EFFECTS OF VIDEO INSTRUCTION AS A COMPLEMENT TO CONVENTIONAL TEACHING APPROACHES ON MOTIVATION AND THE PERFORMANCE OF SECONDARY SCHOOL STUDENTS IN AGRICULTURE TESTS IN MOLO SUB-COUNTY, KENYA

ESTHER MUTHONI MAINA

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been published or presented for examination or the award of a degree in any other university.

Signature …… Date……

Esther Muthoni Maina

ESM11/00241/15

Recommendation

This thesis has been submitted with our approval as the University Supervisors.

Signature…….. Date……

Prof. Christopher A. Onyango

Department of Agricultural Education and Extension

Egerton University

Signature…….. Date……

Dr. Nancy O. Openda

Department of Applied Community Development Studies (ACDS)

Egerton University

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DEDICATION

This thesis is dedicated to my mother Damaris Wanjama and my sister Catherine Wambui for their prayers, patience and unreserved support in my academic struggle of accomplishing my long cherished dream**.**

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My humble gratitude goes first and foremost to the Almighty God, who has fought for me and through whom I have been able to achieve all that I have. I also thank Egerton University for giving me an opportunity to study in this institution. My special thanks go to my two supervisors Prof. C.A. Onyango and Dr. Nancy O. Openda, for their helpful insights, suggestions and criticisms to make this thesis what it is. Special thanks go to all members of the Department of Agricultural Education and extension for their indiscriminate guidance throughout the research period.

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ABSTRACT

The teaching of Agriculture in Kenyan schools is dominated by teacher centered methods such as lecture and class demonstration. Consequently, students perform poorly in Agriculture tests and examinations. This calls for a re-examination of the current teaching methods in order to incorporate more practical learner centered methods in the teaching learning process. This study therefore aimed to assess the effect of video instruction as a complement to conventional teaching approaches on performance in Agriculture tests by students in secondary schools in Molo Sub-county. The study adopted a pretest-posttest experimental design where four schools were selected purposively from the list of public secondary schools in the Sub-County, and randomly assigned to either the control and intervention group (two schools per group). Form-one agriculture students in the schools that formed the intervention group (n=89) were taught a topic on Water Supply Irrigation and Drainage using a combination of video instruction and conventional method, while form one students in the schools that formed the control group (n=83) were taught using conventional teaching method only. Participants in the two schools were subjected to an achievement test before and after the six periods each lasting for forty minutes for comparison of the test results. The experimental group was further subjected to a semi-structured questionnaire to obtain information on their motivation. The validity of the test was ascertained by the two experts to ensure that the items adequately represent concepts being taught. The test was piloted in a school in Njoro Sub-County which had similar characteristics to the schools involved in the study so as to assess its reliability. The collected data was analyzed using both descriptive and inferential statistics with the aid of Statistical Package for Social Sciences version 25. Inferential statistics were tested at the 0.05 level of significance. Descriptive analysis showed that students in the intervention group had higher mean scores in the post-test in both theoretical and practical tests. The t-tests showed that the use of video instruction had a statistically significant and positive effect on students' performance in both the Agriculture theoretical test ($t= 8.981$, $p= .000$) and practical test ($t=4.077$, $p= .000$). Students in both the intervention and control group performed better in the practical test than in the theoretical test. Video instruction was also found to have a positive effect on students' motivation based on observed responses from the student's questionnaire. The study recommends that schools within the study area as well as other parts of the country should embrace the use of video instruction in the teaching of Agriculture in order to boost students understanding of both theoretical and practical aspects of the subject.

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LIST OF ABBREVIATIONS AND ACRONYMS

AED	:	Academy for Educational Development
CER	:	Center for Educational Research
CDs	:	Compact Discs
DLA	:	Dry Land Agriculture
DVDs	:	Digital Video Discs
GPS	:	Global Positioning System
IICD	:	International Institute of Communication and Development
ICT	:	Information Communication Technology
IT	:	Information Technology
NGO	:	Non-governmental Organization
VHS:	:	Video Home System
VCD:	:	**V**ideo Compact Disc
SD	:	Standard Deviation
NACOSTI		National Commission for Science Technology and Innovation

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In formal education, curriculum implementation is a composite of the teacher, learner, resources, methodologies, anticipated experiences and outcomes. Therefore a successful teacher should have the abilities to provide these requirements in order for curriculum implementation to succeed (O'Neill, 2015). However, there are often challenges to this process which affect the quality and level of curriculum implementation especially with respect to acquisition of knowledge and skills by the learners. In general, teachers use conventional methods of teaching which includes lecture, discussion, fieldtrips and classroom demonstration. These conventional methods often fail to help a teacher meet the goals of a curriculum, and especially so with respect to science based subject such as Agriculture (Harman & Nguyen, 2010).

In conventional teaching, a teacher communicates ideas to learners through direct verbal discourse sometimes called talk and chalk making the teaching process teacher-centered (Zhang, 2012). The implication of this is that learners become discouraged and passive Agriculture is a practical subject and when taught using conventional approaches, topics like, farm power, physical properties of soil, crop and poultry improvement are not well-mastered by students leading to below average performance in examinations (Okoro, 2007). Teachers of Agriculture have a tendency to rely on use of school farm to acquaint their students with topics in the curriculum. However as Shimave (2007) pointed out, some secondary schools do not even have school farms and where they exist they are ill prepared to help students acquire relevant practical skills.

A need to introduce alternative instructional techniques that help overcome the weaknesses associated with the talk and chalk method is therefore evident. Scientific advancement has made it possible to introduce technology-based methods such as models, filmstrips, overhead transparencies, pictorials, animation, slide shows, films and video into the teaching process. According to Kearney and Schuck (2006), these approaches have strengthened learning opportunities for students whereby video appears to encourage academic rigor by inspiring and engaging students and making the learning process student-centered. There are indications that video could be used as a complement to conventional teaching. As reported by Akpabio (2004), video instruction can expose children to modern agricultural practices

and environmental concepts far more than the traditional and conventional classroom teacher can achieve. This is because their interest in watching home video can be exploited in formal school system to teach agricultural practices in a vivid and entertaining manner.

Video- taped instructions in teaching and learning of agricultural science may enhance students' performance especially where the class is over populated. According to Aggarwal (2007), video instructions enhance comprehension and retention. Real life activities like illustration, demonstration and observation of specimens in agriculture and the environment can be brought to the learners in the classroom in an exciting package. The visual nature of some technologies, and particularly animations, simulations and moving imagery, engage learners and enhance conceptual understanding (Eskrootchi & Oskrochi, 2010). Apart from facilitating understanding of abstract concepts, video instructions also facilitate the acquisition of practical skills (Deegan *et al.*,, 2016). Acquisition of practical skills such as planting and raking is vital in agriculture. Learning experiences that would have alternatively cost much in terms of field trips can be recorded with a video camera and shown on a television through VHS or VCD at a reduced cost. Environmental issues such as effect of erosion, bush burning, pesticides poisoning, forest degradation, global warming and climatic changes can be taught through video.

In the United States of America, teachers have employed video instruction as a way of helping educators improve their instructional practices through techniques such as microteaching. Equally in Belgium, Van Mele (2011) found that the use of moving images and video's flexibility was advantageous in training farmers. On the other hand, Video instructions also make learning enjoyable; hence, creating a positive attitude among learners. As Awang *et al.*, (2013) found, students' attitude has a significant effect on learning outcomes. The study recommended that teachers should create enjoyable and attractive learning environment so as to engage students in classroom activities and reinforce a positive attitude towards the subject. In Kenya as pointed out by Gakuru (2013), introducing videos that are specific to a topic greatly enhances the learners' interest and motivation towards physics which in turn leads to an overall improved performance. From the literature reviewed so far, none of the studies has evaluated the use of videos as a possible complementary teaching approach in the Kenyan secondary school context. Therefore the study sought to fill this knowledge gab by examining the effect of video instruction as a complement to the conventional teaching approach on the performance of secondary school students in agriculture tests in Molo Sub-County, Kenya.

1.2 Statement of the Problem

Generally, conventional approaches of teaching Agriculture include lecture, class discussions, field trips and class demonstrations (O'Neill, 2015). These methods have been used in passing knowledge and skills consequently making the teachers the main source of information, ideas and concepts. However, these methods are challenging in terms of high cost of field trips, shortage of Agriculture teachers leading to a low teacher-student ratio, low enrollment of students in agriculture subject, poor syllabus coverage in relation to curriculum implementation and poor performance in both theoretical and practical tests. This is not different in Molo Sub-County. For instance, the mean score for agriculture in KCSE examination declined from 6.24 (2014), 5.33(2015), 3.47(2016), 2.39(2017), 3.61(2018) and 3.13(2019).Though this decline may have been caused by other factors, there is therefore a need to look into the methods used to teach agriculture. Recent technological advancement has led to development of various teaching aids including overhead transparencies, filmstrips, animations, simulations and video. Use of video in teaching agriculture may help to overcome these obstacles by making learning easy, real and practical through motivation and sustaining interest of the learners towards learning. Despite the potential of this video-aided teaching, studies examining the effect of this instruction strategy in improving learning outcomes in the agricultural fields are sparse.

1.3 Purpose of the Study

The purpose of the study was to assess the effect of instructional video as a complement to conventional teaching approach on the performance of secondary school students in Agriculture theoretical and practical tests in Molo Sub-County.

1.4 Objectives of the Study

The specific objectives of the study were to:

i. Assess the effect of instructional video in the teaching of Agriculture on student performance in theoretical tests.
ii. Examine the effect of instructional video in the teaching of Agriculture on student performance in practical tests.
iii. Compare both practical and theoretical test results from students taught with and without instructional video.

iv. Investigate the effect of instructional video in the teaching of Agriculture on the students' motivation towards the subject.

1.5 Research Hypotheses

HO_1: There is no statistically significant difference in theoretical test performance of students exposed to video instructions and those subjected to conventional approach to teaching only.

HO_2: There is no statistically significant difference in practical test performance of students exposed to video instructions and those subjected to conventional approach to teaching only.

HO_3: There is no statistically significant difference in the practical and theoretical test results by students taught with and without video.

1.6 Significance of the Study

The study may be of benefit at the policy, practice, and academic level. At the policy level, the study may provide evidence that support the inclusion of video instructions in the agricultural curriculum and equipping students with relevant skills. At the teaching practice level, the study provides evidence regarding how best to apply video in delivering instructions in a manner that will enhance improved performance. Such evidence would enhance acquisition of desired knowledge and skills among agriculture students. Finally, the study benefits education as an academic field as it has added to existing theories and literature regarding the use of video in delivering educational content to students. The study has also recommended areas for future research facilitating an advancement of knowledge on this issue.

1.7 Scope of the Study

The study focused on public secondary schools in Molo Sub-County. This is because public schools tend to have minimal resources compared to private schools and therefore teachers have no other option but to teach using the conventional approaches. It was restricted to assessing the effect of instructional video as a complement to conventional teaching of agriculture. Agriculture subject was selected for this study because it has both theoretical and practical components which require facilities which may not be available in the school. This creates a need for learners to go out for field trips which are costly. A video assisted lesson on the other hand can be recorded and brought to the classroom. The study also targeted all form one agriculture students in public secondary schools located in Molo sub-county. This is

because Agriculture is a compulsory subject in most of the schools at the form one level and students had no prior knowledge in Molo Sub-County.

1.8 Assumptions of the Study

The study was based on the following assumptions:

i. Agriculture teachers were adequately competent with regard to Agriculture subject matter.
ii. Students' performance was a priority to Agriculture teachers and schools within the study area and that these stakeholders were interested in improving performance.

1.9 Limitation of the Study

The researcher utilized the purposive sampling technique to select the public secondary schools that participated in the study. This sampling approach was necessary because of the need to select schools that had similar characteristics and that had not yet covered the topic that would form the focus on the instructional strategy. The purposive sampling technique exposes the study to sampling bias and errors in judgment by the researcher (Black, 2010). The study tried to overcome this limitation by defining clear inclusion and exclusion criteria which included (1) must be a Sub-County school, (2) must be a mixed school (3) must not have covered the topic of interest at the time of study, (4) must not be using the video-based instruction, (5) must not be implementing another intervention that can directly affect performance in agriculture and (6) must be willing to participate.

1.10 Definition of Terms

The following are operational definitions that apply to this study

Agriculture: the art and science of growing plants and rearing of animals for food, other human needs, or economic gain. In this study this will refer to a subject taught in secondary schools

Complement: Something that contributes extra features to something else in such a way as to improve or emphasize its quality. In this study it will refer to the addition of instructional video in enhancing the conventional teaching approach.

Conventional teaching approaches: These are teacher-oriented methods where the teacher controls the learning environment. Power and responsibility are held by the teacher and they play the role of instructor .In this study this will refer teacher centered method, discussion and classroom demonstration methods.

Grasp of Agricultural practical concepts: It means demonstrating, or comprehending ideas and skills. In this study this will refer to the ability of learners to understand the practical skills when taught using either the conventional or a combination of both conventional and video instruction.

Kenya Certificate of Secondary Education (KCSE): This is the certificate which is awarded to students who have sat for the national examinations after completing the secondary school education cycle in Kenya.

Kenya Institute of Curriculum Development(KICD): This is the semi-government body which is responsible for the development of curriculum for the primary schools, secondary schools, teacher training colleges and institutes of technology in Kenya (KICD was established by the Educational Act of 2013)

Kenya National Examination Council (KNEC): This is the semi-government organization responsible for the setting and marking of the national examinations in Kenya (KNEC was established by an Act of Parliament of 1980)

Practical: A physical activity an individual engages in, in order to master a specific skill or to attain a specific objective. In this study this will refer to an activity done manually in the field by the learners.

Project: A set of interrelated activities designed to achieve given objectives within a specified time period. In this study this will refer to set out agricultural activities done by students to help them grasp agricultural concepts

Public Secondary schools: Schools that are maintained at public expense for the education of the children of a community or district. They constitute a part of a system of public education commonly including primary and secondary schools. In this study this will refer to secondary schools maintained by the Kenyan government.

Technology: This is the application of scientific, well-organized knowledge to processes. In this study it will refer use of instructional video to explain concepts in place of verbal interaction with learners

Video: Is an electronic device which provides audio and visual stimuli as well as motion. In this study a video on water supply, irrigation and drainage of Access agriculture will be used.

Video instruction: Using recorded audio-visual instruction to present a lesson as opposed to the conventional teaching approach. In this study it will refer to teaching learners using instructional videos.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature relevant to the study with a focus to assess the effect of video instruction as a complement to the conventional teaching method in performance of secondary school students' in public secondary schools in Molo sub-county. The chapter is organized into the following subtopics; teaching approaches and performance, video- aided teaching and performance, video based teaching and acquisition of practical skills and video teaching and learners' motivation. The chapter ends by providing a theoretical basis and conceptual framework for this study.

2.2 Teaching Approaches and Performance

Student performance is a function of multiple interacting socio-economic, environmental, and psychological factors. One of these factors is the approach of teaching. Teaching is the process of attending to the learning needs of individual (Ball & Forzani, 2009). In a formal curriculum, it entails delivering content and facilitating activities that lead to the realization of curriculum objectives. There are diverse methods/ approaches of teaching. The most common include lectures, demonstration, discussions, case study, role playing, computer-based simulation, and problem-based learning (Carpenter, 2006). A successful teacher must have abilities to select a combination of methods that provide meaningful learning experiences in order for curriculum implementation to succeed (O'Neill, 2015). However, there are often challenges to this process which affect the quality and level of curriculum implementation especially with respect to acquisition of knowledge and skills by the learners.

In his study that specifically focused on approaches used to teach agriculture in Sub-Saharan Africa, Alkali (2010) postulated that, with the current approach of teaching and learning that consists mainly of lecture method, only 3 percent of those who are trained in agricultural institutions take to agriculture after leaving school. He attributed this to ill preparation of the products whose training did not equip them to acquire useful knowledge and practical skills in agriculture. Olaniyan and Ojo (2008) reported that the increase in students' enrolment in Nigerian secondary schools had created large classes that made it difficult for a single teacher to manage the practical aspects. Consequently, schools offering agriculture had no option but to explore alternative teaching and learning resources if curriculum was to be properly implemented. Auwal (2013) found that the use of alternative teaching approaches such as

demonstration and discussion in implementing agricultural curriculum had a significant effect on student knowledge acquisition and retention. Demonstration was found to have a more profound effect on knowledge retention.

Several studies have been conducted to examine teaching approaches within the Kenyan context. Nyongesa (2015) explored challenges in delivering content in biology and their impact on students' performance. Just like Agriculture, Biology is a practical subject that often requires learning activities that keep students engaged. The study established that the main challenge was that many teachers were still employing the traditional lecture method. This traditional method is less effective in eliciting positive attitude among students and transferring practical skills. Although the study links students' performance to teaching methods, it does not focus specifically on the use of video instruction, which is emphasized in the current study. In addition, the study utilized a survey approach where the study measured teachers' perceptions regarding students' performance rather than actual performance of students.

In another study, Chepkorir *et al.*, (2014) found that poor teaching was one of the factors influencing student's attitude towards Chemistry. The study involved 189 form four students and 10 chemistry teachers selected randomly from ten secondary schools in Bureti Sub-County. Forty percent of the sampled students reported that they were not comfortable with the methods used to teach chemistry. Some students lamented that the methods used left behind slow learners. However, this study did not specify the teaching methods employed in the district but rather focused on recording the general feeling of students towards the methods. In addition, the study examined the effect of teaching methods on students' attitude towards chemistry rather than their performance. Although related, these two concepts are fundamentally different. In her survey involving 120 teachers from Kakuyuni sub-County in Machakos County, Waithera (2013) found that lecture (80%), group work (70%), and demonstration (50%) were the most common methods of teaching agriculture. Less than (20%) of the teachers reported the use of practical approaches such as projects and field visits.

Equally, Kyule (2016) examined challenges in the implementation of the agriculture curriculum in arid and semi-arid counties. Data was collected from schools located in the ASAL counties of Makueni, Baringo, and Narok. Results showed that although textbooks were available, the implementation of the agriculture curriculum was hampered by

unavailability of funds for field trips, laboratories, workshops, school farms and models. The study recommended that teachers of agriculture should be innovative in order to overcome the impact of the unavailability of such resources. Although this study did not examine the use of video instruction, it highlighted the problems that many secondary schools face when it comes to implementation of curriculum and thus a need to curb them. Mwiria (2002) found that agriculture learning resources include a viable school farm, library, laboratory, books, workshops, spacious class rooms, and relevant equipment like, machinery, hand tools, inputs and farming tools. A spacious library with adequate and up to date agriculture books and other reference materials have been found to have a positive correlation to the performance of students in agriculture. The school farm as a teaching and learning facility should be easily accessible and spacious enough to accommodate all students during project or demonstration work and also allow the community to learn from it.

In their study, Waiganjo *et al.,* (2014) examined the effect of the cooperative learning approach (CLA) on the academic achievements in agriculture among secondary school students. The study employed an experimental design where four schools were selected randomly from a list of Sub-County schools in Nakuru-East Sub-County. The four schools were randomly assigned to the intervention and control group, two in each group. The cooperative learning strategy was used to teach form-one students within the two schools in the intervention group while students in the control groups were subjected to routine teaching practices. The performance of students in all the four schools was evaluated using agriculture achievement test. Results showed that there was improved performance among students subjected to CLA as compared to those subjected to routine approach. Although this study focused on a different teaching approach, it provided evidence that the use of alternative teaching approach can enhance students' performance in Agriculture.

2.3 Video-Aided Teaching and Performance

Video-aided teaching also known video-aided instruction or video-based learning is a teaching approach that entails the use of motion pictures often containing an audio component to deliver educational content to students (Willmort *et al.,*, 2012). This teaching method has been linked to several benefits. According to Ozdener and Esfer (2009), video-based teaching brings real-world problems and situations to the class environment. It also facilitates the study of conditions that are difficult or dangerous to encounter in reality. In addition, this approach increases student engagement by making the learning process more exciting. It is no secret that modern generation of learners relies on a number of digital tools,

including social media, mobile devices, and video to help them learn and collaborate. (O'Neill, 2015). Therefore, using these same tools and technologies to deliver instruction increases the appeal of the learning process resulting in improved outcomes.

The benefits of video-aided teaching have been demonstrated empirically in different studies. A study by Brinton (2001) on use of Multimedia Visual Aids in the English Language Classroom revealed that, the use of media appealed to pupil's senses and helped them process the information. It also helped teachers to motivate pupils because it brought the real life into classroom. Teachers, who used instructional video, reported that their students retained more information, understood concepts more rapidly and were more enthusiastic about what they were learning. When video was incorporated in a lesson, it enabled students to link topics and the world outside the classroom and also instead of teachers taking up additional class hours they helped to economize the teaching task. Nasab *et al.,* (2002) also found that students who were subjected to video-based teaching recorded better performance than those involved in the lecture method. A majority of students expressed satisfaction with video instructions and were willing to continue with this teaching approach.

In a study that involved 240 pupils from three rural primary schools in Badagry local government area in the state of Lagos in Nigeria, Isiaka (2007) found that students exposed to the video and realia (use of real objects) approaches of teaching had significantly better performance than those taught using charts or with no instructional media. Gambari *et al.,* (2014) also found that students who were exposed to video multimedia instruction performed better than their counterparts who were subjected to conventional teaching methods in a biology examination. The study was conducted among 120 students randomly selected from four secondary schools in Nigeria and randomly assigned to one of three experimental groups or control. Although the two studies were conducted outside the country they demonstrated the effect of video instruction on students' performance.

Still in Nigeria, Edahe-Abah and Mumuni (2019) found that blending traditional approaches of teaching of biology curriculum content with the use of Youtube can enhance students' performance in the subject. The study utilized the pre-test post-test control design and involved a sample of 109 students from two schools that were selected purposively. Students from one school were taught using tradition approaches while those of from the other school were taught using a blend of traditional approaches and Youtube. The students were then subjected to an achievement test before and after the lesson. The mean gain for the two

groups of students was then compared using t-tests. Results showed that students taught using a blend of traditional approaches and Youtube had a significantly higher mean gain than those who were taught using traditional methods only. The findings led to the conclusion that blending traditional teaching approaches with Youtube enhances students' performance. The study by Edahe-Abah and Mumuni (2019) however focused on the biology subject as opposed to agriculture, which is the focus of the present study.

Video is a learning resource in which Kenyan schools have not sufficiently invested in yet it makes learning interesting, breaks monotony and makes abstract concepts easy for learners to comprehend (Latir, Hamzah & Rashid, 2014). A study by Miima, Ondigi and Mavisi (2013) on teachers' perception of ICT in teaching and learning found that ninety nine percent of Kiswahili language teachers did not use ICTs in teaching and learning process. The one percent only used CDs and DVDs to revise the selected Kiswahili set books. In a study by Kyule *et al.,*, (2016) only 3.3 percent of the participants indicated that agriculture videos were used in their schools. Further, only 3.6 percent of the respondents from Kibwezi Sub-County recorded availability of agriculture videos in their school.

Video-aided teaching may be particularly valuable in the agriculture subject. Effective agriculture curriculum implementation requires that learners learn by doing (Konyango & Asienyo, 2015). To create conducive environment for learning by doing, learners need access to all the relevant agriculture leaning resources including school farms. In addition, teaching some agricultural practices such as dry land agriculture (DLA) in secondary school requires provision of learning resources such as animal or tractor drawn chisel and mould board ploughs, sub-soilers, planters, rollers among others (Mwenzwa, 2011). For schools to provide all these resources for learning purposes, adequate financial support is paramount. Unfortunately, many secondary schools operate on a 'shoe-string' budget hence, are not in a position to avail such resources. Video-based teaching can help secondary schools overcome the resource challenges and also improve on academic performance (Waiganjo *et al.,*, 2015).

2.4 Video-based Teaching and Acquisition of Practical Skills

The agriculture curriculum focuses on imparting both theoretical knowledge and practical skills among students. Empirical evidence shows that video-based teaching is more effective than the conventional methods in teaching practical skills. For instance, Vogel and Harendza (2016) found that, combining video clips with a structured study program provided the best opportunity for undergraduate medical student to grasp practical skills such physical

examination. The study utilized the systematic literature review design where 43 studies exploring at least one method of teaching practical skills in medicine were analyzed and synthesized. Rabab and Samar (2013) also found that video-based instructions provided greater success in immediate and follow-up measures when compared to traditional method of teaching physiology and human anatomy. In addition, students exposed to the video-based instruction rated highly in their acceptance and satisfaction survey. Gazbare and Rathi (2017) similarly found that the use of audio-video clips is an effective strategy for teaching practical skills in physiotherapy.

Effectiveness of video instruction in inculcating practical skills is not limited to the health sciences. Deegan *et al.,* (2015) found that a blended approach that incorporate multimedia materials such as video in traditional lecture are effective in imparting practical skills in agriculture among college students. The study utilized pretest-posttest experimental design where 130 students from Kildalton Agricultural College in Ireland were randomly assigned to the blended approach and traditional lecture group. Hynes *et al.,* (2008) also found that video-based instructions were effective in improving the comprehension, transfer, and retention of cognitive and psychomotor skills in 53 agricultural secondary schools in Upper Egypt. It was noted that these schools were poorly equipped limiting their ability to effective practical training; hence, they were no longer relevant in satisfying the skill demands of the agriculture sector. The video-based instruction provided a low-cost solution for transforming the teaching and learning of practical skills.

In his comparative analysis of videos versus the use of traditional extension agent techniques, Oladele (2008) found that farmers trained using video method exhibited greater rice cultivation knowledge and skills than those who were taught using traditional agent techniques. It was also found that farmers preferred video to the traditional extension method. The study recommended that video be used to supplement agent contact in the dissemination of agricultural information. This video method is seen as a viable solution to the extension agent-farmer ratio problem as farmers can buy the videos and watch by themselves. The study was conducted among 72 rice farmers in Ogun State, Nigeria. As Willmot *et al* (2012) explained, video teaching can inspire and engage students in student-centered learning activities. Equally, Allam (2006) observed that the use of moving images and sound to communicate a topic was indeed engaging and insightful and also enabled students to acquire a range of transferable skills in addition to filmmaking itself. These included research skills, collaborative working, problem solving, technology, and organizational skills.

A study by, Isiaka (2000) found that students acquire practical and social skills better when group discussions are incorporated in video instruction learning and also promotes social skills among students. Equally, Aroh (2006) stated that classroom learning could be made easier through the use of instructional technology. The use of instructional materials in teaching and learning of skills in agricultural science enhances students' achievement, increase interest of the students' and the enthusiasm of teachers. It also facilitates retention of what is learnt and stimulates physical and mental activity by both students and teachers. Furthermore, it simplifies and gives clarity to explanations than talking; provides a cognitive link between abstraction and reality to students. It also helps students to develop skills, scientific attitude and creativity (Ehimere, Bonjoru, & Tsojon, 2010). Video is a medium that engages viewers from many senses: sight and sound and can arouse excitement about a subject or concept. Students will enjoy the experience and retain more information from the class (Isiaka, 2000).

Tamunoiyowuna and James (2016) also found that incorporating of video-based instruction in teaching physics led to significant improvement of performance in practical tests of secondary school students in Port Harcourt Local Government Area of Rivers State in Nigeria. The study utilized a pretest-posttest with control design where a sample of 103 students in from 2 schools were grouped into the experimental and control group. The experimental group was taught using video-based instruction while the control was taught using conventional approaches that entailed real handling of apparatus. The students were assessed using the Physical Practical Skills Rating Scale before and after the lesson. The mean gain in physical practical scores for the two groups was then compared using the independent sample t-tests. Results showed students in the experimental group had a statistically higher mean gain than those in the control group indicating that they performed better than those in the control group.

Equally in USA a study carried out on the effect of video modeling on skill acquisition in learning the handball shooting revealed that the sixty girls that were first pre-tested, exposed to video aided lesson for five weeks on handball shooting then post-tested showed a great improvement in subject performance in the skill acquisition phase .Presenting video to the players improved their skills rather than energy (Sadeghi, Nobakht & Attari, 2013). An analysis of research trends on video use in medical education also revealed that use of video was beneficial to the medical students in gaining practical clinical skills and encouraging cognitive learning (Taslibeyaz, Aydemir & Karaman, 2017)

2.5 Video Teaching and Learners Motivation

Motivation is something that prompts or compels an individual to act in a particular manner at a particular time for attaining some specific goals and therefore there is a link between motivation and learning outcomes (Mangal, 2007). A study done in Spain on exploring the effect of the use of video for assessing the enhancement of students learning motivation using 487 students from three departments in Management Technical University of California indicated that, use of video has a positive effect on students motivation and perception regarding the enhancement of their learning (Targamadze & Petrauskiene, 2010).

Willmot *et al.*,, (2012) also showed that there is strong evidence that digital video reporting can inspire and motivate students when incorporated into student-centered learning activities. The work of Kearney and colleagues revealed the benefits of using video to produce authentic learning opportunities for students and how 'videos' encourage academic growth from an advocacy, research based perspective. (Kearney & Campbell 2010; Kearney & Schuck, 2006). Allam (2006) observed that the use of moving images and sound to communicate a topic is indeed engaging and insightful and also enables students to acquire a range of transferable skills in addition to filmmaking itself. These include research skills, collaborative working, problem solving, technology, and organizational skills. Related strategies can be adopted to ensure the agricultural curriculum can effectively be implemented to equip the students with agricultural skills.

Rhodes and Pufahi (2004) in a study on teaching of foreign of foreign languages to children through Video in United States of America's elementary schools revealed that, video programmes could be incorporated in teaching. This is due to the effectiveness and benefits of using video instruction as a medium of instruction. Its low cost returns on investment are attractive. Its flexibility, convenience and availability are quite good. In addition, when group discussions are incorporated in video instruction learning, it promotes social skills among students and also motivates them to learn more (Isiaka, 2000).

Aroh (2006) stated that in classroom, learning could be made easier through the use of instructional technology. The use of instructional materials in teaching and learning of skills in agricultural science enhances students' achievement, increase interest of the students' and the enthusiasm of teachers. It also facilitates retention of what is learnt and stimulates physical and mental activity by both students and teachers. Furthermore, it simplifies and

gives clarity to explanations than talking; provides a cognitive link between abstraction and reality to students. It also helps students to develop skills, scientific attitude and creativity (Ehimere, Bonjoru, & Tsojon, 2010). Video is a medium that engages viewers from many senses: sight and sound and can arouse excitement about a subject or concept. Students will enjoy the experience and retain more information from the class.

According to a study done on assessment how interactive videos increase students motivation in English, using interactive videos is a more enjoyable way to introduce English since they enable students to watch visual graphic and practical application of spoken language thus contributes to enhancing their interest in learning English .Video use also helps teachers to teach effectively, stimulate students interaction, increase students motivation and helps students in studying some technical concepts which are difficult to understand (Ma'rifah, 2013)

2.6 Theoretical Framework

This study was guided by two theories namely: Pragmatic Theory and Cognitive Theory of Multimedia Learning. The significance of these two theories in relation to this study is discussed in sections 2.6.1 and 2.6.2.

2.6.1 Pragmatic Theory

Dewey (1891) in his pragmatic theory indicated that the method used to teach cannot be separated from the subject matter while the arrangement of the subject matter determines the effectiveness of the teaching method employed. Effective teaching entails preparation of the teacher in terms of the subject matter and how the pupils interact with the subject matter. The teacher must connect the subject matter to the needs, desires, interests and stage of cognitive development. Conventional methods of teaching as indicated in the problem statement are challenging in terms of time management, topic coverage and overall curriculum implementation due to lack of access to instructional materials, cost of field trips and makes learners become discouraged and passive. This means that if the same agricultural content in secondary schools is arranged and presented in a different way say using instructional video teaching and learning may become effective. Use of video in teaching agriculture may help to overcome these obstacles by making learning easy, real and practical through motivation and sustaining interest of the learners towards learning. Video teaching presents the content in an exciting manner which the learner can comfortably engage in and learn effectively. Therefore

this theory is very helpful in understanding the effectiveness of video instruction in complementing or replacing the conventional method of teaching agriculture in secondary schools.

Tang (2019) observed that integration of technology in the classroom can help support pragmatic teaching and learning of second language.by creating contexts that enable learners to communicate and practice. Integration of technology was also found to support focused instructions with pragmatic features such as speech acts. Videos and pictures also appeared to direct learners' attention to the setting of the conversation enabling them to learn the appropriate use of language in different social contexts. Adeleye (2017) examined the implications of pragmatism in Nigerian schools and concluded that pragmatism makes teaching a problem-solving activity leading to more effective learning. It encourages the democratization of ideas by considering the interest of both students and teachers in classroom activities. Khasawneh, Miqdadi, and Hijazi (2014) also found that Dewey's pragmatism philosophy was being implemented in Jordanian public schools. Its application has helped to turn learners into independent and free-thinking individuals by taking into account their views. The application of the pragmatic philosophy in teaching within the public schools has also contributed to the democratization of the country. Pragmatic theory emphasizes on the teacher and the subject matter but does not exhaustively show how the learner benefits from the video aided instruction thus the need for the cognitive theory of Multimedia Learning that explains how the method ensures the use of five senses especially seeing thus improving the level of retention of knowledge and skills gained by the students and motivates them.

2.6.2 The Cognitive Theory of Multimedia Learning

Mayer &Moreno (2003) indicated that memory has two channels for information acquisition and processing: a visual/pictorial channel and an auditory/verbal processing channel. (Figure 1) Although each channel has inadequate capacity, the use of the two channels together can facilitate the integration of new information into existing learner cognitive structures. Use of both channels maximises the capacity of the working memory since both channels can be overwhelmed by high cognitive load. Sweller and Colleagues (1994) suggested that memory has several elements which relates to each other (Figure 1). The sensory memory collects information from the environment which is then selected and sorted for temporary storage and processing in the working memory that has inadequate capacity. This is done in preparation for encoding process into the long term memory which equally has unlimited

capacity. People learn more deeply from words and pictures than from words alone. The instruction media used to teach should not only provide coherent verbal, pictorial information but should also guide learners to select relevant words and images and also reduce the load for a single processing channel. The theory further explains the types of memory loads using a cognitive load model (Figure 2)

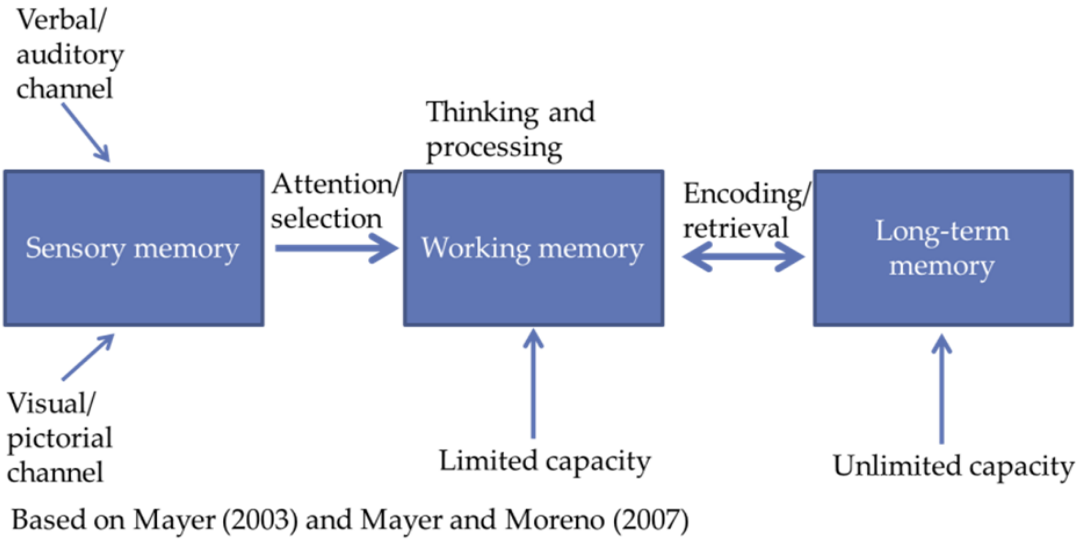

Figure 1. **Cognitive theory of multimedia learning**

The Cognitive Load Model (Figure 2) suggests that any learning experience has three components. The first of these is intrinsic load**,** which is determined by the ability of the learner to connect with the subject matter. Inherent level of difficulty is associated with a specific instructional topic which may not be altered by an instructor.eg Calculation of 2+2 versus solving differential equation. This component is very significant in this study because due to the challenges brought about by the conventional method of teaching, some topics like Soil and Water Conservation are difficult to teach conventionally. Therefore by using video instruction which makes learning easy, real and practical through motivation and sustaining interest of the learners, the difficulty level of some topics will reduce and promote efficient learning. The second component is the germane load, which indicates that the level of cognitive activity determines the learning outcomes. The ultimate goal of this component is for the learner to incorporate the subject matter under study into connected ideas. This component is very helpful in this study because it shows that for a learner to master the lesson, the learner should incorporate ideas coherently. Use of video instruction promotes interest of learners and the level of cognitive activity, thus making learning easy. The third

component is the extraneous load which is generated by the manner in which information is presented to learners and is under control of the instructional designer. This component results from poorly designed lessons. This study benefits a lot from this component because the manner in which information is presented to the learner determines the learning ability. Video instruction presents information in a more interesting, real and captivating way compared to the conventional approach of teaching.

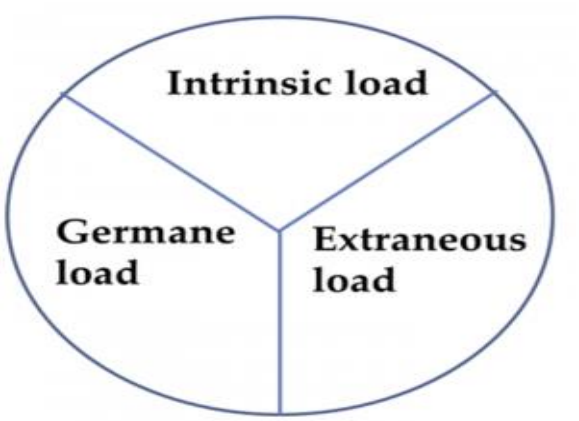

Figure 2. **Cognitive Load model**

These two theories complement each other because in encouraging the use of instructional video in teaching Agriculture because it organizes the content in an exciting ,real and captivating manner enables the learners to engage with the content using many senses especially sight thus making interesting and effective.

2.7 Conceptual Framework

A conceptual framework is a graphic representation of study variables and related concepts, as well as, the relationships between them. The study borrows from the Pragmatic and Cognitive theory of Multimedia Learning. The Pragmatic theory emphasizes that the efficiency of teaching is influenced by how the teacher arranges the subject matter in relation to the interaction of the subject matter to the needs, desires, interests and stage of student cognitive development. The cognitive theory of multimedia learning points out that meaningful learning is enhanced seeing and hearing which in turn improves memory. Figure 3 presents the conceptual framework for this study. As the Figure illustrates, the study has two dependent variables: (1) performance in theoretical and practical test and (2) expressed motivation level of learners. The variable will be measured at the interval level with scores ranging from 1-100. The independent variable of the study is the teaching approach/ method.

It is a categorical variable comprising of two groups: video-aided teaching group versus the convention teaching group. The interaction between independent and dependent variables is further influenced by intervening variables. Intervening variables are those not related to the purpose of the study but may affect the dependent variable. This comprised of availability of video related equipment, class size and infrastructure

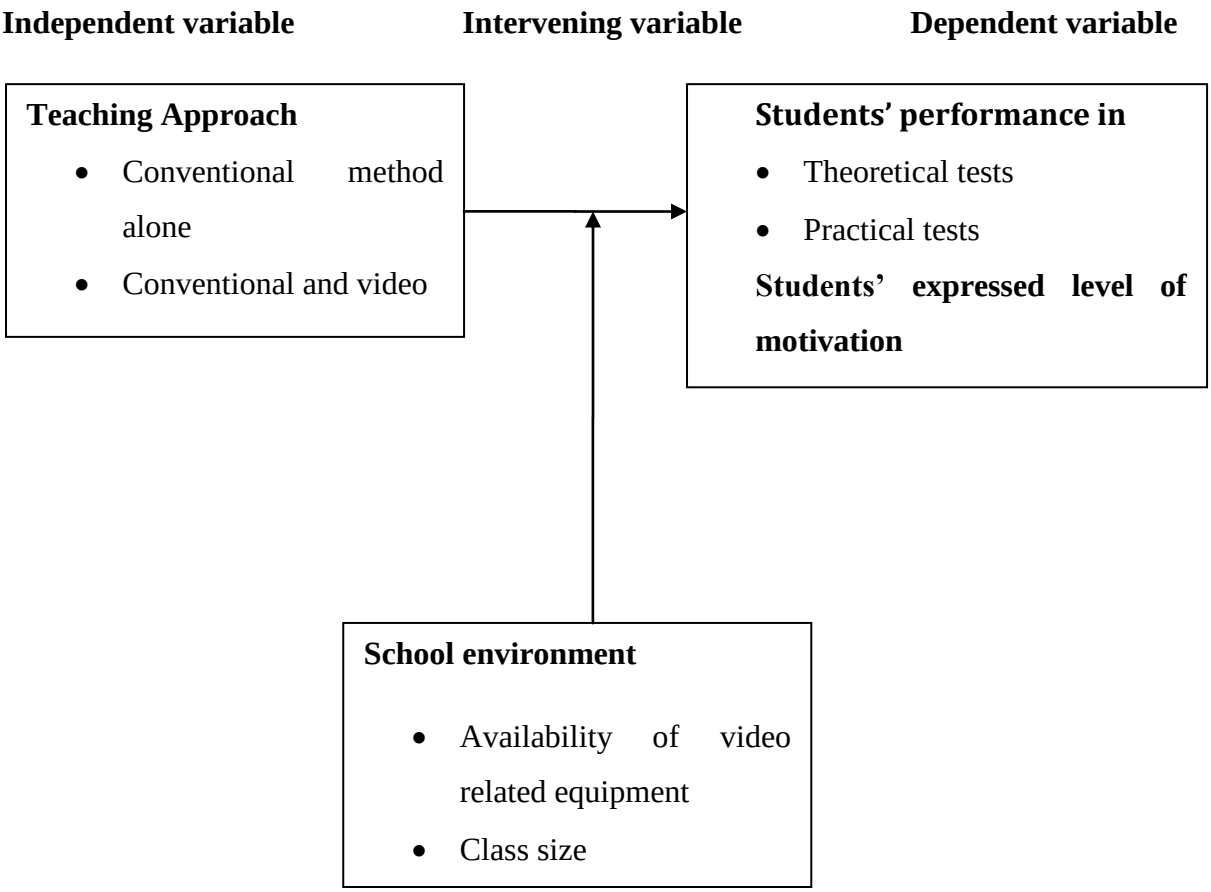

Figure 3. **Conceptual framework showing relationship between effectiveness of video in complementing the conventional method of teaching agriculture**

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology that was used in this study. The chapter describes the research design, target population, sample size and sampling procedure, data collection instruments, validity and reliability of research instruments and data analysis.

3.2 Research Design

The study adopted both survey and experimental design. The experimental design entailed directly manipulating the independent variable in order to observe effect on the dependent variable (Christensen *et al.,*, 2014). Specifically, the study utilized the pretest-posttest with control experimental design that entailed creation of a comparison group and collection of data before and after the intervention. This design was selected because the study aimed to examine whether video instructions have effects on students' performance in agriculture tests. On the other hand, survey design was used to collect data from the experimental group so as to examine the students expressed motivation. Survey design facilitated the collection of a considerable amount of data quickly, efficiently and accurately (Oso & Onen, 2005). Survey designs are perfect for describing current situations, making it possible to study self-reported facts about respondents, their feelings and opinions (Kombo & Tromp, 2013).

3.3 Location of the Study

The study was conducted in Molo sub-county in Nakuru County. Molo lies along the Mau Forest which runs on the Mau Escarpment. The bordering Sub-Counties include Njoro, Kabarnet, and Rongai. It has 33 public secondary schools and 6 private secondary schools. The area was chosen because of the high number of schools teaching Agriculture despite the scarcity of resources for field trips, inadequate school farm, declining performance in the subject and lack infrastructure to facilitate video teaching. The study used four public secondary schools that teach Agriculture.

3.4 Target Population

Target population refers to the entire group upon which the researcher intends to generalize findings (Christensen *et al.,*, 2014). This study targeted all form one Agriculture students (4,220) attending public secondary schools in Molo-Sub-County.

3.5 Sampling Procedure and Sample Size

The sample comprised Form One students in four public secondary schools. The researcher purposively identified the schools that participated in the study based on the following criteria; (1) must be a Sub-County school, (2) must be a mixed school (3) must not have covered the topic of interest at the time of study, (4) must not be using the video-based instruction, (5) must not be implementing another intervention that can directly affect performance in agriculture, (6) must be willing to participate. Purposive sampling was used to select the schools on which the researcher the research objectives could best be realized by selecting schools with above named characteristics.

The four schools were randomly allocated into either intervention or control group using the rotary method. This method entailed writing the name of the four schools on small pieces of papers that were then folded and mixed up. A third party was asked to pick two of the folded pieces of paper and the schools whose names were contained therein were included in the intervention group. The other two schools were used as the control. Students were picked as they were in terms of the number in each class where a total of 172 form one students from the selected four schools completed both the pretest and post-test exercises. This group comprised the study sample.

Table 1.

Sampling Plan

Group	**Sample Size**
Intervention	89
Control	83
Total	**172**

3.6 Instrumentation

Data was collected using two types of instruments namely achievement test and questionnaire.

An achievement test was administered before and after the intervention period. The test was based on the form-one topic, a sample topic being Water Supply, Irrigation, and Drainage. The test comprised of 11 open-ended items/ questions examining acquisition of theoretical knowledge and 1 practical task examining the acquisition of practical skills (see Appendix

A). The student score in each of the two sections was computed and served as the dependent variables.

A semi-structured questionnaire was used to gather information with respect to students' motivation.(see Appendix B) The use of questionnaires was justified by the fact that it was affordable and an effective way of collecting information from the population in a short time. The questionnaire comprised of closed-ended items in order to facilitate statistical analysis. Questionnaires were self-administered, responded to and collected back by the researcher after completion by the respondents for analysis.

3.6.1 Validity

The achievement test and questionnaire were subjected to scrutiny by four peers and the two experts in the Department of Agricultural Education and Extension to ascertain their content, construct, and face validity before administering them for the pilot study.

3.6.2 Reliability

Reliability of the achievement test and questionnaire was estimated using the test-retest method. This technique assesses the internal consistency of a given instrument by collecting data into waves and comparing results of the first wave with those of the second wave using the Pearson Product-Moment correlation test (Rispin, Huff, & Wee, 2017). The test (theoretical and practical) and the questionnaire were piloted in one of the schools within Njoro sub-County that has similar characteristics as the sampled schools. A total of 35 students were subjected to achievement test and also completed the questionnaire, which they were asked to complete again after 2 days. The questionnaire was coded into the statistical package for social sciences software and data for the two waves of data collection was entered. The achievement tests were marked and scores for the practical and theoretical test computed for the two waves of data collection. The data for the first wave was compared with the data from the second wave. Results are presented in Table 2.

Table 2.

Reliability Test Results

Instrument	Number of Items	Correlation Coefficients
Theoretical test	11 (marked out of 100)	0.783
Practical test	1(Marked out of 100)	0.732
Questionnaire	13	0.919

As Table 2 illustrates, the two sections of the test yielded a correlation coefficient that exceeded the 0.7, which is often used as the minimally acceptable standard for the test-retest reliability method. This implies that there was a close association between the students' scores in the first and second test, which is expected for an instrument whose items are consistent. The questionnaire also had a coefficient that was greater than 0.7 suggesting that the instrument also had an acceptable level of reliability.

3.7 Data Collection Procedures

The researcher obtained a clearance form from Board of Post Graduate Studies that enabled the study to be undertaken through authorization of the National Commission for Science Technology and Innovations (NACOSTI). Official request to undertake the study and to access the information from the students in their respective schools was sought from the County Director of Education, Nakuru County. The researcher also contacted the Principals of Schools that met the inclusion criteria, informed them accordingly about the study, and requested to conduct the study in their Schools. The researcher then visited the Schools in person and further explained the purpose of the study to the Principal and teachers of Agriculture, assured them of highest level of confidentiality, and asked for their approval.

The researcher then trained graduate Agriculture teachers in the two Schools within the intervention group on how to administer the tests. Teachers in the Schools that formed the intervention group were also trained on how to implement the video instruction. The students in two schools were taught for two weeks by the Agriculture teacher using conventional method aided with a video. The intervention group also responded to a questionnaire. The control group was taught for two weeks by the Agriculture teacher using the conventional method alone. At the end of the two weeks, the same test was administered to students in both groups. The results of the tests and questionnaires were marked by the researcher and used in data analysis.

3.8 Data Analysis

Both descriptive and inferential statistics were employed in the data analysis. The collected data was edited, coded and analyzed using Statistical Package for Social Sciences (SPSS). Percentages, frequencies, mean, and standard deviation were used in the descriptive statistics analysis. The goal of the descriptive statistics analysis was to describe each of the variables of interest. Inferential statistics analysis was done using t-tests. The test statistics was evaluated at the 0.05 level of significance. Results were presented using tables and narratives

Table 3.

Summary of Data Analysis

Hypothesis tested	**Independent variables**	**Dependent variables**	**Statistical tests**
HO_1: There is no statistically significant difference in theoretical test performance of students exposed to video instructions and those subjected to conventional approach to teaching only.	Method of teaching (Video+ conventional approach vs. conventional only)	Students' performance in Theoretical test	Inferential statistics: T-test Descriptive statistics: Percentages, frequencies, mean standard deviation
HO_2: There is no statistically significant difference in practical test performance of students exposed to video instructions and those subjected to conventional approach to teaching only.	Method of teaching (Video+ conventional approach vs. conventional only)	Students' performance in Practical tests	Inferential statistics: T-test Descriptive statistics: Percentages, frequencies, mean standard deviation
HO_3: There is no statistically significant difference in the practical and theoretical test results by students taught with and without video.	Method of teaching (Video+ conventional approach vs. conventional only)	Students' performance in Theoretical tests and Practical tests	Inferential statistics: T-test Descriptive statistics: Percentages, frequencies, mean standard deviation

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

The aim of the current study was to examine the effect of video instruction on students' performance in Agriculture test in Molo Sub-County (Appendix H).Performance test scores and survey data were collected from a sample of 172 students and analyzed using both descriptive and inferential statistics. This chapter presents and discusses the results of the analysis. The interpretation of these results is based on test scores students obtained after being taught either conventionally or with video as an addition. The chapter is organized in line with the objectives of the study.

4.2 Background Characteristics of the Sample

A total of 172 Form One students were able to complete the study by going through six class periods on Water Supply, Irrigation, and Drainage, and taking both the pre-test and post-test. These students were divided into two groups in line with the methods of instruction used during the six class periods: (1) conventional +video, and (2) conventional only

Table 4.

Respondents Distribution by Teaching Method Used

Group	Frequency	Percentage
Conventional +video	89	51.7
Conventional only	83	48.3
Total	**172**	**100.0**

As shown in Table 4, 89 students representing 51.7 percent of the sample were taught using both conventional methods with addition of video instruction (appendix F). The remaining 83 students representing 48.3 percent of the sample were taught using conventional teaching methods only (appendix G). The study also captured details regarding the gender of the respondents as shown in Table 5.

Table 5.

Respondents Distribution by Gender

Gender	Frequency	Percentage
Male	116	67.4
Female	56	32.6
Total	**172**	**100.0**

As Table 5 illustrates, 116 of the students representing 67.4 percent of the sample were male while the remaining 56 students representing 32.6 percent of the sample were female.

4.3 Effect of Video Instruction on Theoretical Test Performance

The first objective of the study was to examine the effect of video instruction on the students' performance on theoretical tests. To establish this effect, it was first of all important to examine the students' performances on both the pre-test and post-test. A summary of the student's performance in the theoretical pre and posttest is presented in the tables 6 and 7.

Table 6.

Summary of All Students Scores in Theoretical Pre and Post Test

Group	N	Minimum score	Maximum score	Mean score	S.D	Mean gain
All Students(pre-test)	172	9	43	22.93	8.196	29.57
All students (post-test)	172	7	96	52.50	21.494	

The pre-test was essential in this study as it enabled the researcher to assess and control the students' prior knowledge on the topic being taught. Binder *et al.*, (2019) asserts that in order to accurately determine how much learning has taken place, it is not sufficient to assess the students' knowledge at the end of the lesson. It is also important to establish the knowledge and skills that the students had before the lesson. As table 6 illustrates the mean score for all the students in the theoretical pre test was 22.93 which rose to 52.50 after post test. This revealed a mean gain of 29.57 meaning that the approach employed in teaching had a significant impact on the student's performance.

Table 7.

Summary of Students (Conventional & Conventional +Video) Scores in Theoretical Pre-Test

Group	N	Minimum score	Maximum score	Mean Score	S.D	Mean gain
Conventional(pre -test)	83	9	37	19.88	6.654	20.11
Conventional(post-test)	83	11	74	39.99	15.149	
Conventional+ Video (pre-test)	89	9	43	25.77	8.506	38.40
Conventional+ Video (post-test)	89	7	96	64.17	19.968	

As Table 7 illustrates, the mean score for the students taught using conventional + video addition method in the pre-test was 25.77 while that of students taught using the conventional methods only was 19.88. This suggests that generally, students who were taught using both video and conventional methods had greater prior knowledge on the Water Supply, Irrigation, and Drainage topic than their counterparts in the control group. In the conventional + video group, the lowest students had 9 percent while the highest had 43 percent as shown in table 8. In the group taught using conventional method only, the lowest also scored 9 percent while the highest scored 37 percent. The standard deviation values also confirm the relatively large dispersion of scores around the mean.

On post test results, Table 7 illustrates that the mean score for the conventional + video group was 64.17 as compared to 39.99 for the conventional group This implies that generally students taught using both video and conventional methods performed better than the students taught using conventional methods only. The main gain for the conventional + video group was also higher (mean gain = 38.40) than that of the conventional only group (mean=20.11). As Binder *et al.,* (2019) explained, the main gain represents the knowledge acquired by students during the lesson. It is the different between the knowledge that the student had before the lesson and the knowledge that the student has after the lesson. The higher mean different among students in the conventional + video group suggest that students in this group gain more knowledge during the lesson than those in the conventional only group. These findings are consistent with the study by Edache-Abah & Mumuni (2019) who also found that biology students who had been taught by using online you tube content in Nigerian secondary schools had higher mean gain in their performance than

4.3.1 Difference between Theoretical Pre–Test and Post-Test mean score in the Conventional Only Group

To assess the effect of using conventional teaching methods only on students' understanding of the theoretical concepts, the study compared the theoretical pre-test mean score and post-test mean score of students in the convention only group. The mean scores are summarized in Table 8.

Table 8.

Theoretical Pre-Tests and Post-Test Means Score in the Conventional Only Group

		Mean sore	N	Std. Deviation
Pair 1	Pre-Test Theory Percent Score	19.88	83	6.654
	Post-Test Theory Percent Score	39.99	83	15.149

As Table 8 illustrates, students in the conventional group had a mean score of 19.88 percent in the theoretical pre-test and mean score of 39.99 percent in the theoretical post-test. This implies that the theoretical mean score improved by 20.11 percent after the lesson. The paired sample t-test was used to examine whether this improvement (mean difference) was statistically significant. Results are presented in Table 9.

Table 9.

Paired Sample T-test Results on Theoretical Pre-Tests and Post-Test Means score in the Conventional Only Group

Paired Differences							
			95% Confidence Interval				
Mean Difference	Std. Deviation	Std. Error Mean	of the Difference Lower	Upper	t	df	Sig. (2-tailed)
20.115	13.803	1.515	17.101	23.129	13.277	82	.000

As Table 9 exemplifies, the difference in the pre-test and post-test mean score was statistically significant (t= 13.129, p= .000). This implies that the delivery of the lesson using the conventional teaching methods only led to a significant improvement in the students understanding of the theoretical concept related to the topic of Water Supply, Irrigation, and Drainage.

4.3.2 Difference Between Theoretical Pre–Test and Post-Test Scores in the Conventional + Video Group

To also examine the effect of conventional + video teaching method on students understanding of theoretical concept, the study compared the theoretical pre-test mean score and post-test mean score of students in conventional + video group. Results are presented in Table 10.

Table 10.

Theoretical Pre-Tests and Post-Test Means in the Conventional+ Video Group

		Mean score	N	Std. Deviation
Pair 1	Pre-Test Theory Percent Score	25.77	89	8.506
	Post-Test Theory Percent Score	64.17	89	19.968

As Table 10 shows, the students in the conventional + video group has a mean score of 25.77 percent in theoretical pre-test, which changed to 64.17 percent in the post-test. This marks an improvement of 38.29 percent in theoretical mean score after the delivery of the lesson. The significance of this improvement was tested using the paired sample t-test. Results are presented in Table 11.

Table 11.

Paired Sample T-test Results on Theoretical Pre-Tests and Post-Test Means in the Conventional+ Video Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean Difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
38.398	18.954	2.009	34.405	42.390	19.111	88	.000

As Table 11 indicates, the difference between the theoretical pre-test mean score and the theoretical post-test mean score was statistically significant. This implies that the use of a combination of video and conventional teaching methods led to a significant improvement of students understanding of theoretical concepts related to the subject.

4.3.3 Difference in Theoretical Post-Test Scores Between Convention Only and the Conventional + Video Groups

To test the first research hypothesis, the study examined the difference in theoretical test mean score of students taught using a combination of video and convention and that of students taught using the conventional methods only. The theoretical post-tests scores for the two groups are summarized in Table 12.

Table 12.

Difference in Theoretical Post-Test Mean Score Between the Two Groups

Group	N	Mean score	Std. Deviation
Conventional	83	39.99	15.149
Conventional + video	89	64.17	19.968

As Table 12 illustrates, students in the conventional + video group had a high mean score of 64.17 percent in the theoretical post-test as compared to their counterparts in the conventional only group who had a mean score of 39.99 percent. This implies that students taught using a combination of conventional and video method had a better understanding of theoretical concepts related to the subject than students who were taught using the conventional method only. Independent sample t-test was used to test whether the differences in theoretical post-test mean scores of the two groups is statistically significance. Results are presented in Table 13.

Table 13.

Independent Sample T-test Results Difference in Theoretical Post-Test Mean Score Between the Two Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	8.266	.005	8.896	170	.000	24.172	2.717	18.809	29.536
Equal variances not assumed			8.981	163.364	.000	24.172	2.692	18.857	29.487

As shown in Table 13, the mean difference observed in the theoretical posttest means scores of the two groups of students (Mean difference= 24.172) was statistically significant (t= 8.981, p= .000). This implies that contrary to the first research hypothesis, there was a statistically significant difference in theoretical test performance of students exposed to video instructions and those subjected to conventional teaching only. Since the students in the video

+ convention group had the higher mean score, it means that incorporation of video instructions had a significant and positive effect on the students understanding of the theoretical concepts in the subject taught.

This finding is consistent with studies conducted in other settings such as Nasab *et al.,* (2002), where it was found that students who were subjected to video-based teaching recorded better performance than those involved in the lecture method. Isiaka (2007) also found that students exposed to the video and realia (use of real objects) approaches of teaching had significantly better performance than those taught using charts or with no instructional media. Gambari *et al.,* (2014) also found that students who were exposed to video multimedia instruction performed better than their counterparts who were subjected to conventional teaching methods in a biology examination. The current finding adds to the existing body of evidence that demonstrate that the use of video instruction has a positive effect on students' academic performance.

4.3.3.1 Tests of Hypothesis one (H_{01})

The first hypothesis stated that *there was no statistically significant difference in theoretical test performance of students exposed to video instructions and those subjected to conventional teaching only.* Three paired sample t-tests were used to test for significance in variations existing in the conventional, conventional + video and the whole sample.

Table 14.

Paired Sample T-test Results Differences in Theoretical Pre-Tests and Post-Test Means Score in the Conventional Only Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean Difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
20.115	13.803	1.515	17.101	23.129	13.277	82	.000

As Table 14 exemplifies, the difference in the pre-test and post-test mean score was statistically significant (t= 13.129, p= .000). This implies that the delivery of the lesson using the conventional teaching methods only led to a significant improvement in the students understanding of the theoretical concept related to the subject of Water Supply, Irrigation, and Drainage

Table 15.

Paired Sample T-test Results differences in Theoretical Pre-Tests and Post-Test Means in the Conventional+ Video Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean Difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
38.398	18.954	2.009	34.405	42.390	19.111	88	.000

As Table 15 indicates, the difference between the theoretical pre-test mean score and the theoretical post-test mean score was statistically significant. This implies that the use of a combination of video and conventional teaching methods led to a significant improvement of students understanding of theoretical concepts related to the subject.

Table 16.

Independent Sample T-test Results Differences in Theoretical Post-Test Mean Score Between the Two Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	8.266	.005	8.896	170	.000	24.172	2.717	18.809	29.536
Equal variances not assumed			8.981	163.364	.000	24.172	2.692	18.857	29.487

As shown in Table 16, the mean difference observed in the theoretical pre-test means scores of the two groups of students (Mean difference= 24.172) was statistically significant (t= 8.981, p= .000). This implies that contrary to the first research hypothesis, there was a statistically significant difference in theoretical test performance of students exposed to video instructions and those subjected to conventional teaching only. Since the students in the

conventional +video group had the higher mean score, it means that incorporation of video instructions had a significant and positive effect on the students understanding of the theoretical concepts in the subject taught. The findings are congruent with the study by Edache and Mumuni (2019), who found that incorporation of Youtube video in the traditional methods of teaching biology, increased the performance of secondary school students in Nigeria. The study concluded that integration of video technology in the classroom can help to promote the shift from teacher-centered approach of teaching to a student-centered approach.

4.4 Effect of Video Instruction on Practical Test Performance

The second objective of the study was to examine the effect of video instruction on the students' performance in the Agriculture practical test. To bring out this effect, the study also began by examining the students practical test performance in both the pre-test and post-test. Table 17 and 18 presents a summary of the students' performance in the practical pre and post-test.

Table 17.

Summary of All Students Scores in Practical Pre-Test and Post-Test

Group	N	Minimum score	Maximum score	Mean score	S.D
All students(pre-test)	172	0	100	53.20	34.049
All students(post-test)	172	0	100	81.25	27.323

Conducting the pre-test was meant to control the effect of the students' prior-knowledge so as to arrive at a valid conclusion regarding the effect of incorporating video instruction on students' performance. As table 17 illustrates the mean score for all the students in the practical pre-test was 53.20 which rose to 81.25 in the post test. This revealed a mean gain of 28.05 meaning that the approach employed in teaching had a significant impact on the student's performance in the practical tests

Table 18.

Summary of Students (Conventional & Conventional +Video) Scores in Practical Pre-Test

Group	N	Minimum score	Maximum score	Mean score	S.D
Conventional(pre-test)	83	0	100	48.49	30.331
Conventional(post-test)	83	0	100	73.49	31.320
Conventional + video)(pre-test)	89	0	100	57.58	36.813
Conventional + video(post-test)	89	0	100	88.48	31.320

On pre-tests scores, Table 18 illustrates, the average performance of the students in the conventional + video group (Mean= 57.58) was better than that of students in the conventional only group (Mean= 48.49). This implies that students in the conventional + video group had greater prior knowledge relating to the topic than those in the conventional group. There were also major variation in the performance of students in both groups with some students scoring as low as 0 and others scoring as high as 100 percent. The standard deviation for both the pre-test (SD= 36.813) and posttest (SD= 30.331) also indicate that the students' scores were widely spread around the mean.

The post-test scores as illustrated in table 18, the students in conventional + video group also recorded better average performance (Mean= 88.48) in the practical post-test than the students in conventional only group (Mean= 73.49) in table 19. The mean scores for the post-test were also higher than those of pre-test in both groups. This improvement was expected as the post-test was administered after the students in both groups were taught the issues at hand. Major variations in the students' were also observed in both groups with the lowest students scoring a 0 and the highest getting 100%. The mean score for the entire sample (both the intervention and control group) was 81.25 percent. The findings agree with Gambari *et al.,* (2014) who found that the incorporation of video instruction in teaching biology improved students' performance in biology practical tests. Tamunoiyowuna & James (2016) also found that students who were taught using videotaped instructions had higher physics practical tests than those who were taught using conventional methods.

4.4.1 Difference Between Practical Pre–Test and Post-Test in the Conventional Method Group

To examine the effect of teaching using conventional methods only on students understanding of practical aspects of the subject, the study compared the practical pre-test mean score and the practical post-test mean score of students in the conventional method group. The mean scores are summarized in Table 19.

Table 19.

Difference in Practical Pre-Test and Post-Test scores in the Conventional Group

		Mean score	N	Std. Deviation
Pair 1	Pre-Test Percent Score	48.49	83	30.331
	Post-Test Practical Percent Score	73.49	83	31.320

As Table 19 illustrates, the students taught using conventional methods only had a mean score of 48.49 percent in the practical pre-test and mean score of 73.49 percent in the post-test. This implies that teaching using the conventional method only led to a mean score increase of 25 percent. The paired sample t-test was used to examine whether this difference was statistically significantly. Results are shown in Table 20.

Table 20.

Paired Sample T-test Results Difference in Practical Pre-Test and Post-Test Scores in the Conventional Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
25.000	28.424	3.120	18.793	31.207	8.013	82	.000

As Table 20 demonstrates, the difference between the pre-test mean score and post-test mean score of students in the conventional group was statistically significant (t= 8.013, p=.000). This implies that there was a significant improvement in the students understanding of the practical aspects of the subject after being taught using the conventional methods only.

4.4.2 Difference Between Practical Pre–Test and Post-Test in the Conventional + Video Group

To understand the effect of using a combination of video and conventional teaching methods on students understanding of practical agricultural concepts, the practical pre-test scores of the students in the conventional + video group were compared with the practical post test scores. The mean scores are summarized in Table 21.

Table 21.

Difference in Practical Pre-Test and Post-Test Scores in the Conventional + Video Group

		Mean score	N	Std. Deviation
Pair 1	Post-Test Practical Percent Score	89.61	89	18.390
	Pre-Test Practical Percent Score	57.58	89	36.813

As Table 21 shows, the pre-test mean score of students in the conventional + video group was 57.58 percent while the post-test mean scores was 89.61. The mean score improved by 32.02 percent after the students were taught using a combination of video and conventional methods. The paired sample t-test was used to test whether this difference is statistically significant. Results are presented in Table 22

Table 22.

Paired Sample T-test Results Difference in Practical Pre-Test and Post-Test Scores in the Conventional + video Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
32.022	38.248	4.054	23.965	40.079	7.898	88	.000

As shown in Table 22, the difference in pre-test and post-test mean scores in the conventional + video group was statistically significant (t= 7.898, p= .000). This implies that there a significant improvement in the students understanding of the practical aspects of the subject after they were taught using a combination of video and conventional method.

4.4.3 Difference in Practical Post-Test Scores Between Convention Only and the Conventional + Video Groups

To establish the effect of integrating video instruction on students' performance in practical test, the study examined whether there was a difference between the practical post-test mean score of the group taught using a combination of video and conventional methods and that of students taught using conventional methods only. A summary of the mean scores is presented in Table 23.

Table 23.

Difference in Practical Post Test Scores Between the Two Groups

Group	N	Mean score	Std. Deviation
Conventional + video	89	89.61	18.390
Conventional Only	83	73.49	31.320

As Table 23 indicates, the students in the conventional + video group had a higher mean score in the practical post-test (Mean = 89.61) than their counterparts in the conventional only group (Mean=73.49). This implies that the students taught using a combination of video and conventional method had on average a better understanding of the practical aspects of the subject taught when compared to students who were taught using conventional methods only. The independent sample t-test was used to determine whether the difference in mean scores was statistically significant. Results are presented in Table 24.

Table 24.

Independent Sample T-test Results Difference in Practical Post Test Scores Between the Two Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	20.133	.000	4.147	170	.000	16.113	3.885	8.444	23.782
Equal variances not assumed			4.077	130.624	.000	16.113	3.952	8.295	23.931

As Table 24 illustrates, the difference in mean score between the conventional only group and the conventional + video group was 16.113 percent. The independent sample t-test showed that this difference was statistically significance (t=4.077, p= .000). This implies that contrary to the second research hypothesis, there was a statistically significant difference in practical test performance of students exposed to video instructions and those subjected to conventional teaching only. Therefore the conclusion made was that integrating the video instruction in the teaching of Agriculture improves the students understanding of practical concepts.

This finding reinforces earlier studies such as Vogel and Harendza (2016) where it was observed that combining video clips with a structured study program provided the best opportunity for undergraduate medical student to grasp practical skills such physical examination. Gazbare & Rathi (2017) also established that the use of audio-video clips is an effective strategy for teaching practical skills in physiotherapy. The current finding is also congruent with Deegan *et al.,* (2015) who found that a blended approach that incorporate multimedia materials such as video in traditional lecture are effective in imparting practical skills in agriculture among college students. The finding is also in line with Oladele (2008) who found that farmers trained using video method exhibited greater rice cultivation knowledge and skills than those who were taught using traditional agent techniques.

4.4.3.1 Test of Hypothesis two (H_{02})

The second hypothesis stated *there was no statistically significant difference in practical test performance of students exposed to video instructions and those subjected to conventional teaching only.* Three paired sample t-tests were used to test for significance in variations existing in the conventional, conventional + video and the whole sample.

Table 25.

Paired Sample T-test Results on Differences in Practical Pre-Test and Post-Test Scores in the Conventional Group

Paired Differences								
			95% Confidence Interval of the Difference					
Mean difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)	
25.000	28.424	3.120	18.793	31.207	8.013	82	.000	

As Table 25 demonstrates, the difference between the pre-test mean score and post-test mean score of students in the conventional group was statistically significant (t= 8.013, p=.000). This implies that there was a significant improvement in the students understanding of the practical aspects of the subject after being taught using the conventional methods only.

Table 26.

Paired Sample T-test Results on Differences in Practical Pre-Test and Post-Test Scores in the Conventional + Video Group

Paired Differences							
			95% Confidence Interval of the Difference				
Mean difference	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
32.022	38.248	4.054	23.965	40.079	7.898	88	.000

As shown in Table 26, the difference in pre-test and post-test mean scores in the conventional + video group was statistically significant (t= 7.898, p= .000). This implies that there a significant improvement in the students understanding of the practical aspects of the subject after they were taught using a combination of video and conventional method.

Table 27.

Independent Sample T-test Results Difference in Practical Post Test Scores Between the Two Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	20.133	.000	4.147	170	.000	16.113	3.885	8.444	23.782
Equal variances not assumed			4.077	130.624	.000	16.113	3.952	8.295	23.931

As Table 27 illustrates, the difference in mean score between the conventional only group and the conventional + video group was 16.113 percent. The independent sample t-test showed that this difference was statistically significance (t=4.077, p= .000). This implies that contrary to the second research hypothesis, there was a statistically significant difference in practical test performance of students exposed to video instructions and those subjected to conventional teaching only. The conclusion made that integrating the video instruction in the teaching of agriculture improves the students understanding of practical concepts. The finding agrees with Isiaka (2000) who found that students acquire practical and social skills better when group discussions are incorporated in video instruction learning and also promotes social skills among students. Equally, the finding is congruent with Aroh (2006) who noted that classroom learning could be made easier through the use of instructional technology. The use of instructional materials in teaching and learning of skills in agricultural science enhances students' achievement, increase interest of the students' and the enthusiasm of teachers. Video is a medium that engages viewers from many senses: sight and sound and can arouse excitement about a subject or concept. Students will enjoy the experience and retain more information from the class.

4.5 Comparison of the Differences between Theoretical and Practical Post Test Results

The third objective of the study was to compare theoretical and practical post-test results for students taught conventionally without video those taught conventionally with video assistance in which each of the two groups excelled. Three areas were examined in this comparison.

4.5.1 Difference in Theoretical and Practical Performance in Conventional + video Group

To begin with, the study sought to compare the theoretical and practical test results among the students taught using conventional methods only Results of the analysis are presented in Table 28:

Table 28.

Comparison of Theory and Practical Post-Test Performance for the Conventional Only Group

Test	N	Minimum	Maximum	Mean	S.D.
Theory Test Score	83	11	74	39.99	15.149
Practical Test Score	83	0	100	73.49	31.320

As shown in Table 28, the mean score for students in this group was 39.99 as compared to 73.49 for the practical test. Thus, on average, the students in this group performed better in the practical test than in the theoretical test. There were major variations in practical test scores with the lowest scoring 0 and the highest scoring 100 percent as compared to the theoretical test scores where the lowest scored 11 percent while the highest scored 74 percent. The paired sample t-test was used to compare the difference in theoretical and practical mean scores with the conventional only group. Results are presented in Table 29.

Table 29.

Paired Sample T-test Results for the Difference Between Theory and Practical Post-Test Performance in the Conventional Only Group

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	-33.499	30.137	3.308	-40.080	-26.919	-10.127	82	.000

a. Intervention made = Conventional Only

As Table 29 demonstrates, the difference between the theoretical and practical mean scores was -33.499 percent. This difference is higher than that observed in the conventional+ video group (-24.316). The standard deviation is also high (30.137 percent) suggesting that the difference in theoretical and practical test performance varied considerably from one student to another. The lower and upper bound suggest that the difference in theoretical and practical

test performance within the population of agriculture students in Molo Sub-County would fall between -40.080 and -26.919 at the 95 percent confidence level. The t-value for this difference was -10.127 while the significance value was .000 suggesting that the differences between theoretical and practical test performance among the students in the conventional group was statistically significant. A negative t-value implies that the sample mean is less than the hypothesized mean since the practical scores (which were higher) were deducted from the theoretical scores.

4.5.2 Difference in Theoretical and Practical Post-Test Performance in Conventional + video Group

Second, the study examined the difference in theoretical and practical test performance within the group of students who were taught using video and conventional methods. Results of the analysis are presented in Table 30:

Table 30.

Comparison of Theory and Practical Post-Test Performance for the Conventional + Video Group

Test	N	Minimum	Maximum	Mean	S.D.
Theory Post-Test Score	89	7	96	64.17	19.968
Practical Post-Test Score	89	0	100	88.48	20.662

As shown in Table 30, students in the conventional + video group scored an average of 64.17 percent in the theoretical test as compared to an average of 88.48 percent in the practical tests. There was however major variations in the practical test performance with the lowest students scoring 0 and the highest scoring 100 percent as compared to the theoretical test performance where the lowest had 7 percent and the highest scored 96 percent. In both tables (23 and 24) it shows that there are significant variations in both theoretical and practical test scores when video is introduced in the method. A greater improvement in the scores is evidenced in the practical test.

In order to test the hypothesis a paired sample t-test was used to establish whether the difference in performance between the theoretical and practical test was statistically significant. Results are presented in Table 31.

Table 31.

Paired Sample T-Test Results for the Difference Between Theory and Practical Performance in the Conventional + Video Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	-24.316	26.493	2.808	-29.897	-18.735	-8.659	88	.000

a. Intervention made = Conventional+ video

As Table 31 illustrates, the differences in the mean score for the two tests was -24.316 percent. The figure is negative because the mean score for practical test (which was higher) was deducted from the mean score for theoretical test. The standard deviation was 26.493 suggesting that the difference between theoretical and practical test performance varied considerably was one student to another. The lower and upper bound figures represent the confidence interval. They suggest that the difference between the mean scores for the two tests within the population of students in Molo falls between -29.897 and -18.735. The t-value for this difference was -8.659 while the significant value as .000 suggesting that the difference between theoretical and practical test performance within the conventional +video group was statistically significant. A negative t-value implies that the sample mean is less than the hypothesized mean since the practical scores (which were higher) were deducted from the theoretical scores.

4.5.3 Difference in Theoretical and Practical Test in the Whole Sample

Third, the study sought to establish the difference between theoretical and practical test performance among both groups of students (conventional + video and conventional only, n=172). Results are presented in Table 32:

Table 32.

Comparison of Theory and Practical Performance for Both Groups

Test	N	Minimum	Maximum	Mean	S.D.
Theory Test Score	172	7	96	52.50	21.494
Practical Test Score	172	0	100	81.25	27.323

As Table 32 demonstrates, the mean score in theoretical test for entire sample was 52.50 as compared to 81.25 for the practical test. This indicates that the students in both groups generally performed better in the practical test than in theoretical tests. There were greater variations in practical test performance with the lowest scoring 0 and the highest scoring 100 than in the theoretical test where the lowest scored 7 and the highest scored 96. The paired sample t-test was used to compare whether the difference observed between theoretical and practical test scores is statistically significant. Results are presented in Table 33.

Table 33.

Paired Sample T-test Results for the Difference Between Theory and Practical Performance in Both Groups

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	-28.747	28.599	2.181	-33.052	-24.443	-13.183	171	.000

As Table 33 exemplifies, the differences been the theoretical mean score and practical mean score in the entire sample was -28.747. The lower and upper value suggests that the difference in mean score within the population of agriculture students in the study area would be between -33.052 and -24.443. The t-value for this difference was -13.183 while the significance value was .000 suggesting that the difference between theoretical and practical test performance in both the conventional + video and conventional only groups is

statistically significant. These findings are congruent with the study by Riley and Jutras (2010) where it was found that students in a plant science course performed better in laboratory exercises than in theoretical tests where the difference in performance was attributed to the partial removal of pressure often experienced in normal examination when it comes to practical tests and the tendency to repeat the practical exercise resulting in greater mastery.

4.5.2.1 Test of Hypothesis three (H_{03})

The third hypothesis stated that *there was no statistically significant difference in practical and theoretical test results by students taught with and without video.* Three paired sample t-tests were used to test for significance in variations existing in the conventional, conventional + video and the whole sample.

Table 34.

Paired Sample T-test Results for the Difference between Theory and Practical Performance in the Conventional Only Group

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	-33.499	30.137	3.308	-40.080	-26.919	-10.127	82	.000

a. Intervention made = Conventional Only

As Table 34 demonstrates, the difference between the theoretical and practical mean scores was -33.499 percent. This difference is higher than that observed in the conventional+ video group (-24.316, Table 31). The standard deviation is also high (30.137 percent) suggesting that the difference in theoretical and practical test performance varied considerably from one student to another. The lower and upper bound suggest that the difference in theoretical and practical test performance within the population of agriculture students in Molo Sub-County would fall between -40.080 and -26.919 at the 95 percent confidence level. The t-value for this difference was -10.127 while the significance value was .000 suggesting that the

differences between theoretical and practical test performance among the students in the conventional group was statistically significant.

Table 35.

Paired Sample T-test Results for the Difference Between Theory and Practical Performance in the Conventional + Video Group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	24.316	26.493	2.808	-29.897	-18.735	-8.659	88	.000

a. Intervention made = Conventional+ video

Table 35 illustrates that the differences in the mean score for the two tests was -24.316 percent. The figure is negative because the mean score for practical test (which was higher) was deducted from the mean score for theoretical test. The standard deviation was 26.493 suggesting that the difference between theoretical and practical test performance varied considerably was one student to another. The lower and upper bound figures represent the confidence interval. They suggest that the difference between the mean scores for the two tests within the population of students in Molo falls between -29.897 and -18.735. The t-value for this difference was -8.659 while the significant value as .000 suggesting that the difference between theoretical and practical test performance within the video+ conventional group was statistically significant.

Table 36.

Paired Sample T-test Results for the Difference Between Theory and Practical Performance in Both Groups

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Post-Test Theory Percent Score - Post-Test Practical Percent Score	-28.747	28.599	2.181	-33.052	-24.443	-13.183	171	.000

As Table 36 exemplifies, the differences been the theoretical mean score and practical mean score in the entire sample was -28.747. The lower and upper value suggests that the difference in mean score within the population of agriculture students in the study area would be between -33.052 and -24.443. The t-value for this difference was -13.183 while the significance value was .000 suggesting that the difference between theoretical and practical test performance in both the conventional + video and conventional only groups is statistically significant.

4.6 Effects of Video Instruction on Students Motivation

The fourth objective of the study was to investigate the effect of video instruction on students' motivation towards the Agriculture subject and learning in general. The students taught using video instructional as an addition were presented with a list of statements and asked to indicate their level of agreement on a five point scale (1=strongly disagree, 2=agree, 3= neutral, 4= agree, and 5= strongly agree). Results are presented in Table 37.

Table 37.

Effect of Video Instruction on Students Motivation

Statement	N	SD %	D %	N %	A %	SA %
Video learning explains concepts clearly in details	85	0	0	5.9	16.5	77.6
It does not explain difficult concepts	85	37.6	16.5	20.0	10.6	15.3
It enhances my interest in agriculture lessons	85	1.2	0	5.9	20.0	72.9
It makes lessons boring	85	81.2	10.6	4.7	1.2	2.4
It captures my attention during lessons	85	5.9	3.5	3.5	28.2	58.8
It helps to sustain interest in subject for long	85	9.4	7.1	12.9	24.7	45.9
It helps one integrate the outside world into classroom learning	85	5.9	3.5	11.8	35.3	43.5
It helps relate theoretical and practical concepts	85	2.4	3.5	11.8	28.2	54.1
It promotes a positive attitude towards agriculture subject	85	3.5	1.2	9.4	24.7	61.2
It helps one remember concepts easily	85	2.4	0	3.5	23.5	70.6
It makes one forget concept easily	85	67.1	12.9	2.4	7.1	10.6
It enhances memories hence high score in examinations	85	1.2	0	5.9	20.0	72.9

As Table 37 illustrates, a total of 85 students completed the survey. First, the survey sought to understand the effect of video instruction on the quality of explanation given during lessons. The study established that video learning explains concept more clearly in details according to the majority of the respondents. Results in Table 39 shows that 77.6% of the surveyed students strongly agreed with claim that video learning explains concepts clearly and in details while another 16.5% agreed with this claim. Similarly, 37.6% of the surveyed students strongly disagreed with the statement that the use of video instruction does not help to explain difficult concept and another 16.5% disagreed with the statement. These findings imply that the use of video instruction tends to increase student motivation by improving the explanation of concepts. The finding is congruent with Eskrootchi and Oskrochi (2010) who contend that video instruction improves understanding of concepts as it visual nature engages learners and supports illustrations. It is also in line with Brinton *et al.*, (2001) who found that the multimedia nature of video instruction appeal to students' different senses including sight and sound resulting in better understanding.

The students were also asked whether video instruction enhances their interest in Agriculture lesson. About 72.9% of the survey participants strongly agreed with the statement that the use of video instruction enhanced their interest in Agriculture lesson while another 20.0% agreed with the statement. On a similar note, 81.2% of the respondents strongly disagreed with the statement that video instructions make the class boring while another 10.6% disagreed with the assertion. Further, 58.8% strongly agreed and another 28.2% agreed with the claim that video instruction captures their attention during the lesson. These findings reinforce the position that video learning increases students' interest in the lesson being taught and attention during lesson. The findings are also consistent with the study by Awang *et al.,* (2013) where it was observed that the use of video instructions creates an enjoyable and attractive learning environment that engage students in classroom activities and reinforces a positive attitude towards the subject.

Students were then asked whether video instruction affects the duration of their interest or attention span during a lesson. This is founded on the premise that students who are able to maintain concentration over longer duration are more likely to gain more than those who lose concentration after a short span (Bester & Brand, 2013). About 45.9% of the survey participants strongly agreed with the statement that video instruction helps to sustain their interest for long while 28.2% agreed with the statement. The findings suggest that the majority of the respondents were of the view that vide instructions sustains their interest in learning. The findings are however consistent with the study by Bester and Brand (2013) where it was found that integration of technology in the classroom improves students' attention span during lessons. It is also in line the study by Akpabio (2004), which established that video instruction exploits the learners' interest in watching home video within formal school system to teach agricultural practices in a vivid and entertaining manner.

Respondents were also asked whether the use of video instruction helps students to connect the issues taught in class with real world occurrences. This was in line with the argument advanced by Aggarwal (2007) that video instruction brings real life activities in agriculture to the learners in the classroom in an exciting package due to the visual nature of this technology. As shown in Table 37, 43.5% of the surveyed students strongly agreed with the statement that the use of video instructions helps one integrate the outside world into classroom learning while another 35.3% agreed with the statement. In addition, 54.1% of the students strongly agreed and another 28.2% agreed with the statements that video instruction helps

them to relate theoretical and practical concepts. These findings are congruent with the study by Ozdener and Esfer (2009) where it was found that video-based teaching brings real-world problems and situations to the class environment. They are also in line with a study by Brinton (2001) where it was found that video learning helps teachers to motivate pupils because it brings the real life into classroom. The findings further correspond with Ehimere *et al.,* (2010) who contend that video instruction provides a cognitive link between abstraction and reality to students.

Lastly, the study sought to understand the effect of video instruction on students' ability to retain and remember concepts. Results in Table 39 shows that 70.6% of the survey respondents strongly agreed while another 23.5% agreed with the statement that the use of video instruction helps one to remember concepts easily. On the same note, 67.1% of the students strongly disagreed and another 12.9% disagreed with the claim that the use of video instructions makes one forget concepts easily. Similarly, 72.9% of the respondents strongly agreed with the assertion that the use of video instructions enhances memories hence high score in examinations while another 20% agreed with this statement. These findings suggest that the use of video instruction promotes memory and retention of concepts. The findings are consistent with Aggarwal (2007), who also found that video instructions enhance comprehension and retention.

4.7 Additional Analysis

Additional analyses were carried out to examine whether gender has any effect on students' performance in the agriculture test, whether gender has effect on the relationship between instructional method used and performance, and whether gender has an effect on students' motivation towards the Agriculture subject.

4.7.1 Gender and Theoretical Test Performance

The first item that was examined was whether there were differences between theoretical pre-test performance of male and female student in the conventional and conventional + video group. Results are presented in Table 38.

Table 38.

Gender Differences in Theoretical Pre-test Mean Performance

	All Students	Conventional Only	Conventional+ video
Male Mean Score	23.88	20.94	26.02
Female Mean Score	20.96	18.35	25.00
t-value (sig)	2.209(.029)	1.766 (.081)	0.487(.628)

As Table 38 illustrates, when the entire sample is considered, male students had higher mean score (Mean= 23.88) than female students (Mean=20.96) in the theoretical pre-test score. This implies that overall, male student had greater prior knowledge in the subject than female students. The independent sample t-test showed that this difference was statistically significant (t=2.209, p=.029).

In the conventional group only, male students also had higher mean score (Mean= 20.94) in the theoretical pre-test than female students (Mean= 18.25). However, the independent sample t-test showed that the difference in male and female mean score is not statistically significant (t=1.766, p=.081). In the conventional + video group, male students also had higher mean score (Mean=26.02) in the theoretical pre-test than female students (Mean=25.00). The independent sample t-test showed that this difference in mean score is not statistically significant (t=.487, p=.628).

To examine whether the teaching method has differential effect on male and female students performance in Agriculture theoretical students, post-test scores of different genders were compared. Results are presented in Table 39.

Table 39.

Gender Differences in Theoretical Post-test Performance

	All Students	Conventional Only	Conventional + video
Male Mean Score	52.83	41.97	60.77
Female Mean Score	51.82	37.15	74.51
t-value (sig)	0.287(.775)	1.435 (.155)	3.586(.001)

As illustrated in Table 39, the mean score of males was higher than that of females in both the entire sample and the conventional only group, which is in line with what was observed in the pre-test. The independent sample t-test also showed that the differences in female and male mean scores were not statistically significant. This implies that the conventional method of teaching did not have a significant differential effect on male and female students' performance in the theoretical test. However, in the convention+ video group, female students had higher mean score (Mean= 74.51) in the theoretical post-test performance than male students (Mean= 60.77). Female had better mean score in post-test despite having lower mean score in the pre-test. The independent sample t-test showed that the mean score difference between male and female students in the theoretical post-test was statistically significant (t=3.586, p=.001). This implies that the video + conventional method of teaching had a differential effect on male and female performance in Agricultural theoretical test. Particularly, the findings suggest that this teaching method had a greater effect on female students' performance.

4.7.2 Gender and Practical Test Performance

The second item that was examined was whether there were differences between male and female student in the conventional and conventional + video group in practical test performance. Results are presented in Table 40.

Table 40.

Gender Differences in Practical Pre-test Performance

	All Students	**Conventional Only**	**Conventional + video**
Male Mean Score	58.41	55.10	60.82
Female Mean Score	42.41	38.97	47.73
t-value (sig)	2.951(.004)	2.455 (.016)	1.457(.149)

As Table 40 shows, male students had a higher overall mean score than female students in the practical pre-test performance. This implies that overall, male students had greater prior practical knowledge of the focus subject. The difference in the overall mean performance between male and female students was statistically significant (t=2.951, p=.004).

In the conventional only group, boys also had higher mean score in the practical pre—test than girls. This implies that in this group, boys also had greater prior knowledge of in the

subject of interest than girls. The difference in pre-test practical performance in this group was statistically significant (t=2.455, p=.016).

In the conventional + video group, male students also had higher mean score in the practical pre-test than female students. However, the difference was not statistically significant (t=1.457, p=.149). This implies that the difference between male and female students prior knowledge in the subject of interest in this group was negligible.

To examine whether the method of teaching had a differential effect on female and male students understanding of practice concept, the practical post-test mean scores for male and female students were also compared. Results are presented in Table 41.

Table 41.

Gender Differences in Practical Post-test Performance

	All Students	**Conventional Only**	**Conventional + video**
Male Mean Score	84.48	79.08	88.43
Female Mean Score	76.34	65.44	93.18
t-value (sig)	1.893(.060)	1.853 (.069)	1.052(.296)

As Table 41 shows, male students had a higher overall mean score than female students in the practical post-test performance. The difference in the overall mean performance between male and female students was statistically not significant (t=1.893, p=.060).

In the conventional only group, males also had higher mean score in the practical post—test than females. The difference in post-test practical performance in this group was statistically not significant (t=1.853, p=.069).

In the conventional + video group, female students had higher mean score in the practical post-test than male students. However, the difference was statistically not significant (t=1.052, p=.296). This implies that the difference between male and female students in the subject of interest in this group was negligible. This therefore generally means there were no statistically significant differences between the mean score of male and female students in the overall sample as well as across the two groups. This implies that the methods used in teaching had no differential effect on female and male students grasping of Agricultural practical concepts.

4.7.3 Gender and Students Motivation

The final item examined was whether there were differences in the motivation level of male and female students taught using conventional + video method. The rationale of this analysis was to understand whether the incorporation of video instruction has a differential effect on the motivation level of male and female students. Results of the analysis are presented in Table 42.

Table 42.

Gender Differences in Motivation Level

Gender of respondent	N	Mean	Std. Deviation	Std. Error Mean
Male	64	49.1406	4.59768	.57471
Female	21	48.8571	4.95263	1.08075

As Table 42 illustrates, male students had higher mean motivation score (mean=49.1406) than their female counterpart (Mean=48.8571). This implies that male students had higher levels of motivation towards the Agriculture subject than female students. The independent sample t-test was used to examine whether the difference in motivation level of male and female students was statistically significant. Results are presented in Table 43

Table 43.

Independent Sample T-test Results on Motivation Level

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.002	.966	.241	83	.810	.28348	1.17837	-2.06025	2.62721
Equal variances not assumed			.232	32.096	.818	.28348	1.22406	-2.20955	2.77652

As Table 43 illustrates, the difference captured in the motivation level of male and female students was not statistically significant (t=.241, p=.810). This implies that the difference was negligible. It can therefore be concluded that the use of video + conventional method in teaching Agriculture does not have a differential effect on male and female students.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the study by outlining the methodology used in the study and the main research findings. Conclusions and recommendations are also made based on the major findings.

5.2 Summary of the Study

The study sought to investigate the effect of integrating video instruction in the teaching of agriculture on students' performance. It was noted that video instruction presents an opportunity to improve how theoretical and practical agricultural concepts are presented to students. The study employed an experimental design and targeted Form Agriculture students in Molo Sub-County. Four schools were purposively selected and randomly assigned into either the conventional + video (experimental) group, or the conventional only (group). Each group comprised of two schools with a total 177 students participating in the study. A pre-test was administered on all the form one students before they were taught for six lessons on Water Supply Irrigation and Drainage. The students were then asked to complete a post-test after completing the lesson. Students in the conventional + video group were also asked to complete a questionnaire that sought to assess their motivation towards the Agriculture subjects. The resultant data was analyzed using descriptive and inferential statistics. This chapter presents a summary of key findings, conclusions, and recommendations.

5.2.1 Key Findings of the Study

Specifically, the current study sought to assess the effect of video instruction on theoretical test performance, examine effect of video instruction to practical test performance, compare theoretical and practical test performance, and investigate the effect of video instructions on students' motivation.

Regarding the effect of video instruction on theoretical test performance, the study established that students taught using a combination of video and conventional method had higher mean score in the theoretical test (Mean= 64.17) than their counterparts who were taught using the conventional method only (Mean= 39.99). The independent sample t-test showed that the difference observed in the theoretical mean scores of students in the two groups was statistically significant (t= 8.981, p= .000). The on the use of video instruction in

teaching of agriculture had a statistically significant and positive effect on the students' performance.

Concerning the effect of video instructions on practical test performance, results show that students taught using a blend of video and conventional methods had higher mean score in the practical test (Mean= 88.48) than those taught using conventional methods only (Mean= 73.49). The independent sample t-test showed that the difference observed in the practical test mean scores of the two groups is statistically significant (t=4.077, p= .000).

Regarding the difference between the student performance in the theoretical and practical tests, findings revealed that students in both groups had a higher mean score in the practical test (Mean=81.25) than in the theoretical test (Mean= 52.50). The paired sample t-test showed that the difference between the theoretical and practical test performance was statistically significant (t= -13.183, p=.000).

About the effect of video instruction on students' motivation, the study established that the use of video instruction improved students' motivation by enhancing the explanation of concepts during lessons. The surveyed students also reported that video instruction made the class more interesting and helped to increase their attention span. Also, the student reported that the use of video instruction enabled them to connect the concepts being taught in class to the real-world setting. Most of the students also reported that video learning improved their ability to retain and remember concepts.

5.3 Conclusions

From the data analysed, results presented and discussed in the preceding chapter, the following conclusions were drawn:

a) Incorporation of video instructions in the teaching of Agriculture has a significant and positive effect on students' theoretical test performance thus blending the use of video in agriculture classes can significantly improve the student understanding of theoretical concepts.

b) Integration of video instruction in the teaching of Agriculture has a significant and positive effect on students' performance in practical test. Therefore the use of video instruction in the teaching of Agriculture can improve the students' application of Agricultural concepts.

c) Agriculture students generally perform better in practical tests than in theoretical tests. This phenomenon was observed among students in both groups suggesting that the difference is not due to teaching methods. Therefore the incorporation of video instruction has a more pronounced impact on practical test performance than on theoretical test performance.

d) Blending video instruction in the teaching of Agriculture improves students' motivation by enhancing the explanation of concept, making lessons more interesting, increasing the students' attention span, helping students to relate theoretical concepts with real-world issue, and improving memory and retention of items learnt.

e) The use of conventional + video method had a greater effect on female students understanding of theoretical agricultural concept that that of male students. However, the method of teaching does not have a differential effect on male and female students understanding of practical agricultural concept.

f) The use of a combination of conventional and video methods had no differential effect on the level of motivation of male and female students towards the Agriculture subjects

5.4 Recommendations

The following recommendations have been suggested from the findings and conclusions of the study:

a) Schools should encourage teachers to add video instruction to their normal conventional teaching approaches in Agriculture and possibly in other practical oriented subjects.

b) Schools should make provision in their budgets to include the necessary resources such as computers, projectors to enhance development and use of video content for teaching purposes as it can be used extensively in emergency situations like the covid-19 pandemic.

c) Schools should expose and promote the use of video instructions to motivate enrollment of more students in Agriculture subject.

5.5 Suggestions for Further Studies

From the conclusions and recommendations discussed in the preceding chapter, the following suggestions for further studies were drawn:

a) A study on examining the effect of incorporating video instruction on students' performance in other practical-based subjects besides Agriculture should also be carried out.

b) A study should be carried out to compare males and females performance in both theoretical and practical tests using specific gender characteristics.

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APPENDICES

Appendix A: Agriculture Achievement Test

Water Supply, Irrigation and Drainage

Instructions

Answer all the questions in the spaces provided

Gender (**Tick where appropriate**)

Male **[ ]** Female **[ ]**

1. What is the meaning of the following terms as used in Agriculture?
   a) Irrigation (2mks)

   ……

   ……

   ……

   b) Drainage (2mks)

   ……

   ……

   ……

2. Using a well labeled diagram explain how the hydrological cycle works. (5mks)

   ……

   ……

   ……

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   ……

   ……

   ……

   ……

3. Give three examples of surface water sources. (3mks)

   ……

   ……

   ……

   ……

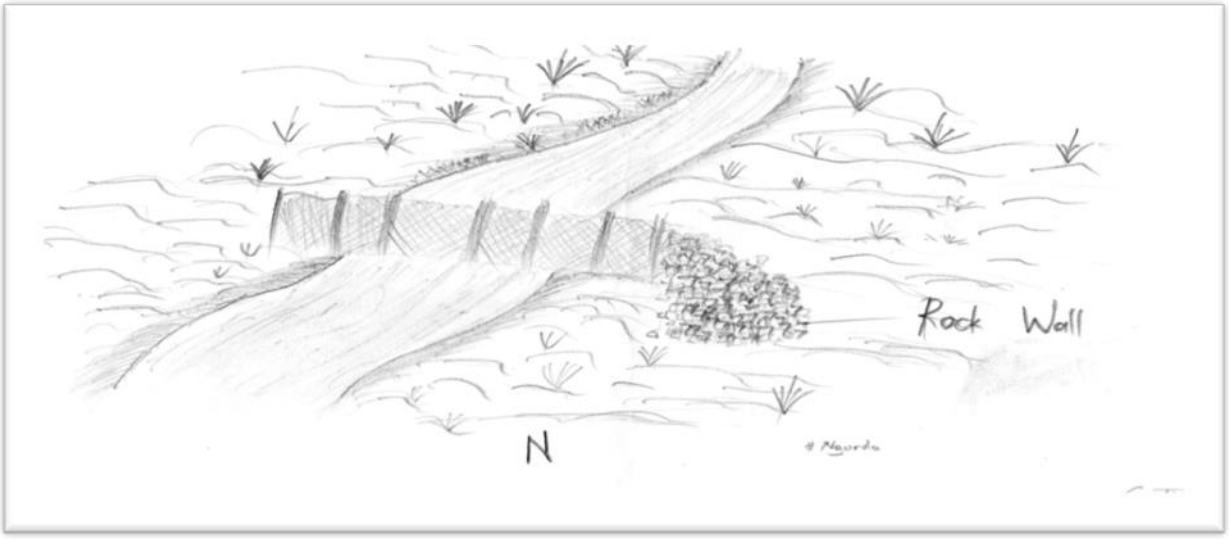
4. Explain why it is advantageous to dig well during the dry season. (1mk)

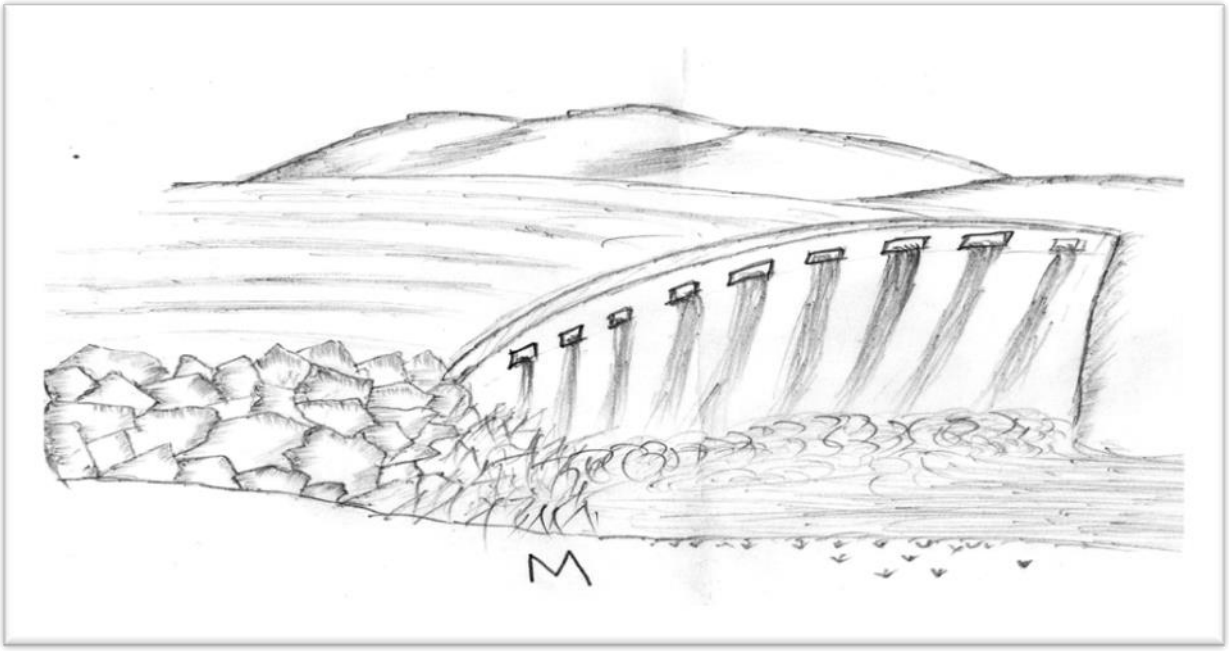
……

……

……

5. The following diagrams shows ways of collecting and storing water. Use them to answer the following questions





a) Give the names of the structures shown in the diagrams above labeled as M and N

M……..……..(1mk)

N…….(1mk)

b) State one difference between structure M and N shown in the diagrams above. (1mk)

M	N

6. Outline two disadvantages of using plastic pipes to convey water (2mks)

……

……

……

7. a) State two importance of treating water before using it in the farm (2mks)

……

……

……

……

b) Name the six stages of treating water. (6mks)

……

……

……

……

……

……

……

……

……

c) Give the function of the following chemicals in water treatment process.

i) Soda ash (Sodium bicarbonate). (1mk)

……

……

ii) Alum (Aluminum sulphate). (1mk)

……

……

iii) Chlorine. (1mk)

……

……

8. Give the six stages through which furrow irrigation is carried out. (5mks)

……

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……

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9. The following diagram shows a method of irrigation. Study it and answer the following questions

i) Name the method of irrigation shown in the diagram above. (1mk)

……

……

ii) List two advantages of the method of irrigation shown above. (1mk)

……

……

……

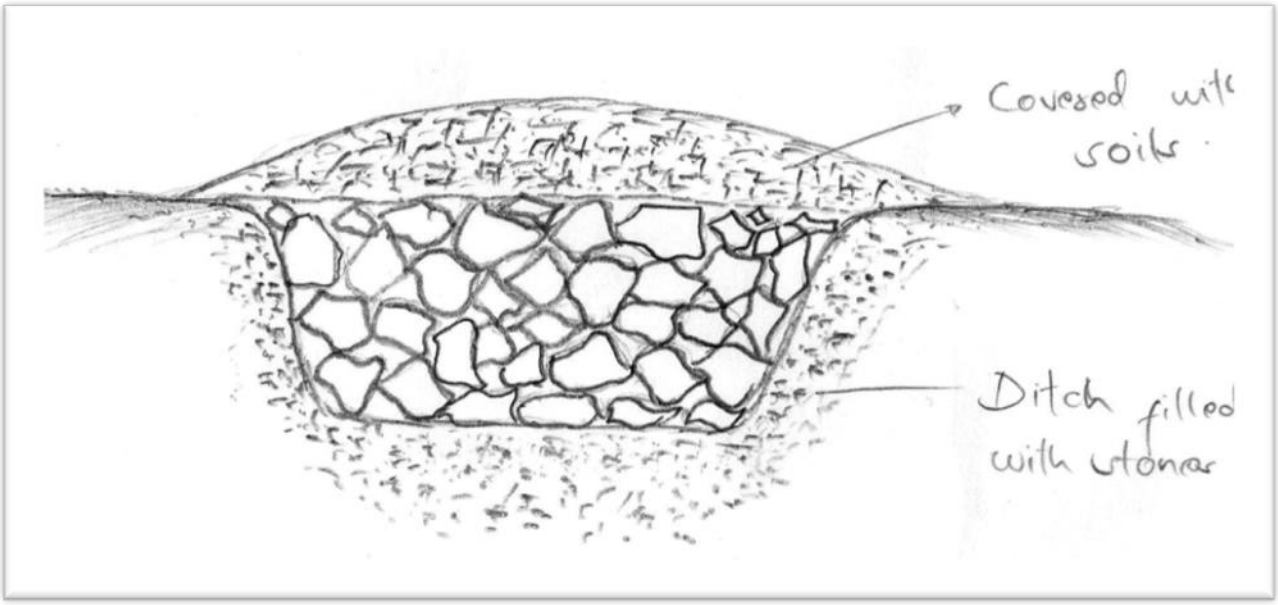
10. Outline two advantages of drainage as a form of land reclamation. (2mks)

……

……

……

11. Study the diagram below and answer the questions that follow.



i) Name the method of drainage shown in the diagram above (1mk)

……

……

ii) List three poor agricultural cultivation practices that lead to water pollution (3mks)

……

……

……

……

12. You are provided with the following.

Requirements

Two types of soil (500gms each) labeled X and Y

Two funnels

Two filter papers

400mls of water

Two containers labeled X and Y

Procedure

Fold the filter papers so that the fit in the funnels

Place the funnels on top of the containers

Put soil X onto funnel on container X, and soil Y onto funnel on container

.Pour 200mls of water each of the two types of soils and leave it to drain into the containers.

Observe the amount of drained water

i) Identify soils X and Y shown in the experiment above (2mks)

Soil

X……

Soil

Y……

ii) Which soil would be appropriate for flood irrigation (1mk)

……

……

iii) Give a reason for your answer in (ii) above (1mk)

……

……

……

Appendix B: Questionnaire for Agriculture Students

Introduction

1. Tick**(√)** against your gender

   Male **[ ]** Female **[ ]**

Section A: Tick (√) where available and cancel (×) where not available)

2. Which of these equipments are in your school?

White board [ ]

Flip chart [ ]

Overhead projector [ ]

Videos camera [ ]

Computers [ ]

DVD/CD [ ]

Television screen [ ]

Dispensable agricultural CDs and DVDs [ ]

Section B: In a scale of 1 to 5 where (5-Strongly Agree), (4-Agree), (3-Neutral), (2-Disagree), (1-Strongly Disagree) to what extent do you agree or disagree with the following statements

3. **Tick (√) where appropriate**

Statement	5	4	3	2	1
a) Video learning explains concepts clearly in details.					
b) Video learning enhances my interest in agriculture lessons.					
c) Video learning makes the lesson boring.					
d) Video learning helps to sustain interest in the subject for a longer period of time.					

e) Video learning does not explain difficult concepts.					
f) Video learning helps me integrate the outside world into classroom learning.					
g) Video learning helps me relate theoretical and practical concepts.					
h) Video learning promotes a positive attitude towards Agriculture subject					
i) Pausing, rewinding and fast forwarding of video clips allows flexible learning.					
j) Video learning makes me forget concepts easily.					
k) Video learning captures my attention during the lesson					
l) Video learning helps me remember concepts easily					
m) Video learning enhances memory hence high scores in examinations					

THANK YOU FOR YOUR TIME AND PARTICIPATION IN THE SURVEY

Appendix C: Research Authorization Letter from Egerton University

EGERTON
Tel: Pilot: 254-51-2217620
254-51-2217877
254-51-2217631
Dir.line/Fax: 254-51-2217847
Cell Phone
Extension; 3606

UNIVERSITY
P.O. Box 536 - 20115
Egerton, Njoro, Kenya
Email: bpgs@egerton.ac.ke
www.egerton.ac.ke

OFFICE OF THE DIRECTOR GRADUATE SCHOOL

ESM11/00241/15

8th May, 2018

The Secretary,
National Council of Science and Technology,
P. O. Box 30623-00100,
NAIROBI.

Dear Sir,

RE: REQUEST FOR RESEARCH PERMIT – MAINA ESTHER MUTHONI
REG. NO: ESM11/00240/15

This is to introduce and confirm to you that the above named student is in the Department of Agricultural Education & Extension, Faculty of Education and Community Studies, Egerton University.

She is a bonafide registered Masters student in this University. Her research topic is entitled **"Effect of Video Instruction as a Compliment to Convectional teaching Methods on the Performance of Secondary School Students in Agricultural Tests in Molo Sub-County, Kenya.""**.

She is at the stage of collecting field data. Please issue her with a research permit to enable her undertake the studies.

Yours faithfully,

Prof. Nzula Kitaka
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Appendix D: Research Authorization Letter from NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/29536/22831**

Date: **25th June, 2018**

Esther Muthoni Maina
Egerton University
P.O. Box 536-20115
NJORO

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Effect of video instruction as a complement to conventional teaching methods on the performance of secondary school students in agriculture tests in Molo Sub-County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Nakuru County** for the period ending **22nd June, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Nakuru County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

DR. MOSES RUGUTT, PHD, OGW
DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Nakuru County.

The County Director of Education
Nakuru County.

Appendix E: NACOSTI Research Permit

THIS IS TO CERTIFY THAT:
MISS. ESTHER MUTHONI MAINA
of EGERTON UNIVERSITY, 52-20102
ELBURGON,has been permitted to
conduct research in *Nakuru County*

on the topic: *EFFECT OF VIDEO INSTRUCTION AS A COMPLEMENT TO CONVENTIONAL TEACHING METHODS ON THE PERFOMANCE OF SECONDARY SCHOOL STUDENTS IN AGRICULTURE TESTS IN MOLO SUB-COUNTY, KENYA*

for the period ending:
22nd June,2019

Permit No : NACOSTI/P/18/29536/22831
Date Of Issue : 25th June,2018
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

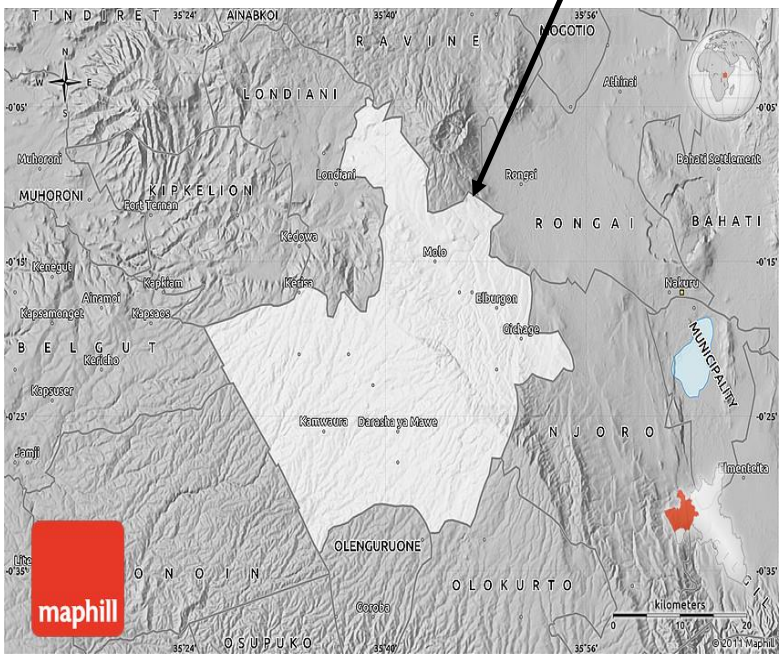
Serial No.A 19125

CONDITIONS: see back page

Appendix F: Images of Students being Taught using Conventional + Video

Appendix G: Images of Students being Taught using Conventional Approach

Appendix H: Map of the Study Area



Appendix I: Journal Publication

International Journal of Research and Scientific Innovation (IJRSI) | Volume VI, Issue VI, June 2019 | ISSN 2321–2705

Effect of Complementing the Conventional Method of Teaching Agriculture with Video On Performance of Agriculture Theoretical Tests in Secondary Schools

A Case Study of Molo Sub-County, Kenya

Esther Muthoni Maina[1*], Christopher A. Onyango[2], Nancy O. Openda[3]

[1,2,3] *Department of Agricultural Education and Extension, Graduate School, Egerton University*

**Corresponding Author*

Abstract: **- This study aimed to assess the effect of video instruction as a complement to conventional teaching methods on performance in Agriculture theoretical tests by students in secondary schools in Molo Sub-county. The study adopted a pretest-posttest experimental design where four schools were selected purposively from the list of public secondary schools in the Sub-County, and randomly assigned to either the control and intervention group (two schools per group). Form-one agriculture students in the schools that formed the intervention group (n=89) were taught a topic on Water Supply Irrigation and Drainage using a combination of conventional method and video, while form one students in the secondary schools that formed the control group (n=83) were taught using conventional teaching method only. Participants in the two secondary schools were subjected to an achievement test before and after the six lessons for comparison of the test results. The collected data was analyzed using descriptive and inferential statistics at the 0.05 level of significance with the aid of Statistical Package for Social Sciences. Descriptive analysis showed that students in the intervention group had higher mean scores in the post-test. The analysis of t-tests showed that the use of video instruction had a statistically significant effect on students' performance in the Agriculture theoretical post-tests scores (t=8.981, p=.000) even after controlling the student pretest-scores. The finding led to the conclusion that the incorporation of video instructions improves students' performance in agriculture theoretical tests. The study recommends that schools within the study area as well as other parts of the country should embrace the use of video instruction in the teaching of Agriculture in order to boost students understanding of theoretical aspects of the subject.**

Keywords: **Agriculture, Performance, Video Instruction, Theoretical Test, Kenya.**

I. INTRODUCTION

In formal education, curriculum implementation is a composite of the teacher, learner, resources, methodologies, anticipated experiences and outcomes and therefore a successful teacher must have abilities to provide these requirements in order for curriculum implementation to succeed (O'Neill, 2015).However, there are often challenges to this process which affect the quality and level of curriculum implementation especially with respect to acquisition of knowledge and skills by the learners. In general, teachers use conventional methods of teaching which includes lecture, discussion, fieldtrips and classroom demonstration. These conventional methods often fail to help a teacher meet the goals of a curriculum, and especially so with respect to science based subject such as Agriculture (Harman, 2010).

In conventional teaching, a teacher communicates ideas to learners through direct verbal discourse sometimes called talk and chalk making the teaching process teacher-centered. The implication of this is that learners become discouraged and passive (Zhang, 2012). A need to introduce alternative instructional techniques that help overcome the weaknesses associated with the talk and chalk method is therefore evident. Scientific advancement has made it possible to introduce technology-based methods such as models, filmstrips, overhead transparencies, pictorials, animation, slide shows, films and video into the teaching process. According to Kearney and Schuck (2006), these approaches have strengthened learning opportunities for students whereby video appears to encourage academic rigor by inspiring and engaging students and making the learning process student-centered. There are indications that video could be used as a complement to conventional teaching. As reported by Akpabio (2004), video instruction can expose children to modern agricultural practices and environmental concepts far more than the traditional and conventional classroom teacher can achieve. This is because their interest in watching home video can be exploited in formal school system to teach agricultural practices in a vivid and entertaining manner.

Video- taped instructions in teaching and learning of agricultural science may enhance students' performance especially where the class is over populated. According to Aggarwal(2007), video instructions enhance comprehension and retention. Real life activities like illustration, demonstration and observation of specimens in agriculture