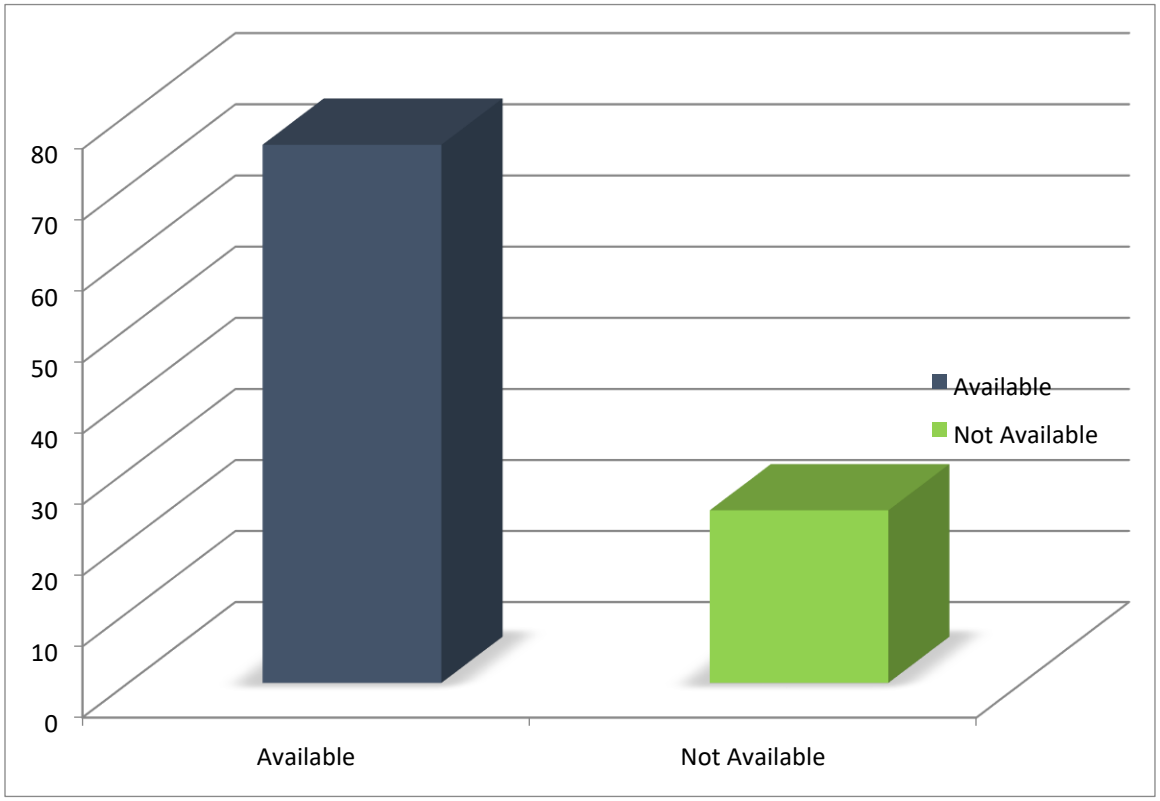


Figure 3: Availability of Audiovisual Material to Students

4.2.3 Type of Audiovisual Material Available to Teachers

This results of the type of audiovisual materials available in the schools using the frequency distributive table and the percentages, indicated that computers and

projectors were mostly available at percentage of 92.3% and 84.6% respectively. Where all the teachers used their mobile phones available to aid in their lesson delivery representing 100% of the respondents. Due to the limited number of televisions in the schools, none of the teachers uses television in the teaching and learning process. Whilst all teachers had used other teaching and learning materials (TLMs) aside the audiovisual materials.

Audiovisual materials include print and non-print media; projected & non-projected media; and hardware and software needed for transmission of information and instruction. Since these materials incorporate the audio, either visual or both the audiovisual elements they provide multi-sensory experiences to the learners (Pathshala, 2013).

However, Tairu, (2018) emphasized that, text files, photos, video, audio, databases, archives, library catalogs, course notes, relevant links to various websites, and quick access to search engines available on the internet are all examples of audio-visual processing, storage, production, manipulation, and retention resources.

Computers, films, slides, transparencies, projectors, audio/video CDs, tape recorder/player, video cassette recorder (VCR) & video cassette player (VCP), and other examples may be used in classroom instruction, library collections, or the like (Chukwueke & Oluwabunmi, 2022a). The availability of audiovisual materials by teachers in teaching agriculture science is shown in table 4.2.2 below.

Table 4: Types of Audiovisual material Available by Teachers

Variable	Categories	Frequency	Percentages (%)
Computer	No	1	7.7
	Yes	12	92.3
Projector	No	2	15.4
	Yes	11	84.6
Television	No	4	30.8
	Yes	9	69.2
Mobile phone	Yes	13	100.0
	No	0	0
Others	Yes	13	100.0
	No	0	0

Source: Field Survey, 2022.

4.2.4 Type of Audiovisual Material Available to Students

Audiovisual materials are equipment that are used in classrooms to help in the teaching and learning process by making it easier and more entertaining. They are the most effective instrument for effective education and knowledge distribution (Akraam & Malik, 2017).

The study results on the type of audiovisual material reported by students to be available in the school using the frequency distributive table and the percentages, indicated that computers were mostly available among all the audiovisual materials in the school at a percentage of 98.4%. This was followed by the mobile phone as the next available audiovisual material in the teaching process at a percentage of 94.1% and the rest were television and projectors at a percentage of 90.2% and 86.3% respectively. Whilst other teaching and learning materials (TLMs) aside the audiovisual materials were not used in the learning process as disagreed by the respondents at a percentage of 82.4%, which contradict with the results of the teachers.

According to Milosevic (2012) the audiovisual materials, unlike professional texts, which might be full of ambiguity, abstract terms, and meanings, can give real examples and remove the doubt from Agriculture Science. This is accomplishing with a film that contains a variety of agricultural practices including both plants and animals.

Video, audio, relevant links to various websites, and quick access to search engines available on the internet are examples of audio or visual processing, storage, creation, modification, and remembering resources (Keith et al., 2021).

By overcoming distance, language, and cultural barriers, and utilizing various internet-connected devices, audiovisual materials provide access to all human knowledge, anytime and anywhere, in a friendly, multi-modal, efficient, and effective manner (Tairu, 2018). The availability of audiovisual materials by students in teaching and learning agriculture science is shown in table 4.2.3 below.

Table 5: Type of Audiovisual Material Available by Students

VARIABLE	CATEGORY	FREQUENCY (%)	PERCENTAGE
Television	Yes	230	90.2
	No	25	9.8
Computer	Yes	251	98.4
	No	4	1.6
Projector	Yes	220	86.3
	No	35	13.7
Mobile phone	Yes	240	94.1

	No	15	5.9
Others	Yes	45	17.6
	No	210	82.4

Source: Field Survey, 2022.

4.3 Level of Usage of Audiovisual Material in Teaching and Learning of Agriculture Science

4.3.1 Level of Usage of Audiovisual Materials by the Teachers

Level of usage of audiovisual materials was measured using set of questionnaires. Respondents who score less than average were given a score of zero (0) and respondents who scored more than average were given a score of one (1). Level of usage of audiovisual materials was categorize into low usage and high usage. Low usage were respondents who scored less than average and usage were respondents who scored more than average.

This study results on the level of usage of audiovisual material using the frequency distributive table and the percentages, indicated that there was a generally high usage of audiovisual material in the school. About three quarters of the teachers at a percentage of 76.9% confirmed to have been using some form of audiovisual materials in the teaching and learning process. Whilst less than half of the teachers at a percentage of 23.1% do not used audiovisual materials in their studies.

According to Kwegyiriba et al. (2022) the most common teaching and learning materials used in the classroom in recent times is the use of projectors and computer with slides, photos, and videos of scenarios, which makes the class more interesting, dynamic, and effective.

The agriculture science education program is intended to motivate and assist students in becoming intellectually informed about agriculture, as well as to produce competent and effective agriculturists with strong content and method mastery (Nallusamy et al., 2015).

Despite the fact that some studies have shown that subject combination has an effect on students' academic achievement of agricultural concepts, the subject combination of students had no effect on their academic achievement of agricultural concepts. This collection of educational resources provides a self-directed, learner-controlled, and personalized learning environment for the student (Olajumoke & Kayode, 2022). The Table 4.3.1 below shows the level of usage of audiovisual resources by the teachers in teaching of agriculture science.

Table 6: Level of Usage of Audiovisual Materials by the Teachers

Variable	Categories	Frequency	Percentages
Level of usage of AV	Low usage	3	23.1
	High usage	10	76.9

Source: Field Survey, 2022.

4.3.2 Method of Teaching Used in the Teaching Process

Teaching methods are processes for teaching and learning that use tactics that emphasize idea learning, inquiry learning, and problem-solving learning to teach concepts, patterns, and abstractions (Abdulbaki et al., 2018).

However, the survey results show that among the various methods used by teachers in the teaching and learning process of Agriculture Science, the discussion method is the most commonly used, accounting for 68.2% of the total. This method was followed by the lecture method, which had a 22% share, and the demonstration method, which had a 9.8% share.

The demonstration teaching technique is one in which the teacher is the major participant and the student observes with the purpose of participating later. The teacher teaches the pupils what they should know at the conclusion of the class by teaching them how to do it and discussing the methodical process of completing the assignment (Diise, Z, et al., 2018a).

Chidimma, O et al., (2020) emphasized that an effective use of the audiovisual materials in the process of teaching and learning will change the teaching method in most senior high schools from teacher centered method to a more innovative and enriched method known as “child centered method”. This makes the student an active participant in a classroom setting as it encourages learning with audio-visual materials and other instructional devices.

These findings contradict with the findings of Birinci and Sariçoban (2021) which reveals that, critical thinking, logic, creativity, and the development of an

inquisitive mind are all outcomes of activity-based learning, which is the true goal of education.

Activity-based learning is a teaching technique that emphasizes excellent student teacher interaction in order to promote students' abilities to enquire, explore, experiment, collaborate, and feel the joy of learning (Patil & v. Siddamal, 2016). The teaching methods used in agriculture science teaching and learning are shown in Table 4.3.2 below.

Table 7: The Teaching Method Used in the Teaching Process

Variable	Category	Frequency	Percentage
Method of teaching	Demonstration method	25	9.8
	Student-centered method	174	68.2
	Teacher-centered method	56	22.0

Source: Field Survey, 2022.

4.3.3 Accessibility of Audiovisual Material by Teachers

The findings of this study indicate the degree to which students in the various schools sampled have access to audiovisual material. The researcher found that close to three quarters representing 70.6% of the respondents reported to be facing some form of difficulties in accessing audiovisual material in their schools. On the other hand, only few constituting a percentage of 29.4% reported no form of

difficulty accessing audiovisual material in the school. The inability of teachers and students to get access to the available audiovisual materials will affects students understanding and increase the workload of teachers in their lesson delivery.

The inability of management to allow teachers and students have access to the audiovisual materials in the school that are needed for teaching and learning is putting students' competency and future employability at risk within the agriculture sector (Diise et al., 2018).

The audio-visual materials have the capacity of ensuring effective teaching and learning, which improves skill development and retention among students (Abdullah & Mamun, 2014a).

Agriculture science education and learning in senior high schools should bring learners to practical knowledge that will help them develop the necessary skills, abilities, and principles for the country's agricultural production (Coley et al., 2015).

Students are encouraged to develop an interest in and awareness of the opportunities available in the agriculture sector, to broaden their understanding of agriculture and its relevance at the household and national levels, and to demonstrate that agriculture is a profitable and dignified profession aimed at improving the learners' knowledge and skills (Jonah, 2015). The Table 4.3.3 below shows the accessibility of audiovisual materials by the teachers in teaching and learning of agriculture science.

Table 8: Accessibility of Audiovisual Material

Variable	Category	Frequency	Percentage
Accessibility of audiovisual material	Difficult to access	180	70.6
	Not difficult to access	75	29.4

Source: Field Survey, 2022.

4.3.4 Level of Usage of Audiovisual Materials by the Students

The findings of this study on the level of usage of audiovisual material in the schools studied using the frequency distributive table and the percentages, revealed that nearly three-quarters of the total respondents, at a percentage of 73.7%, indicated a low level of usage of audiovisual material in their schools. Whiles less than half at a percentage of 26.3% of them indicated that the level of usage of audio visual in their various schools is high. This contradicts with the results of the teachers, which indicated a high-level usage of audiovisual materials in the schools sampled for the study.

However, the number of times that teachers used audio-visual materials in their lesson delivery is a factor that enhances proper use of the material. This increases student attention, motivation, and interest when compared to a classroom session that does not use audio-visual materials (Tang & Intai, 2018).

Teachers of agricultural science placed more emphasis on the cognitive domain at the detriment of the other two domains in their teaching process. Where the use of

audio-visual materials in teaching and acquiring practical information in agricultural science contributes to the development of the psychomotor and the affective domains of the students (Sadiq et al., 2017).

An animated video used to deliver engineering drawing to University students discovered that the materials have a significant potential to improve student visualization and thus the quality of learning in senior high school (Tang et al., 2018c). The Table 4.3.4 below shows the level of usage of audiovisual materials by the students in learning of agriculture science.

Table 9: Level of usage of audiovisual materials by the students

Variable	Category	Frequency	Percentage
Level of usage of audio-visual material	Low usage	188	73.7
	High usage	67	26.3

Source: Field Source, 2022.

4.4 Benefits of Using Audiovisual Materials in Teaching and Learning of Agriculture Science

4.4.1 Benefits of Using Audiovisual Materials in Teaching by the Teachers

Audio-visual materials have contributed significantly to agricultural education, which makes knowledge acquisition easier and comfortable. However, the revolution of technology has been influential in every aspect of life, where teaching and learning is not an exemption. Where using audio-visual materials in agriculture science studies has make it different and effective from the traditional way of teaching (Abdullah & Mamun, 2014a).

The results of this study illustrate how the audiovisual materials help in teaching and learning process using the frequency distributive table and the percentages. Majority of the respondents agreed that more energy is reserve in teaching as the rate of 84.6% indicated .More than three-quarters of the respondents were also of the view that the audiovisual materials enhance teacher's ability to present and facilitate lesson in simply as the percentage of 76.9% depicted. Almost all the respondents revealed the attention of students are captured (a rate of 92.3%) in the teaching process when the audiovisual materials are used. More than half of the respondents, a percentage of 69.2%, agreed that the audiovisual materials improve classroom management for teaching and learning of agriculture science. This confirms the findings of Grade (2019), which indicate that the audio-visual materials increase the interest of learners and assist the teachers to explain the concepts and theories of Agriculture Science to the understanding of every student.

Alenizi (2015) indicated that, among all the learning tools available to man, audiovisual materials create a relationship of hearing and seeing that increases an effective teaching and learning. These materials save teachers' time and help in creating innovation and motivation, as the introduction of visuals by teachers is important than just describing a concept.

When using audiovisual materials in the learning process, it is critical to consider the learners' learning styles. Some students learn best by seeing things, while others learn best by touching and feeling tangible, physical objects. However, when considering learner characteristics, the primary learning style should be

identified as visual, which is the style in which a person learns visually (Juliana, 2017).

Audiovisual learners have a strong visual sense and think primarily in terms of images. Where the learner uses this system to recognize objects, distinguish sizes and shapes, perceive depth, and so on. In other words, because audiovisual aids students the most, they will be able to recognize or associate images with key vocabulary more easily (Ulloa et al, 2018). The Table 4.4.1 below shows the benefits of using audiovisual materials in teaching and learning of agriculture science to the teacher.

Table 10: Benefits of Using Audiovisual Materials in Teaching

Variable	Categories	Frequency	Percentages
More energy is reserve in teaching.	Yes	11	84.6
	No	2	15.4
Enhance teacher's ability to present lesson in simple.	Yes	10	76.9
	No	3	23.1

The attention of students is retained in the teaching process	Yes	12	92.3
	No	1	7.7
Improves classroom management.	Yes	9	69.2
	No	4	30.8

Source: Field Survey, 2022.

4.4.2 Benefits of Using Audiovisual Materials for Learning by the Students

According to the findings, almost all of the respondents (93.7%) agreed that using audiovisual materials improves students' level of communication in learning of agriculture science. Whereas 100% of respondents agree that audiovisual materials aid in stress reduction during the learning process. 99.2% of respondents agreed that audiovisual materials increase students' interest in the agricultural science learning process.

Furthermore, more than three quarters of respondents (89.0%) agreed that audiovisual materials facilitate easy understanding of agricultural science concepts and practices.

Audiovisual materials windings students understanding to current practical or psychomotor learning of topics in agriculture science as compare to the use of charts in classrooms (Sadiq et al., 2017). When the audio-visual materials are used

in the learning process, students are able to talk and comment on what they have seen and heard from the material. Therefore, under such an atmosphere the students will work because they want to work and not because the teacher wants them to work (Ayinla, 2016).

Audiovisual materials appeal to more than one sense, making learning more concrete students remember more of what they hear, see, and feel than just what they hear. Therefore, using the audiovisual tools to help learners understand abstract concepts in agriculture science is advocated by visual teaching of the subject. This can be accomplished effectively by incorporating audio-visual elements into teaching and learning to transfer agricultural science knowledge to students (Dalid & Ode, 2014). The Table 4.4.2 below demonstrates the benefits of using audiovisual materials for learning by agriculture science students.

Table 11: Benefits of Using Audiovisual Materials for Learning

Variable	Categories	Frequency	Percentages
Improve students' level of communication	Yes	239	93.7
	No	16	6.3
It reduces stress in learning	Yes	255	100
	No	0.0	0.0

	Yes	253	99.2
It improves students' interest in learning.	No	2	0.8
It makes learning more permanent	Yes	227	89.0
	No	28	11.0

Source: Field Survey, 2022.

4.5 Factors Affecting the Use of Audio-visual Materials in Teaching and Learning of Agriculture Science

4.5.1 Factors Affecting the Use of Audiovisual Materials by the Teachers

The findings of the factors that affect teachers' use of audio-visual materials in teaching and learning using the frequency distributive table and the percentages, revealed that the majority of respondents (84.6% of teachers) teach the subject with audiovisual materials, but more than two-thirds (76.9% of teachers) compete with others for audiovisual materials. Also, more than half of them, representing a percentage of 69.2% confirmed that accessing, audiovisual material is quite difficult for teaching and learning. In addition, almost all the teachers a percentage of 84.6% accept to have the require knowledge and skills of using the audiovisual materials for teaching and learning.

This contradicts with the findings of Ucan, S. (2016) which revealed that the continuous professional development (CPD) program, which are designed to be a cyclical lifelong experience after completing the teacher education curriculum has

not been sufficiently organized for teachers at the senior high schools to satisfy their needs. As a result, audiovisual materials are used ineffectively in the teaching and learning process.

The teacher's inability to use visual aids such as images in their lesson delivery is among the most significant barriers to effective use of audiovisual materials. Where the teachers lack the commitment needed to locate relevant photographs and other resources in order to provide relevant content to their students (Bajrami & Ismaili, 2016).

Teachers are hesitant to incorporate new experiments into their standard teaching methods, and as a result, they are unable to select and use appropriate audio-visual equipment in their classroom (Alenizi, 2015). The Table 4.5.1 below shows the factors that affects level of usage of audiovisual material by teachers in teaching and learning of agriculture science.

Table 12: Factors that Affects Teachers' Level of Usage of Audiovisual Material by Teachers

Variable	Categories	Frequency	Percentages
Competing with other teachers for AV	No	3	23.1
	Yes	10	76.9
Interest in teaching with AV	No	2	15.4
	Yes	11	84.6

Inadequate knowledge and skills in using AV	Yes	2	15.4
	No	11	84.6
	No	4	30.8
Difficulty in accessing the AV in the school	Yes	9	69.2

Source: Field Survey, 2022.

4.5.2 Factors Affecting the Use of Audiovisual Materials by the Students

Education is the most important tool for practically all countries' growth and development, which cannot be achieved without long-term investments in human capital through teaching and learning (Apaliya, 2019).

These results of the factors that affects the level of usage of audiovisual materials in the Senior High Schools sampled for the study using the Chi-square test indicate that, the independent variable (Availability of AV, Adequacy of AV, Teacher's skill level, Difficulty using AV) was tested against the dependent variable (level of usage). Among all the variables tested against level of usage, only teacher’s skill level was significantly associated with level of usage at p-value 0.001.

According to Alenizi (2015) the main challenges to the impacting the effective use of audio-visual resources is the teacher's inability to effectively use visual aids such as images in their lesson delivery, and they lack the dedication required to locate relevant photographs and other resources in order to offer appropriate

content to their students. This increases the workload of the teachers which they find difficult to manage and unable to select and use the appropriate audio-visual equipment in their classroom.

This finding compares fairly well with the findings of Ikpe, (2018) which indicate that, the diversion of resources, bribery, and outright fraud of unverifiable projects for personal gain at the expense of agriculture science education. Which has affected the provision of educational materials to some government-owned senior high schools that lack the materials needed for effective teaching and learning of agriculture science

While it is widely acknowledged that appropriate audiovisual learning materials enhance learning experiences by providing sensory stimulations, it is unclear how the AV materials can be used to teach agriculture science in rural senior high schools. In general, rural senior high schools lack technological resources to support the effective use of audiovisual materials in routine teaching and learning (Tang & Intai, 2018c). Teaching in these schools is still primarily based on the chalk-and-talk model, supplemented by pictures. Regardless of the focus on student-centered learning, teachers spend a significant amount of time explaining and narrating learning content in these schools (Phoong et al., 2020). The Table 4.5.2 below shows the factors affecting the level of usage of audiovisual materials by the students in teaching and learning of agriculture science.

Table 13: Factors Affecting the Use of Audiovisual materials by the Students

Variable	Category	Low level of usage	High level of usage	Chi-Square	P-Value
Availability of AV	Not available	48	14	0.57	0.27
	Available	53	140		
Adequacy of AV	Not adequate	164	61	0.69	0.27
	Adequate	24	6		
Teacher's skill level	low skill	60	7	9.06	0.001
	high skill	134	54		
Difficulty using AV	No Difficulty	57	18	0.28	0.3
	Difficulty	131	49		

Source; Field Survey, 2022.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.0 Introduction

This section summarizes the study findings, as well as conclusions and recommendations of the study. The first section gives a brief overview of the study. The second section focuses on the demographic characteristics of the respondents.

5.1 Overview of the Study

The study had four objectives: the first was to assess the availability of audiovisual materials for teaching and learning Agriculture Science. The second goal was to examine the benefits of using audiovisual materials in agriculture science studies. The third specific goal was to investigate the extent to which audiovisual materials were used in the teaching and learning process. The fourth goal was to investigate the factors that affect the use of audiovisual resources in agricultural science education in SHS within the Sagnarigu Municipality.

5.2 Summary of Demographic Characteristics

The results of the demographic information of the respondents shows that majority of the teachers representing a percentage of 84.6% were male while less than a quarter of them with a percentage of 15.4% were female. Many of the teachers were also within 30 – 39 age brackets at a percentage 61.5% whiles 38.5% of them were 40 years and above. 84.6% of the respondents studied Agriculture Science at the Senior High School, whiles 7.7% studied General Arts

and those who studied General Science back at the Senior High School were 7.7%.

5.2 Summary of Findings

5.2.1 Availability of Audiovisual Material in Teaching and Learning of Agriculture Science:

Almost all the teachers (92.3%) from the schools selected for the study, agreed that the audiovisual materials are available in the schools. Whilst a few of the teachers (7.7%) disagreed to the availability of audiovisual resources in teaching of agriculture science in the SHS sampled for the study.

More than two-third (75.7%) of the students in these SHS also confirmed the availability of audiovisual materials in the schools sampled for the study. Among the total students studied, less than half (24.3%) of them did not confirm to the availability of audiovisual material in their schools.

5.2.2 Type of Audiovisual Material Available

The teachers indicated that computers, projectors, television and mobile phones are the types of audiovisual materials in the schools. Where all the teachers (100%) mostly used their mobile phones to aid them in their lesson delivery. Computers and projectors were the next audiovisual materials that were available in the schools at a percentage of 92.3% and 84.6% respectively. However, there were no televisions in the schools for teaching and learning.

The types of audiovisual material reported by the students to be mostly available in the schools for teaching and learning was the computer at a percentage of 98.4%. This was followed by the mobile phone as the next available audiovisual

in the teaching process at a percentage of 94.1% and the rest was television and projectors at a percentage of 90.2% and 86.3% respectively. Whilst other teaching and learning materials (TLMs) aside the audiovisual materials were not used in the learning process as disagreed by the respondents at a percentage of 82.4%, which contradict with the results of the teachers.

5.2.3 Level of Usage of Audiovisual Materials:

Even though the audiovisual materials were available in the schools, the responds by the teachers revealed that, there was a generally high usage of audiovisual materials in the schools. Where more than two-quarters (76.9%) of the teachers confirmed to have been using some form of audiovisual materials in the teaching and learning process. Whilst less than half (23.1%) of the teachers do not used audiovisual materials in the teaching and learning process.

More than two-quarters (73.7%) of the students contradict with the teachers on the level of usage of audiovisual material in the schools sampled for the study indicating low level of usage of audiovisual materials in the teaching and learning process. Whiles less than half (26.3%) of the students indicated that the level of usage of audio visual in their schools is high.

However, the various methods of teaching employed by teachers in teaching and learning process of Agriculture Science include the discussion method, which is the most used method of teaching at a percentage of 68.2%. Second to this method was lecture method at a percentage of 22%, followed by demonstration method being the less used method at a percentage of 9.8%.

5.2.4 Benefits of Using Audiovisual Materials:

The findings of this study show how the use of audiovisual materials benefits both teachers and students during the teaching and learning process. Where majority of the respondents were of the assertion that the use of audiovisual material in the teaching process helps in facilitating easy understanding of agriculture science in the senior high schools sampled for the study.

5.2.5 Factors Affecting the Use of Audiovisual Materials:

More than two-quarters (70.6%) of the respondents reported to be facing some form of difficulties in accessing audiovisual material in their school. Whiles on the other side, only few constituting 29.4% reported no form of difficulty in accessing the audiovisual materials for effective teaching and learning process in the senior high schools.

The factors that influence teacher's level of usage of audiovisual material in teaching and learning revealed that majority (84.6%) of the teachers teaches with audiovisual materials. More than two-third (76.9%) of the respondents competes with other teachers for audiovisual materials for effective teaching and learning. Whilst more than half (69.2%) of them confirmed that accessing the audiovisual materials is quite difficult for teaching and learning. However, almost all the teachers at a percentage of 84.6% have the require knowledge and skills of using the audiovisual materials for an effective teaching and learning of agriculture science.

5.3 Conclusion

A valuation of the distribution of teachers and students by gender showed that almost all the teachers and the students were males, with just a few of them being females. This does not represent gender equality within the agriculture science department.

The research shows that the audiovisual materials needed for effective teaching and learning of agriculture science in senior high schools in the Sagnarigu Municipality are available. Overwhelming majority of the respondents (92.3%) confirm that the audiovisual materials are available, even though they are inadequate to be properly use in order to serve its intended purpose.

The computers were the most available audiovisual materials (98.4 %.) due to the government initiative of providing laptops to all teachers across the country known as “one teacher one laptop policy”.

According to the findings of this study, the majority of respondents agreed that the use of audiovisual materials in the teaching and learning process aids in the easy understanding of agriculture science in the SHS sampled for the study.

The research shows that, the respondents (70.6%) were facing some form of difficulties in accessing audiovisual material in their school for effective teaching and learning process to occur, despite its availability. However, teachers in the senior high schools sampled for the study have the require knowledge and skills of using the audiovisual materials for effective teaching and learning of agriculture science.

5.4 Recommendations and Suggestions:

Base on the findings of this study, the audiovisual materials assist in easy understanding of the agriculture science in the SHS sampled for the study. The Headmasters or Headmistresses should ensure that the use of audiovisual materials becomes compulsory in all senior high schools that study agriculture science and any related subject for easy understanding of the students.

The researcher recommends that, of adequate and modern audiovisual materials should be provided to all the senior high schools in order to enhance an effective teaching and learning of agriculture science. This is in response to the findings that the audio-visual materials inadequate for effective teaching and learning of agriculture science in the senior high schools,

The study discovers that almost all the respondents reported to be facing some form of difficulties in accessing audiovisual material for teaching and learning in their schools. The researcher recommends that, headmasters or headmistresses' and heads of departments (HODs) should ensure that every teacher or student gets an easy access to the audiovisual materials in the school to improve an effective teaching and learning of agriculture science.

This study did not investigate the drawbacks of using audiovisual materials in senior high agriculture science teaching and learning. As a result, more research on the disadvantages of using audiovisual materials in the teaching and learning of agriculture science in senior high schools is required.

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APPENDIX 1: QUESTIONNAIRE FOR TEACHERS

TOPIC: Effectiveness of the Use of Audio-Visual Materials in Teaching and Learning of Agriculture Science in Senior High Schools in the Sagnarigu Municipality

The purpose of this questionnaire is to collect data for an academic exercise only. Your candid opinions and views on the subject would be very essential and useful for this study. However, you are assured that the information provided would be treated with the utmost confidentiality and tactfulness it deserves.

CONSENT OF RESPONDENT'S UNDERTAKEN SIGNED

I understand that the information collected is going to be used and disclosed, while keeping my identity confidential, between the researcher and the agencies responsible for the safety, effectiveness, and conduct of the research; and that the researcher may use and share my information for scientific purposes related to this and other associated studies.

Respondent's Signature…… Date……

Please, answer the question by ticking (√) in the appropriate box or by writing in the space provided.

SECTION A; DEMOGRAPHIC OF THE RESPONDENT

1. Sex of respondent male [ ] Female [ ]

2. Age of respondent……....

3. Occupational status of respondent. A. Part time [ ] B. National Service personnel [ ] C. Full time (Permanent staff) [ ] D. Volunteer teacher [ ], others specify…….....

4. Which occupations are/were parents engage in? A. Farming [ ] B. Trading [ ]

C. Fishing D.Hunting [ ], Others

specify…….....

Educational Background of Respondents

1. Which course did you studied at secondary school/GCE O level education?

A. General Science [ ] B. Agricultural Science [ ] C. Business [ ] D. Visual

Art [ ] E. General Art [ ],

Othersspecify.....

2. What is your highest level of education? A. University [ ] B. Polytechnic [ ] C. Agricultural College [ ] D. Teachers Training College [ ], Others specify.....

4. Which area did you specialized/major in? A. Horticulture [ ] B. Agronomy [ ] C. Agriculture Education [ ] D. Economics [ ] E. Agricultural Extension [ ], other specify.....

Professional Status of Respondent

1. Are you a professionally trained agricultural science teacher? Yes [ ] or No [ ]

2. If no, what is your area of expertise/specialty?

……

3. How long have you been teaching? A. Less than a year [ ] B.1 -5years [ ] C. 6 – 10 years [ ], D. 11-20 years [ ], others specify.....

4. During your professional training/educational career which teaching method did your lecturers/ tutors/ trainers frequently used in training you? Please list them from mostly used to least used.…….....……

SECTION B; AVAILABILITY OF AUDIO-VISUAL MATERIALS FOR TEACHING AND LEARNING AGRICULTURE SCIENCE IN SENIOR HIGH SCHOOLS.

1. Are audio-visual materials available for teaching and learning of agriculture science? A. Yes [ ] B. No [ ]
2. If yes, which of the following procedure do you follow in accessing the audiovisual materials? A. Writing a letter to the Headmaster/Headmistress [ ] B. Writing a letter to the Head of Department [ ] C. Seeking permission from the authority [ ] D. Picking it without any permission [ ], other, specify……
3. Do you compete with other teachers in using the audio-visual materials for teaching and learning of agriculture science? A. Yes [ ] B. No [ ]

SECTION B; LEVEL OF USAGE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING PROCESS OF AGRICULTURE SCIENCE.

1.Do you teach the Agriculture Science lesson with audio-visual materials? Yes [ ] No [ ]

2. Which of the following methods of teaching do you apply when using audiovisual materials?

A. Demonstration method [ ] B. Discussion method [ ] C. Lecture method [ ] D.

Project teaching method [ ], others, specify……

3. How often do you access audio-visual materials for teaching and learning?

A. Very frequent [ ] B. Somewhat frequent [ ] C. Less frequent [ ] D. Not frequent at all [ ] .

4. How long have you been teaching? A. Less than a year [ ] B.1 -5years [ ] C. 6– 10 years [ ], D.11-20years[ ],others specify.....

SECTION C; BENEFITS OF USING AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING OF AGRICULTURE SCIENCE.

1. How does the audio-visual material help in teaching and learning process? A. Easy understanding [ ] B. Difficulty understanding [ ] C. Very easy understanding [ ] D. Very difficult understanding [ ], others, specify……

SECTION D; FACTORS THAT AFFECT THE USE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING AGRICULTURAL SCIENCE.

1. Do u compete with others in using the audio-visual materials for Agriculture Science lessons? Yes [ ] No [ ].
2. Do you teach agaric with Audiovisual materials? Yes [ ] No [ ].

3. Do you have the require knowledge in using the audiovisual materials? Yes [ ] No [ ].
4. Is it difficult in accessing the audiovisual materials for teaching and learning of agriculture science? Yes [ ] No [ ].

APPENDIX 2: QUESTIONNAIRE FOR STUDENTS

TOPIC: Effectiveness of The Use of Audio-Visual Materials in Teaching and Learning of Agriculture Science in Senior High Schools in The Sagnarigu Municipality

The purpose of this questionnaire is to collect data for an academic exercise only. Your candid opinions and views on the subject would be very essential and useful for this study. However, you are assured that the information provided would be treated with the utmost confidentiality and tactfulness it deserves.

CONSENT OF RESPONDENT'S UNDERTAKEN SIGNED

I understand that the information collected is going to be used and disclosed, while keeping my identity confidential, between the researcher and the agencies responsible for the safety, effectiveness, and conduct of the research; and that the researcher may use and share my information for scientific purposes related to this and other associated studies.

Respondent's Signature…… Date……

DIRECTION: Please tick (√) the appropriate space corresponding to your choice(s), or provide the appropriate response (s) in writing.

SECTION A: DEMOGRAPHIC OF THE RESPONDENT.

1. Sex of students. Male [ ] Female [ ]
2. Class/ Form of student. Form 1 [ ] Form 2 [ ]
3. Age of students. 14-18 [ ] 18-22 [ ]
4. Where do you live (reside)? A. Rural area [ ] B. Urban area [ ]

SECTION B; AVAILABILITY OF AUDIO-VISUAL MATERIALS FOR TEACHING AND LEARNING AGRICULTURE SCIENCE IN SENIOR HIGH SCHOOLS.

1. Are audio-visual materials available for teaching and learning of agriculture science?
   A. Yes [ ] B. No [ ]
2. Do you compete with other teachers in using the audio-visual materials for teaching and learning of agriculture science? A. Yes [ ] B. No [ ]
3. What kind of audio-visual materials are available in the school? A. Television [ ] B. Computer [ ] C. Projector [ ] D. Mobile phone [ ]

others, specify……

SECTION C; LEVEL OF USAGE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING PROCESS OF AGRICULTURE SCIENCE.

1. Do your teachers teach you with the audio-visual materials? Yes [ ] No []
2. If yes, how often do they teach you with the audio-visual materials? A. Very frequent (At least 3times a week) [ ] B. Somewhat frequent (at least 2times a week) [ ] C. Less frequent (once a week) [ ] D. Not frequent at all (a just a coup in a term) [ ]
3. How would you describe your level of participation (involvement) during learning with the audio-visual materials? A. Very Actively Participatory [ ] B. Somewhat actively participatory [ ] C. Less actively participatory [ ] D. Not participatory at all [ ]

SECTION D; BENEFITS OF USING AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING OF AGRICULTURE SCIENCE.

1. How does the audio-visual material help in teaching and learning process? A. Easy understanding [ ] B. Difficulty understanding [ ] C. Very easy understanding [ ] D. Very difficult understanding [ ], others, specify……
2. Where do your teachers always teach you Agriculture science lesson? .....

SECTION E; FACTORS THAT AFFECT THE USE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING AGRICULTURAL SCIENCE.

1. Does the school have any audio-visual material? Yes [ ] No[ ]
2. If yes, are the audio-visual materials adequate? Yes [ ] No[ ]
3. Do teachers have the require knowledge and skills to teach with the audiovisual materials? Yes [ ] No[ ]
4. Do you face any difficulty using the audiovisual materials? Yes [ ] No[ ]

Availability Of Audio-Visual Materials for Teaching and Learning of Agriculture Science.

Tick (√) the appropriate response to indicate the extent to which you agree or disagree with the following statement below. Strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

Items	**SA**	**A**	**D**	**SD**
The audio-visual materials are enough for teaching and learning agriculture science.				
The audio-visual materials are durable				
Each class has a particular audio-visual material.				
The materials are not adequately used.				
Each class has audio-visual material for the teaching and learning of agriculture science.				
Audio-visual materials last at least the period of the lesson.				
The procedure of securing the audio-visual materials for teaching and learning is difficult.				

Level Of Usage of Audio-Visual Materials in The Teaching and Learning Process of Agriculture Science.

Tick (√) the appropriate response to indicate the extent to which you agree or disagree with the following statement below. Strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

Items	**SA**	**A**	**D**	**SD**
Audio-visual materials are used at all times in the teaching and learning of agriculture science.				
The materials are not used in the teaching and learning process of agriculture science				
Different teaching-learning materials (TLMs) are used rather than audiovisual materials.				
Teaching agriculture science without seeing the actual content of what is being taught makes the lesson boring.				
Teachers are not comfortable with the use of audio-visual materials.				
Teachers are not comfortable in using the audio-visual materials for teaching and learning of agriculture science.				

Benefits of Using Audio-Visual Materials in Teaching and Learning of Agriculture Science.

Tick (√) the appropriate response to indicate the extent to which you agree or disagree with the following statement below. Strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

Item	**SA**	**A**	**D**	**SD**
Students are more involve in the teaching and learning of agriculture science when audiovisual materials are used.				
Copying of notes are replaced with extensive explanation using audiovisual materials.				
It is difficult to understand the procedure use in teaching by the agriculture science teacher.				
The audio-visual materials make the lesson more interesting and understanding.				
Teachers stay very long in a topic before changing a new topic.				
Students' understanding of the use of audio-visual materials is low.				

Factors Affecting the Use of Audio-Visual Materials in Teaching and Learning Agriculture Science.

Tick **(√)** the appropriate response to indicate the extent to which you agree or disagree with the following statement below. Strongly agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

Items	**SA**	**A**	**D**	**SD**
1. Teachers do not have the required skills in using audio-visual materials for teaching and learning agriculture science.				
2. Students show less interest in teaching with audio-visual materials.				
3. Inadequate audio-visual materials for teaching and learning agriculture science.				
4. There is no power source for the audio-visual materials to be used in class.				
5. The audio-visual materials are obsolete and archaic.				
6. The school does not see the need to involve audio-visuals in the teaching and learning of agriculture science.				
7. Time allocated for Agriculture Science lesson is very short to involve an audio-visual material into the teaching and learning.				