IMPLEMENTATION OF AGRICULTURE EDUCATION FOR JOB CREATION IN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN WESTERN KENYA

OLUOCH BASIL OWUOR

A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF EDUCATION IN EDUCATIONAL TECHNOLOGY (AGRICULTURAL EDUCATION), DEPARTMENT OF CURRICULUM AND INSTRUCTION, UNIVERSITY OF ELDORET, KENYA

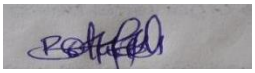
2025

DECLARATION

Declaration by the Student

This thesis is my original work and has not been submitted for any academic award in any institution; and shall not be reproduced in part or full, or in any format without prior written permission from the author and/or University of Eldoret.

Oluoch, Basil Owuor



Date: 03/11/2025

SEDU/CIM/M/006/22

This thesis has been submitted for examination with our approval as university supervisors.

Date: 04/11/2025

Dr. Peter Ouma
Department for Centre for Teacher Education,
University of Eldoret, Kenya

Date: 03/11/2025

Dr. Jacob Lolelea Natade

Department of Curriculum and Instruction

University of Eldoret, Kenya

DEDICATION

I dedicate this research thesis to my parents Monica and Dalmas Oluoch, wife Ruth Owuor Oluoch and my daughter Amaliah Monica Oluoch.

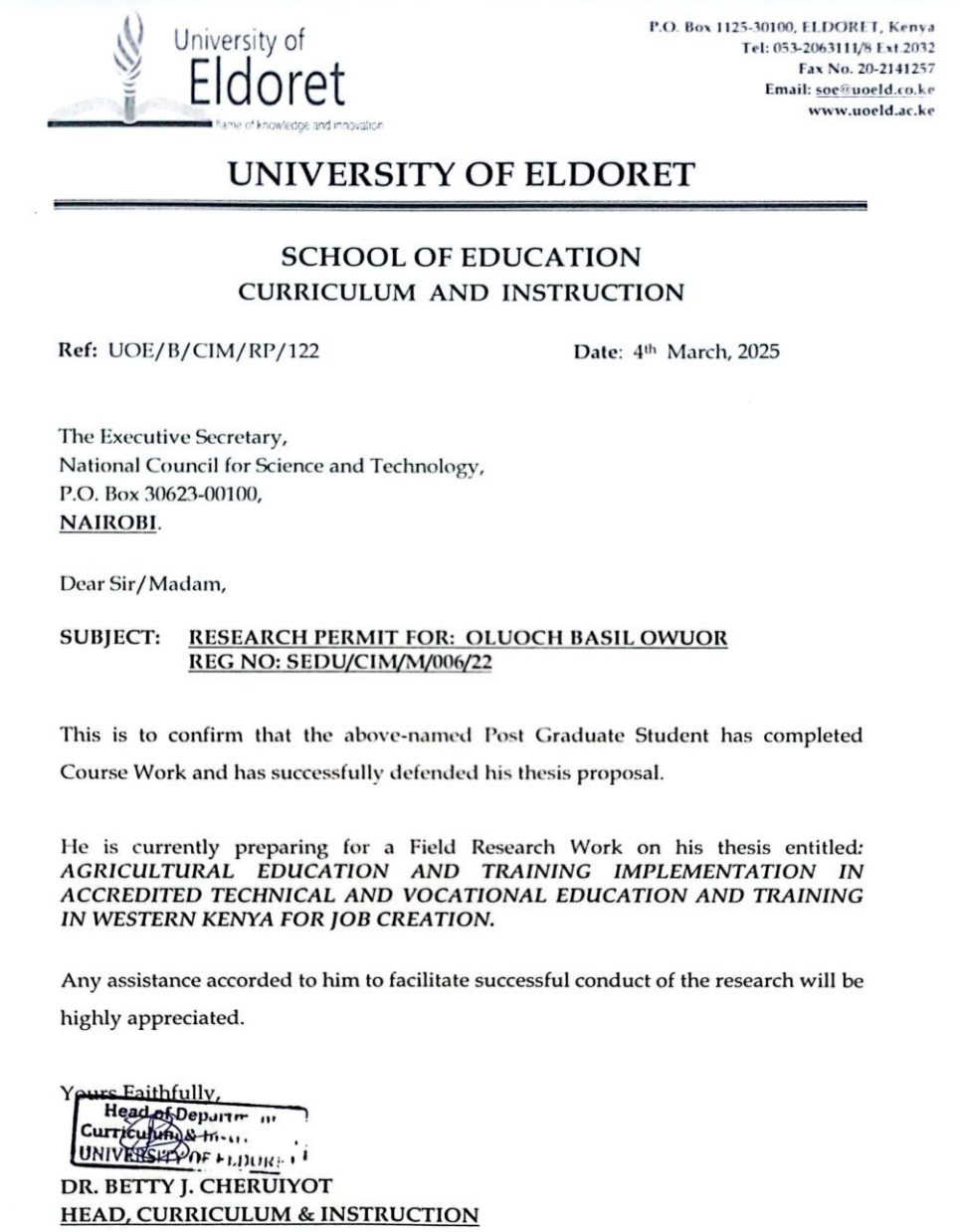
ACKNOWLEDGEMENT

First, I thank the Almighty God for his protection and guidance throughout this thesis writing process. Secondly, to thank the University of Eldoret for the opportunity and support during the study. I would also want to appreciate the tremendous contribution of my supervisors Dr. Peter Ouma and Dr. Jacob Lolelea in providing expert guidance throughout this study. Also, I would like to acknowledge Western Regional and County commissioners and education offices for seamlessly providing permit for data collection. Again, I would like to thank TVET institutions principals for accepting and providing data that was needed for the study. Lastly, to appreciate the encouragement and emotional support of my family during the entire study period.

ABSTRACT

This study investigated the extent of implementation of agriculture education to enhance job creation in Technical and Vocational Education and Training institutions in Western Kenya. This purpose of this study was to find out the suitability of the process of implementing agriculture education programs in TVET institutions with the aim of reducing joblessness. The study objectives were: to establish the competence of trainers involved, adequacy and efficiency of physical infrastructure and training equipment used, the extent to which trainers incorporates practical and trainee-centered pedagogical approaches and the curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya. The study was guided by Functional curriculum theory by Kauffman that opines that, the purpose of education is to equip trainees with practical knowledge and skills to enable them fit and exploit their environment. Descriptive research design approach with a combination of mixed method was used for the study. Stratified and simple random techniques were used to sample 131 respondents for the study that included 9 principals, 42 trainers and 80 trainees selected from a population of 985 that encompassed 43 principals, 142 trainers and 800 trainees. An observation checklist, interview guide and questionnaires were employed for data collection. The study revealed that the trainers have not been adequately retooled to enhance their competence in agriculture training for job creation. They were also found to be using traditional pedagogical approaches as opposed to practical and trainee centered method. Similarly, the physical infrastructure of TVET institutions was found to be inadequate hence impeding successful implementation of agriculture education for job creation. Curriculum support materials were averagely available in the TVETs. This study concluded that agriculture education implementation for job creation in TVETs in Western Kenya is not achieved due to inadequate trainer retooling, inadequate infrastructure and poor pedagogical approaches used. The finding of this study can help mitigate areas of weaknesses that need improvement as well as those that need to be strengthened when implementing agriculture education. Ultimately, this research sought to contribute to enhancing sustainable development through the better alignment of education and training with the societal needs such as job creation.

TABLE OF CONTENTS



University of Eldoret
Flame of knowledge and innovation

P.O. Box 1125-30100, ELDORET, Kenya
Tel: 053-2063111/8 Ext 2032
Fax No. 20-2141257
Email: soe@uoeld.co.ke
www.uoeld.ac.ke

UNIVERSITY OF ELDORET

SCHOOL OF EDUCATION
CURRICULUM AND INSTRUCTION

Ref: UOE/B/CIM/RP/122 **Date**: 4th March, 2025

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

Dear Sir/Madam,

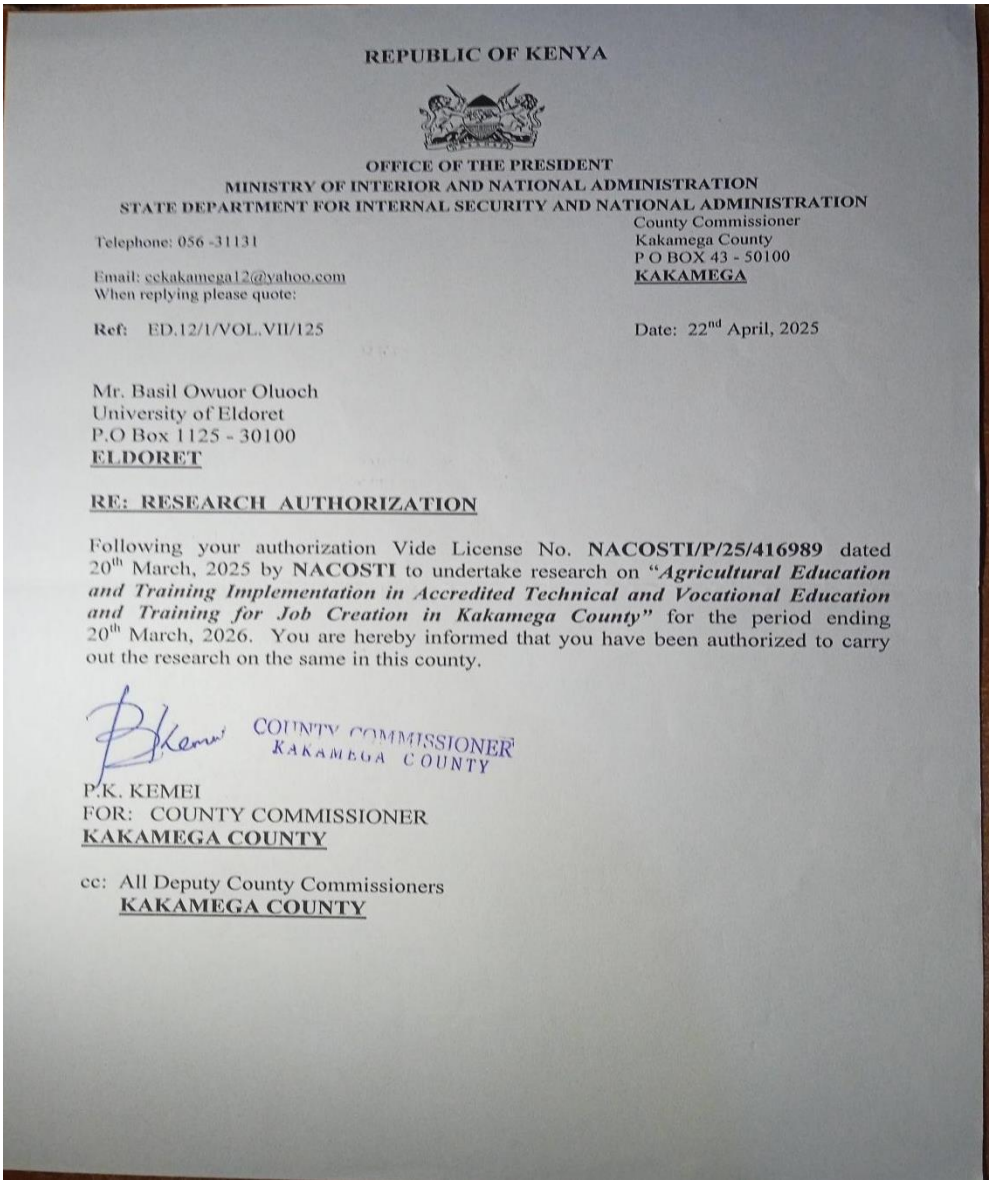
SUBJECT: **RESEARCH PERMIT FOR: OLUOCH BASIL OWUOR**
REG NO: SEDU/CIM/M/006/22

This is to confirm that the above-named Post Graduate Student has completed Course Work and has successfully defended his thesis proposal.

He is currently preparing for a Field Research Work on his thesis entitled: ***AGRICULTURAL EDUCATION AND TRAINING IMPLEMENTATION IN ACCREDITED TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN WESTERN KENYA FOR JOB CREATION.***

Any assistance accorded to him to facilitate successful conduct of the research will be highly appreciated.

Yours Faithfully,
Head of Department
Curriculum & Instruction
UNIVERSITY OF ELDORET
DR. BETTY J. CHERUIYOT
HEAD, CURRICULUM & INSTRUCTION



REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
STATE DEPARTMENT FOR INTERNAL SECURITY AND NATIONAL ADMINISTRATION

Telephone: 056 -31131

Email: cckakamega12@yahoo.com
When replying please quote:

County Commissioner
Kakamega County
P O BOX 43 - 50100
KAKAMEGA

Ref: ED.12/1/VOL.VII/125

Date: 22nd April, 2025

Mr. Basil Owuor Oluoch
University of Eldoret
P.O Box 1125 - 30100
ELDORET

RE: RESEARCH AUTHORIZATION

Following your authorization Vide License No. **NACOSTI/P/25/416989** dated 20th March, 2025 by **NACOSTI** to undertake research on "***Agricultural Education and Training Implementation in Accredited Technical and Vocational Education and Training for Job Creation in Kakamega County***" for the period ending 20th March, 2026. You are hereby informed that you have been authorized to carry out the research on the same in this county.

COUNTY COMMISSIONER
KAKAMEGA COUNTY

P.K. KEMEI
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

cc: All Deputy County Commissioners
KAKAMEGA COUNTY

University of Eldoret

University of Eldoret

Certificate of Plagiarism Check for Thesis

Author Name	Oluoch, Basil Owuor SEDU/CIM/M/006/22
Course of Study	Type here...
Name of Guide	Type here...
Department	Type here...
Acceptable Maximum Limit	Type here...
Submitted By	similarity@uoeld.ac.ke
Paper Title	IMPLEMENTATION OF AGRICULTURE EDUCATION FOR JOB CREATION IN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN WESTERN KENYA
Similarity	8%
Paper ID	4582614
Total Pages	166
Submission Date	2025-10-27 22:01:47

Signature of Student

Signature of Guide

University of Eldoret LIBRARIAN P.O. Box 1125, ELDORET - 30100

Head of the Department

University Librarian

Director of Post Graduate Studies

This report has been generated by DrillBit Anti-Plagiarism Software

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATION

AET - Agriculture education and training

ATVET - Agriculture Technical and Vocational Education and Training

AUDA - African Union Development Agency-

NEPAD - New Partnership for Africa's Development

CBC - Competency Based Curriculum

CBET - Competency Based Education and Training

CBE - Competency Based Education

ICT - Information Communication Technology

FAO - Food and Agriculture organisation

KICD - Kenya Institute of Curriculum Development

MoALF - Ministry of Agriculture, Livestock and Fisheries

MoEST - Ministry of Education, Science and Technology

MoE – Ministry of Education

SPSS - Statistical Package for Social Sciences

TVET - Technical Vocational Education and Training

UNESCO - United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.0 Introduction

This chapter provides a brief description of the background of the study that led to identification of problem statement as well as the objectives. The hypothesis provided a clear focus on the path of the study. Subsequent subsections include the scope, significance, justification and limitations. Theoretical and conceptual frameworks are provided towards the end of the chapter to facilitate proper concretization of the dependent and the independent variables.

1.1 Background to the Study

The population in the whole world is increasing at an alarming rate, particularly in the sub-Saharan Africa, and this has posed a serious threat to the available resources, unemployment and poverty being on top of the list. Again, nearly 800 million people in the world who live in a state of hunger and poverty are found in developing countries of South Asia and sub-Saharan Africa (Food and Agricultural Organization (FAO), 2015). International Fund for Agricultural Development (IFAD), (2013) found out that per capita increase of just 1% in agricultural sector GDP was five times more effective in reducing poverty than growth in other sectors. In sub-Saharan Africa, the agricultural sector is still the dominant provider of employment, and it remains crucial for economic growth.

Globally, there is an increasing pace of technological advancements that have created a number of job opportunities which demand change in the nature of the required workforce

(Oguntunde & Mustapha, 2014). There are also changing global needs occasioned by increased population pressure and increased climate change effects. The needs (that range from unemployment, food insecurity, changing weather patterns, floods, drought, etc.) require citizens who are responsive enough to the changes in their environment. These technological advancements and changing global needs require that human resource development efforts and particularly, strategies for education and training, are done so that nations especially developing countries are able to solve their own challenges and adjust with the global advancement and needs (Kidane, 2013).

Most economies therefore, bank on the training institutions, more so, those that are specializing in agriculture to produce the workforce that has the ability to solve these serious challenges of unemployment and poverty. In Kenya, Agriculture still remains the economic cornerstone as the country envisions her transformation into a rapidly industrializing, middle-income nation by the year 2030 (Lewa & Ndungu, 2012). The government of Kenya, like other governments, considers education and training as some of the fundamentals to the social transformation as envisaged under the social pillar of Vision 2030. The main roles of effective training include promoting the socio-economic, technological and industrial skills for the country's development; and promoting individual development and self-fulfillment (KICD, 2017). These points to the role of agriculture education in enhancing job creation through production of industry relevant graduates as well as those who're well equipped to start and run agriculture related enterprises. This role is only achievable when there is effective implementation in the TVET institutions.

Nations all over the world and Africa are undertaking education reforms to shift from a knowledge-based curriculum to a competency based curriculum, with a greater emphasis

on both technical and transferable skills (Ouma, 2021). The Kenyan government in its quest to improve productivity in the agricultural sector is banking on effective education and training to produce competent citizens that are able to help in realizing this dream. This government's commitment is evidenced in its adoption of the new strategies and reforms that are more competence-based. According to Sheng-Shiang (2019), the Kenyan education and training reforms are geared towards the Competency-Based Education and Training (CBET), from the previous content-based curriculum (8-4-4 system in the Kenyan context).

In that regard, Kenya has rapidly increased in the number of Technical and Vocational Education and Training (TVET) colleges that are expected to provide technical skills to trainees to make them self-reliant and also suitable to the labor market. Most of these colleges are accredited to offer Agricultural Education and Training (AET) in the new curriculum. These colleges are herein referred to as Agricultural Technical Vocational Education and Training (ATVET).

The new curriculum, Competency-Based Education and Training (CBET), is a structured learning approach that is directed to individual learner (trainee) to assist them in the development of cognitive skills, psychomotor skills, affective skills, and values that would enable them to function optimally in the world environment (Sheng-Shiang & Hui-Chin, 2019). CBET is also adaptive to the ever-changing needs of students and society in a given learning environment (Tarus *et al.,* 2021). This system when successful in the implementation stage has the potential of improving access to employment opportunities by enhancing job relevance and raises the standard of living of the subjects among the agriculture trainees upon their graduation from the training institutions.

According to World Bank (2007), some of the effects of successful Agriculture education implementation include; enhancing worker productivity, increasing farmers' capacity to innovate and adopt new technologies and to facilitates interaction with commercial markets. These objectives relate well with the objectives of study. Ngware et al. (2024) argues that proper agricultural education and training reduces youth unemployment by proving the required practical skills leading to self-employment and entrepreneurship. Adenyandu *et al* (2021) puts it that a productive worker is always on demand among employers hence, will be employed after attaining relevant workplace skills and their retention capacity is also guaranteed hence reducing unemployment. Agricultural education curriculum should therefore provide relevant professional competence to allow successful transition to the workplace. These relevant skills are also important among the graduate trainees as they can easily initiate agriculture related enterprises and run them to productivity. The FAO (2015) emphasizes that agricultural education and training can act as sources of transformation of agriculture into a more productive and competitive sector capable of creating jobs across the agriculture value chain from farms to distribution and marketing.

The AET is also important in promoting diversification and innovation by encouraging the farmers-to-be trainees to adopt new agricultural technologies like precision farming, biotechnology and digital agriculture which increase the efficiency and quality of food production. Education on agricultural diversification is important in providing alternative sources of food and income, hence reducing food insecurity caused by crop failures or market fluctuations (World Bank, 2019). All these points to the need to effectively implement the agricultural education through use of relevant curriculum support materials,

competent trainers, relevant pedagogical approaches and relevant and enough physical infrastructure.

Therefore, the curriculum and pedagogical reforms from content-based approaches towards CBET are considered as the game changer in education and training, agricultural education and training inclusive, in producing graduates that are knowledgeable, skilled and has the right attitude towards Agriculture for improved standards of living for the ever-increasing population through better jobs (TVETA and TVET-CDACC, 2021).

In Kenya, CBET in Agriculture education was introduced in TVETs by a project done by African Union Development Agency-New Partnership for Africa's Development (AUDA-NEPAD) in the year 2013 (AUDA-NEPAD,2015). The responsibility for ATVET in Kenya is shared over both the Ministry of Agriculture, Livestock and Fisheries and the Ministry of Education, Science and Technology that are all involved in policy-making related to ATVET. The AUDA-NEPAD project that introduced CBET in ATVETs was undertaken in collaboration with these two ministries where they developed some of the curricula in consultation with stakeholders. They also carried out capacity building to some trainers on CBET and some areas of competencies in agriculture.

The curricula was developed and trainers also trained for the following areas: Contract farming, Value chain development, Good agricultural practices, Aquaculture, Vegetable processing by Kenya School of Agriculture, Fodder production and conservation and dairy milk quality control and processing by the Dairy Training Institute, Dairy and horticulture modules in Kakamega County in Western Kenya, Dairy production and processing skills in Bungoma County, horticulture, Sustainable Climate-Smart Soil Management and aquaculture modules in Siaya County in Western Kenya (Recha ,2022). The value chains

were projected to not only provide jobs to the youths both at individual levels (as farmers) and also at the industry level where they would suit well to the requirements of the employer but also enhance national food security achievement by increasing food production workforce. According to AUDA-NEPAD (2019), most of these value chains were introduced in Western Kenya owing to the regions climatic characteristic that is able to support a wide variety of value chains. Also, this region has the capacity to feed the nation based on its potentiality in terms of production of most of food crops in case the training and learning is properly done in the ATVETs. It's also for this reason that the researcher chose this region for study to determine level of implementation of training of these value chains in the institutions.

On 26th July, 2023, the Ministry of Education through the state department of Technical and Vocational Education and Training directed that, henceforth, all intakes in the TVETs were to be on CBET courses exclusively. It's therefore hypothesized that all ATVETs in Kenya are implementing it as directed from level 5 to level 6. This therefore point to the need of using the relevant curricula, competent and adequate trainers, adequate assessment capacity, use of relevant pedagogical strategies and adequate and appropriate infrastructure and equipment such as agriculture farm, workshop equipment, laboratories among others in realizing the objective of agricultural education in these learning institutions.

Therefore, for CBET implementation in ATVETs to achieve its intended objective of enhancing relevance in job market, Agricultural education should be practical and production oriented, where it is removed from the confines of the classroom to laboratories, farms, markets, industries and rural communities (Egbule, 2002). This study hence tried to establish extent to which agriculture education is implemented with reference to job

creation among trainees since its success largely depend on the quality of that implementation process.

1.2 Statement of the Problem

Despite significant investments in Agricultural Education and Training (AET) as a strategy for enhancing youth employability and job creation in Kenya, the region of Western Kenya continues to experience high levels of youth unemployment and underemployment (GIZ, 2024). This raises concerns about the effectiveness of AET implementation in preparing trainees for productive engagement in the agricultural sector and related enterprises. Preliminary observations and available reports suggest that a range of systemic challenges may be undermining the potential of Agriculture Education programmes. Key among these are the pedagogical approaches used by trainers and trainees, the adequacy and efficiency of physical infrastructure, availability and use of training equipment, and access to curriculum support materials.

There is limited empirical evidence on how these components interact to influence the quality and relevance of training, and ultimately, the capacity of graduates to create or access jobs in agriculture. While some trainees report positive experiences with industrial attachments and practical learning, many others lack consistent access to hands-on opportunities and essential resources (Nkyule *et al,* 2018). Furthermore, disparities in trainer qualifications and teaching methods have been noted across institutions, possibly affecting learning outcomes. Without a clear understanding of how these factors influence AET delivery and job creation, efforts to reform the sector may be misdirected or ineffective. This study therefore sought to investigate the influence of pedagogical

approaches, infrastructure, training equipment, and curriculum support materials and their impact on skill acquisition hence job creation among ATVET graduates in Western Kenya.

1.3 Research Objectives

The main objective of this study is to determine the extent of implementation of Agriculture Education in TVETs in Western Kenya for relevance to current societal needs of job creation.

1.3.1 Specific Objectives

The specific objectives were;

i) To establish the competence of trainers involved in implementation of agriculture education for job creation in TVETs in Western Kenya;

ii) To assess the adequacy and efficiency of physical infrastructure and training equipment used in implementing agriculture education for job creation in TVETs in Western Kenya;

iii) To assess the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya, and;

iv) To assess the curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya.

1.4 Hypothesis

The following hypotheses guided the study;

H_{O1}: There is no statistically positive influence between trainers' competence and implementation of agriculture education for job creation in TVETs in Western Kenya;

H_{02}: There is no statistically positive influence between adequacy and efficiency of physical infrastructure and training equipment used and implementation of agricultural education for job creation in TVETs in Western Kenya;

H_{03}: There is no statistically positive influence between pedagogical approaches incorporated by trainers and implementation of agriculture education for job creation in TVETs in Western Kenya, and;

H_{04}: There is no statistically positive influence between curriculum support materials used and implementation of agriculture education for job creation in TVETs in Western Kenya;

1.5 Justification of the Study

The government and other development partners like AUDA-NEPAD have made substantial effort in reforming the ATVET sector in the Country for the better. These reforms include, hiring of additional trainers to bridge the acute shortage, increased capitation to TVETs by use of the new funding model, curriculum reforms that aims at better pedagogical practices mainly CBET. The motivating factor to these reforms, as of the agriculture sector, was to enable the ATVETs to produce graduates who will fit well into the society and help solve the national needs of unemployment among other reasons. For achievement of these goals in agriculture, implementation of AET, which have been identified as the game changer in realizing these objectives, in these ATVETs must be effectively done and kept on track to ensure it delivers its initial role since its inception in 2019. This therefore calls for an urgent need to establish the current status of AET implementation in the TVETs and the challenges faced in the implementation process so that appropriate interventions can be put in place.

1.6 Significance of the study

This study will be very significant to policy makers and educational stakeholders such as TVETA, TVETCDACC, Ministry of education's department of technical education and even the government as whole in various ways. The government will be guided in the best resource allocation programs in the education sector by this research highlighting areas that needs it most. TVETA will get information on how much the TVETA guidelines are adhered to during training. TVET CDACC will get valuable information on the manner in which training is done in TVET institutions, and also availability of training materials. This study explored how TVETs that train agriculture equips learners with necessary skills to thrive in the agricultural job market hence able to reduce unemployment. All these provided remedial steps in enhancing proper training.

1.7 Scope and Delimitations of the Study

This study was restricted to investigate the extent of implementation of Agriculture education in public TVET institutions in Western Kenya that offer Agriculture related courses. According to TVETA portal, there are about 184 accredited TVET institutions in Kenya. Out of these, about 25 are found in Western part of Kenya (Kisumu, Siaya, Busia, Bungoma, Kakamega and Vihiga). For an institution to be accredited it must meet the minimum requirements on trainer qualification, adequate infrastructure and tools, presence of curricula approved by TVETA, a well-developed and implemented examination and assessment policy, utility services, management requirement among others (TVETA, 2023). The institutions was to be assessed on the adequacy of physical infrastructure to be used for agriculture education, presence of required curriculum support materials, availability of competent trainers of agriculture education and also evidence of practical

oriented pedagogical practices used. The study delved into only two levels of training, level 5 (certificate) and level 6 (diploma). The study targeted the principals of the institutions that are to be sampled, trainers of agriculture related courses, and trainees of selected TVETs of agriculture courses of sampled institutions.

1.8 Limitations of the Study

The research had the following limitations;

i) The respondents were likely to withhold some important information for fear of exposing their weaknesses. The researcher mitigated this by illustrating the importance of the study hence boosting their confidence. They study also assured the respondents that their identities would be made anonymous by using codes.

ii) Few graduates that have gone through CBET that would facilitate a tracer study or comparative study with those of KNEC and other former examining bodies. This was overcome by getting data of performance during internship sessions.

1.9 Assumption of the Study

The study assumed that;

i) All TVETs in Kenya admitted trainees on CBET courses as directed by the Ministry of Education, State Department of Technology Education since 2023 September.

ii) All the TVETs offering agriculture related courses are accredited to so by TVETA and TVET-CDACC

1.10 Theoretical Framework

The study employed the functional curriculum theory by Kauffman and Hallahan (2005), Wolfensberger (1972) and Halpern (1985) among others. This theory explains that the

purpose of education is to equip learners with practical knowledge and skills to enable them fit and exploit their environment. According to Mbachu and Dorgu (2014), a functional curriculum is that which is for human development and prepares learners for the world of work or vocations or problems in their daily lives, and therefore should be activity based, gainfully engaging, meets interest of learners and prepare learners to show their skills. This theory can be applied effectively in agricultural education which focuses on practical skills and real-world applications, as it resonates well with the aim of this research on proper implementation of agricultural education which will enable them effectively utilize their environment and solve their problems effectively. Offorma (2005) calls functional curriculum theory as "curriculum for wealth creation" as it equips one with entrepreneurial knowledge, skills and attitude.

These skills, he says, relate to problem solving, decision making and effective communication. Also according to Mutungi & Muriuki (2021) and Adams (2019) CBET curriculum aligns skills and competencies needed with the job market and industry requirements. This would provide graduates with hands-on experience and practical skills, enhancing their employability. A Study by Ngware *et al* (2024) indicates that TVET trainees develop essential soft skills like leadership, teamwork, entrepreneurship, etc through their training experiences, which are instrumental in preparing them for employment and personal growth. Rutayuga (2014) supports the claim that the successful implementation of CBET in developed countries like the USA, UK, Australia, Netherlands, and Germany "significantly enhanced the advancement of science and technology by producing graduates who are better aligned with the needs of employers, thus increasing the employability and self-employment opportunities for Technical and Vocational

Education and Training (TVET) graduates, who, in turn, contribute to social and economic development".

This theory can also be used to assess integration of ICT in agricultural education like use of precision farming tools and data management software, which can enhance students' readiness for the ever-evolving agricultural world. In Agriculture education where hands-on experiences affect significantly skill acquisition, practical methods of learning are encouraged as they encourage trainee participation and experiential learning (Koech and Molnar, 2020).

According to (Rivera,2006), successful implementation of agricultural education is determined by factors such as capacity of educators (trainers), nature of infrastructure and technology, pedagogical approaches, institutional linkages and availability of training materials. This theory was used to assess trainers' capacity to engage students actively and practically, ability of institutions infrastructure to support practical methods of learning, whether the curriculum support materials are available and adequate for the agriculture students in each ATVET and also to investigate the pedagogical methods used while training agricultural education. The strengths of Functional curriculum theory include;

This theory focuses on learning of life skills that trainees require for their daily living. Since training occurs in natural setting, the contents learnt can be easily linked to practical life skills hence it providing practical life relevance. Also, since it basing on individualized approach, skills taught are always relevant to specific students' needs.

1.11 Conceptual Framework

This is a diagrammatic presentation which shows the relationship between dependent and independent variables (Creswell, 2014). In this study, the researcher, despite many other factors that might influence AET implementation in ATVETs as independent variable, it focused on the influence emanating from the trainers, pedagogical approaches used, adequacy and efficiency of physical infrastructure, training equipment and curriculum support materials used for AET implementation as independent variables. Intervening variables included trainee perception of CBET curriculum, institutional policy, e.g. internship criteria and trainee funding. The intervening variables were controlled by randomly selecting the institutions and the trainees. Conceptual framework is shown in Figure 1.1.

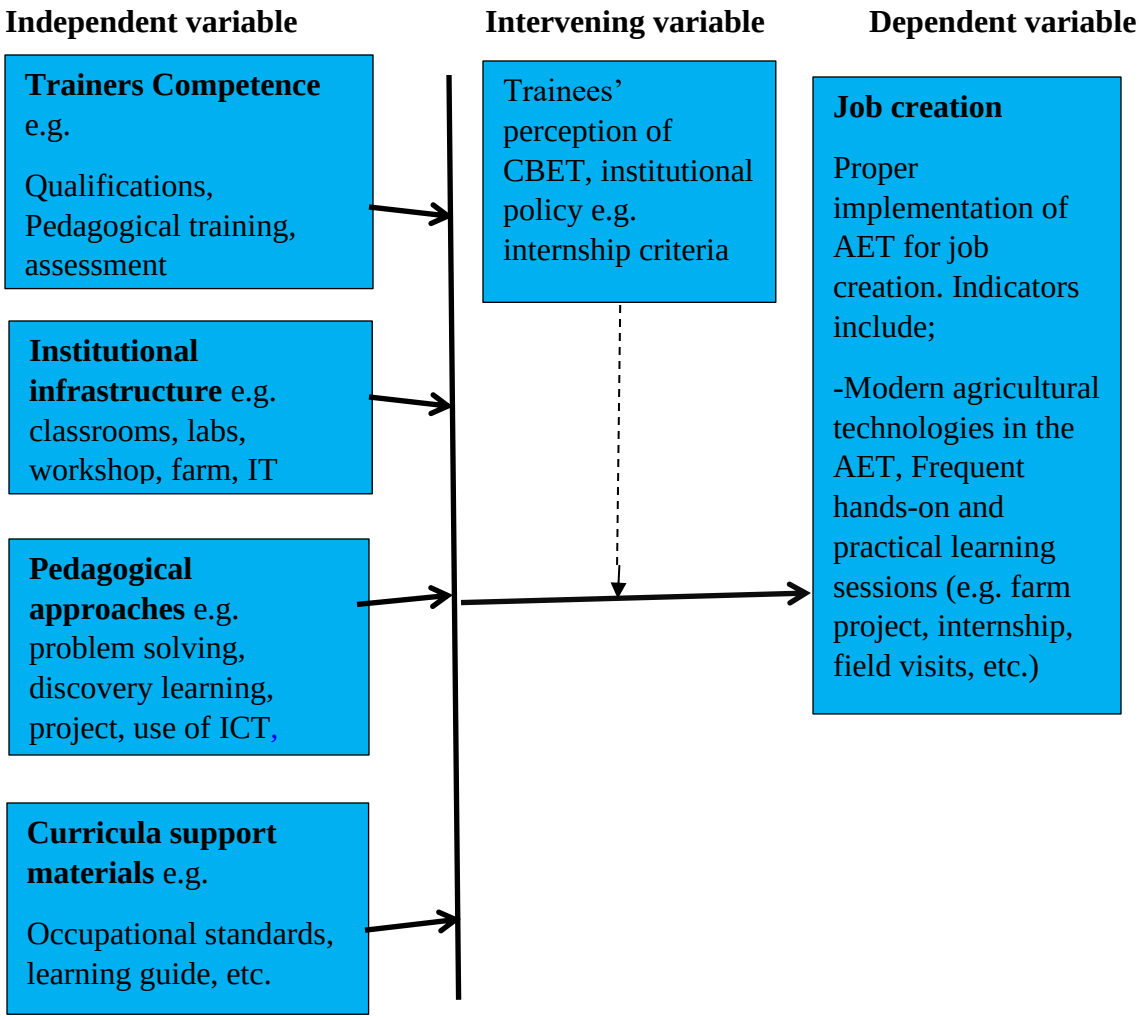


Figure 1.1: conceptual framework

1.12 Operational Definition of terms

Agriculture Education - This in this context entails a field of study that focuses on the training and learning of agricultural practices, principles and technologies in aspects such as crop and livestock production, agribusiness, food systems, and related fields. Agriculture education and training has also been used in place of agriculture education.

Agriculture Education for Job Creation- This in this context entails training and learning of agricultural practices, principles and technologies with the aim of equipping trainees with skills and knowledge that enable them to start their own agricultural ventures, pursue careers in agriculture and also develop skills for agricultural value chains upon graduation.

Curriculum- This is used in this context to mean the structured plan that outlines the educational content, skills, and objectives for learning agriculture related courses in agriculture technical and vocational education training institutions.

Curriculum support materials- This in this study means the resources designed to enhance and facilitate the training and learning process of agriculture related courses as outlined in the agriculture CBET curriculum.

Implementation-The study refers to implementation as process of making the Agriculture Education a reality in Western Kenya's Agriculture Training and Vocational Education Training institutions

Pedagogical Approach- This refers to methods**,** strategies and approaches used by the trainer to facilitate learning of agriculture related courses by trainees.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter entails an overview of agriculture education overview of Competency Based Education and Training, Factors influencing AET implementation, e.g., trainer competence, pedagogical practices, curriculum support materials and influence of infrastructure and equipment on AET implementation.

2.2 Overview of Agriculture Education

Agricultural Education is a program designed for training learners in the improved crop and animal production processes and marketing as well as in teaching (Egbule, 2004). Agriculture Education should provide learners with sound academic knowledge and skill as well as ample opportunity to apply the knowledge through classroom activities, laboratory experiments, project participation and supervised agricultural experiences as contained in the curriculum (Osinem, 2008). According to Maredia (2011), Agriculture education should offer participatory approach in its teaching and learning, which later can play a major role in improving food productivity as well as creating employment within the economy. Implementation of agricultural education in TVETs is aimed at producing graduates who are skilled hence can contribute to agricultural development (Karanja, 2020).

To achieve agricultural education objectives, quality instructional delivery of the planned curriculum is very vital. The CBET in Agricultural education was introduced in Kenya by a project done by African Union Development Agency-New Partnership for Africa's

Development (AUDA-NEPAD) in the year 2013 (AUDA-NEPAD,2015) with stakeholders input such as Ministry of Agriculture, Livestock and Fisheries (MoALF) and the Ministry of Education, Science and Technology (MoEST), trainers, industry players, etc. they developed curricula for various courses in in agriculture before carrying out piloting of CBET with those courses having trained the trainers using workshops

2.3 An Overview of CBET

Competency-based education was first integrated in the USA higher education for half a century. Reforms in vocational and training were first established in the 1960 and 70s. According to Mbwillo (2023), Competency based Education ensure trainees demonstrate mastery of competencies and can apply knowledge learnt effectively in their daily live. Also,), trainees transits upon demonstrating mastery. This competence-based approach is not based on effort or participation in the activity or based on age or time for training. Infrastructural enhancements are needed due to the need to identify when trainee has learnt and is ready to move on and when he needs additional support (Mwashingadi *et al*, 2020). This is achievable when the learning process is assessed by level of performance. The methods of instruction and assessment techniques are trainee centered enabling those trainees to have voice and choice in what and how they learn. This system encourages trainees to develop a range of skills of the 21st century or work study practices, which improve their employability as well as ability to be self-reliant (Kennedy & Sundberg, 2020).

Again, Carla (2018) adds that there were numerous challenges that trainers encounter in implementing Competency Based education such as inadequate infrastructure and resources, poor leadership styles, lack of conceptual clarity and definition, adoption of

previous strategies. Inadequate research has been done especially in ATVETs which eventually impedes flow of information to policy makers and practitioners that could assist them in understanding the progress of trainees taking agriculture related courses hence necessary adjustments required.

As Rwanda was striving to build a knowledge-based economy which emphasize on science and technology as main pillar in development in the research, it was found that Competency Based Curriculum was better than the knowledge-based curriculum. However, some weaknesses noted were insufficient curriculum support materials like syllabus and textbooks and laboratory equipment for experiments (Mutembei *et al* 2024). In research that employed group discussions, surveys, and school visits, as Nsengimana (2021) indicates, Rwanda shifted to the competency Based Education mainly to enable school graduates cope with the job-related demands and help them be problem solvers. He also reported that after the implementation of the competency-based education in Rwanda, changes have been noted including, increased teaching load, reduced teaching time which interfered with syllabus coverage, lack of adequate teaching and learning materials. Mitigation measures suggested include improvising the teaching materials and continuous collaboration between government and stakeholders

According to Makunja (2016), Tanzania implemented the competence-based curriculum in 2005. The challenges encountered in the implementation of the Competency Based Curriculum have not been sufficiently explored. These confirmed that the understanding of CBET was moderate; the majority of trainers were inadequately trained and prepared for implementing the new curriculum. Trainers were not fully prepared in implementing the curriculum. The infrastructure available in institution were inadequate, under staffing,

inadequate teaching and learning materials, unfriendly teaching and learning environment and the government lack of one channel of communication contributed negatively to effective implementation of the curriculum (Wambua and Waweru, 2019)

The introduction of CBET curricula in Kenya was based on findings of the Odhiambo Report which recommended that the TVET curricula should be reviewed and national standards and quality assurance system be established (MoE, 2012). The report further recommended that the industry and private sector players, who are consumers of TVET graduates, participate in curricula development and monitoring standards and quality of training. The TVET Act No. 29 of 2013 in response created institutions that were to spearhead the proposed reforms in the TVET sub sector (TVET Act, 2013) as was envisioned to facilitate the realization of Kenya's long-term development blue-print; the Vision 2030 that aims at transforming the country into a globally competitive economy providing a high quality of life to all its citizens.

According to Amutabi (2019), many scholars agree that Competency Based Education is friendly and flexible to trainees, it conforms to the changing societal needs and that the curriculum is good due to the holistic needs of the country such as unemployment and food security. Despite all the literature on CBET implementation, there's no data on implementation of Agriculture education programs in Kenya in this current curriculum in TVETs.

2.4 Review of theories

The purpose of this section is to present and critically evaluate the theoretical perspectives that underpin this study. The following theories were reviewed;

2.4.1 Experiential Learning Theory

Kolb's (1984) Experiential Learning Theory (ELT) posits that learning is most effective when learners engage in a four-stage cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation. ELT emphasizes learning through doing, reflection, and iterative application—critical in hands-on domains like agriculture. It directly informs teaching methodologies grounded in reflective, practical engagement. However, its focus remains at the level of learner experience and does not sufficiently address systemic factors such as curricula alignment, trainer qualifications, or infrastructure.

2.4.2 Human capital theory

Human Capital Theory suggests that investments in education and training increase individual productivity and national economic growth (Becker, 1993). It underpins many arguments for expanding TVET as a strategy for addressing youth unemployment and improving workforce readiness.

Though highly relevant to the employment aspect of the study, Human Capital Theory tends to view education through an economic lens, with limited focus on the educational processes, teaching quality, or infrastructure that are critical in evaluating training implementation.

2.4.3 Situated Learning Theory

Situated learning highlights that learning occurs within social and contextual settings when there is legitimate participation in communities of practice. It also alludes that knowledge is constructed within these contexts (Lave &Wenger, 1991). This theory underscores the

value of social context, mentorship. However, like it emphasizes the micro-level learning environment and may not account sufficiently for broader structural dimensions like curriculum design or physical facilities.

2.4.4 Contextual Learning

Contextual learning, rooted in constructivist approaches, focuses on presenting information in ways that enable learners to construct meaning from their own experiences. It promotes problem-solving, authentic assessments, and diverse real-world contexts for learning. This theory supports methods that make agricultural training relevant and engaging, which aligns closely with teaching methodology objectives. Yet, similar to Experiential and Situated Learning, it does not fully integrate considerations regarding curriculum structure, trainer qualifications, or infrastructural support.

2.4.5 Functional Curriculum Theory

Functional Curriculum Theory advocates for curricula designed explicitly to meet societal needs in that the curriculum is structured around real-world roles, tasks, and competencies while maintaining coherence across content delivery, infrastructure, and trainer capability (Kelly, 2009). It originates from pragmatic educational philosophies and is rooted in Tyler's principles of aligning curriculum objectives with learner and societal needs. This theory considers all the factors such as;

- Pedagogical approaches: emphasizes practical, industry-aligned, task-based instruction.
- Trainer competence: underscores the need for trainers who can translate functional competencies into learning, bridging theory and practice.

- Infrastructure availability and adequacy: highlights the essential role of supportive environments (e.g., demonstration farms, labs, tools) in enabling applied learning.
- Curriculum support materials: it focuses on the availability of curriculum and alignment of the curriculum to needs of the society

Furthermore, studies in Kenya reveal persistent mismatch between TVET outputs and industry requirements, emphasizing the need for responsive, functional curricula in agriculture (Ligami, 2018).

2.5 Review of Empirical Studies

2.5.1 Trainer competence to implement Agriculture education in CBET

Komba and Mwandanji (2015) asserted that, implementation of a curriculum essentially depends on the trainers' awareness, knowledge, and skills and the general understanding that they have on the curriculum change. Trainers' reluctance to changes in the curriculum has been linked to a variety of factors among them lack of professional development and training (Gainsburg, 2012). In Kenya, the trainers are expected to have the ability to design instructional documents like occupational standards, learning plan, session plan, mentoring tools etc. according to the CBET/TVET-CDACC requirement (TVET-CDACC, 2021). For proper competency-based curriculum implementation, trainers need a change in the mindsets and theories to match these new systems.

Deißinger and Hellwig (2011) opine that trainer need to understand the context of the current system (CBET) in terms of the role, key characteristics, advantages and limitations, components and potential alternatives. They should have the capacity to effectively choose

the required instructional methods based on the content of the session as well as competencies, skills and knowledge intended to be acquired by the trainees.

Tambwe (2019) established lack of competent educators as one of the major obstacles to the successful implementation of CBET. He noted that educators fail to implement CBET since they lack the necessary instructional and specialized skills to deal with challenging learning issues of individual trainees, hence, producing graduates who lack the necessary skills and capacities in the labor market. As Foster-Heinzer (2018) puts it, a good trainer needs to have pedagogical training so as to involve a variety of teaching and training methods. This learning approach requires trainers to engage their learners in more practical and trainee-centered approaches to training and teaching. This ensures that all trainees who have different learning styles and abilities are accommodated (Kanyonga, 2019).

The trainer is also expected to provide assessment appropriately to the trainees in line with the learning outcomes (Lawson and Williams, 2007). Fischer *et al*. (2018) maintain that with curriculum reforms, trainers must be knowledgeable of the assessment mechanisms to be used. The trainer should therefore be more knowledgeable on criterion-referenced assessment methods as opposed to norm-referenced assessment (Deißinger and Hellwig, 2011). Achievement of competency by trainees is established through peer and self-assessments, projects, observations as well as portfolios on regular basis to monitor the performance. Trainer relay timely, continuous and constructive feedback that keeps the trainees informed of their strengths and weaknesses (KICD, 2017).

These trainees hence have to understand how to use summative and formative assessments, be capable of diagnosing using test findings, and adjust their pedagogical practices in

accordance with trainee needs (Fischer *et al*., 2018). Moreover, Cherng and Davis (2019) indicates that trainers in classrooms are increasingly required to be competent to teach in multicultural settings. Therefore, the implementation of agriculture education in CBET calls for effective trainer professional development to ensure conformity of their pedagogical and assessment abilities. This has the potential of enabling hands-on knowledge and skills that can be applied in agriculture careers to be gained. According to Lee & Buxton (2013), trainer pedagogical training facilitate a mutual understanding of trainee learning, new content knowledge acquisition as well as chances for professional cooperation with trainers. Consistently, Jaquith *et al*. (2010) maintain that trainer pedagogical training enables trainers to keep updated in their profession after they have gained accreditation. Besides, Ringeera *et al* (2025) established that it also ensures sufficient time to achieve mastery of content in the current programs, and full participation allowing collaboration among trainers.

In another study, Dixon *et al*. (2014) looked at differentiated instructional methods, pedagogical training, and teaching effectiveness, and discovered that a higher number of professional development sessions in differentiated instruction was linked to higher trainer efficiency. The study examined the self-efficacy beliefs such as the readiness for investment in novel teaching methodologies, setting objectives, tenacity, and resilience. Since differentiated education necessitates ongoing adaptability and adjustment to change in order to satisfy trainees' requirements, Dixon *et al*.'s (2014) findings can be applied to effective trainer pedagogical practice change in general. It implies that successful professional growth must boost trainer practices since it is the major method through which

trainers are trained on the new teaching activities and classroom management abilities(Dixon *et al*., 2014).

Several studies have established that trainers have a perceived lack of on-the-job CBE training. The on-the-job training in agriculture education is important in providing trainers the opportunity to practice and improve their teaching methods in line with where these competencies and needs of the trainees (Raelin, 2008). This also enables them to align the competence they train with the skills that are needed in the labor market hence improving employment and job creation.

In summary trainer competence is important in ensuring that they are able to provide refined training through proper selection of pedagogical strategies, knowledge of assessment methods, proper perception towards CBET as well as providing up to date information on industrial needs.

2.5.2 Institutional Infrastructure and Equipment in Implementation of AET in TVETs

A study by Gupta and Singh (2019) in India, Tan and Lim (2019) in Singapore and Johnson and Smith (2019) underscores the pivotal role played by school infrastructure during implementation of the supporting competency-based education (CBE). However, they also note that, infrastructural gaps, such as inadequate modern classrooms, workshops, laboratories, limited access to digital learning resources and internet connectivity are barriers to effective implementation of the competency-based education. Inadequate and obsolete infrastructure that encompasses teaching and learning facilities negatively influence implementation of the competency-based curriculum. The content of this

curriculum especially in agricultural education requires facilities and equipment such as classrooms, farms, demonstration plots, equipped workshops and laboratories as well as modern technology gadgets such as projectors, computers and laptops (Bakar et al, 2025).

In developing countries including Kenya, training institutions are characterized by poor infrastructural development. In Kenya, it's the role of department of technical education (DTE) to offer capacity building to enhance provision of training facilities, tools and equipment. TVETA on the other hand, offers quality assurance and inspection to the TVETs to ensure adequacy of infrastructure for the registered courses (TVETA, 2018). Sufficient resources and modern equipment are crucial for supporting CBET by enhancing trainee-centered approaches and personalized instruction in line with the demands of the 21st century period. According to Bold, Kimenyi and Sandefur (2013), for achievement of quality education, an environment with adequately 27erforma physical resources that enhance teaching and learning is a major requirement.

In Nigeria, Akomolafe and Adesua (2016) carried out a study on the influence of physical resources on trainees' achievement in institutions recommended proper provision of adequate physical resources like workshops, laboratories, classrooms, sport fields, classrooms and libraries. In Tanzania, Chisi (2018) and Wambua and Waweru (2019) reported that inadequate educational infrastructure hindered the implementation of competency-based education since trainees were unable to establish the required problem-solving skills and a critical thinking ability among them hence robbing them of the opportunity to be skillfully equipped for the world of work. Also, given the current state of affairs in training institutions, it is critical to increasing the quantity and quality of educational infrastructure (Makunja, 2016).

A flexible classroom space is important to ensure that trainers can vary pedagogical approaches and trainees can also work together, collaborate, and communicate effectively to achieve good performance. Yangambi (2023) asserts that overcrowding in class leads to reduced engagement between trainer and trainee this reduces learning outcomes of the session. Ooko (2019) notes that adequate and well-designed classroom is important for effective interaction and group-based learning competencies for successful implementation of competency-based curriculum. This is supported by Odhiambo and Ndirangu (2019) who argues that overcrowded classrooms hinder adequate space practical demonstrations and collaborative work which is an ingredient for effective implementation of agriculture education.

A study by Murithi and Yoo (2021) noted that lack of school facilities such as ICT facilities was an impediment for successful implementation of the Competency Based education. The study recommended that ICT devices be provided to institution to enable trainers incorporate ICT technology during implementation of the competency-based curriculum. The world is moving rapidly into digital era where agriculture education is also a beneficiary, the role of ICT in agriculture education and training is becoming more significant in learning new agricultural trends like smart agriculture as well in the learning of 21st Century. According to UNESCO Education Strategy 2014-2021 strategic objective One, to maintain quality, access and relevance in curriculum delivery, digital learning and assessment, there is need for effective implementation of ICT for effective education and training.

On the laboratories and workshops, Omariba and Miima (2024) opine that well-equipped workshops and laboratories are essential for implementation of the competency-based

education and training especially in agriculture where hands on activities require workshop tools and equipment, in addition to labs. Lack of a well-equipped laboratories and adequate workshop equipment impedes education implementation. This impacts negatively practical hands-on competencies and experimentation 29 erformance (Odhiambo & Ndirangu, 2019). According to Njagi (2019) a library facility with equipped books and digital devices is crucial for successful implementation of the competency-based education and training. An inadequate library facility with well-stocked and modern digital materials and books limits trainee's ability to freely engage with competency-based curriculum content beyond classroom instruction. This reduces personalized learning and reduces chances for further activity of the trainee

Further, Abubakar (2020) established that most public learning institutions face challenge of sufficient educational resources, resulting to detrimental trainee's achievement. However, these findings were conducted in secondary institution in contrast to the present study that will be conducted in TVETs hence, a gap this study is intended to fill. The present study therefore, intends to assess on the adequacy and status of infrastructural facilities needed for the implementation of competency-based education and training curriculum in TVETs that offer Agriculture related courses, an aspect that is least studied in Kenya. Infrastructure is therefore a determinant factor in the implementation of the competency-based curriculum. However, most countries implementing this curriculum face the impediment of infrastructure in implementing competency-based curriculum programmes. Physical facilities are inadequate in most learning institutions.

2.5.3 Pedagogical approaches used in Implementation of AET in TVETs

Competency Based Education and training was founded on the social constructivism theory, trainees are made to participate in a process of generating their own knowledge through interactions with different environmental contexts. The trainer should ensure that the trainee connects the knowledge with a real-life event in order to gain knowledge. In Agricultural education where hands-on experiences affects skill acquisition, participatory approaches to methods of learning are encouraged as they encourage trainee participation and experiential learning (Koech and Molnar, 2020). This in agricultural education can be instrumental in enabling acquisition of hands-on skills required for job creation and food productivity among graduates. The CBET curriculum in agricultural education require pedagogical practices that are trainee centered and more engaging and emphasizes skill acquisition as well as technology oriented. According to Kolb (2014), Agricultural education should employ experiential learning approaches including, problem-solving, demonstration, question and answer, discovery learning, projects, field visits, practicum, etc. Agricultural education needs use of laboratories, farms for projects, farms for demonstration plots, workshops, ICT integration among other trainee-centered activities.

These resources are used to achieve experiential learning strategies like problem-based learning which has been identified as one of the best strategies in agricultural education as it facilitate direct engagement between trainees and real-life agricultural world in the farms, workshop or labs. This approach also fosters critical thinking and problem-solving skills among the trainees which are essential for agricultural practitioners (Morris, 2020). Similarly, Mutai *et al* (2021) encourages collaborative learning methods such as group projects and peer learning as they promote realization of 21st century skills like team work

and communication skills among trainees. This method improves understanding of complex agricultural concepts through sharing experiences within the groups. Sistermans (2020) studied the implementation of case-based or problem-based teaching methodologies and established that they significantly boost a trainee's competence as they place trainees at the center and emphasizes competence and skill acquisition instead of content mastery hence are a good fit for integrating with competency-based education, which also emphasizes skill and competency development.

As a pedagogical practice, Adhiambo et al (2024) opines that integration of ICT tools in Agricultural education supports diverse learning styles of the trainees and facilitates access to information useful in developing entrepreneurs in the agribusiness field. She adds that digital integration enhances collaboration and resource sharing among students and educators. As prospective farmers, agricultural education trainees require ICT for access to real-time weather information, market information and crop management which can help them make more informed decisions about their crops and hence increase productivity. According to Ejiofor *et al* (2021) ICT opens up opportunities for learning because it enables learners to access, extend, transform and share ideas and information in multi-modal communication styles.

Another pedagogical approach that is essential in improving food productivity and job creation among graduates of agricultural education is partnerships with industries, internships and cooperative education (Jackson and Fenton, 2019). Industry players provide real world work experiences to trainees as they provide opportunity to work with agricultural experts hence improving their skills significantly. This in turn improves their employability and also ability to initiate agribusiness and run them effectively.

2.5.4 Curriculum Support Materials used for implementation of AET in TVETs

In a study by Forbes and Davis (2010) it was found that Curriculum materials are crucial tools for engagement between students and teachers during science inquiry. Research by Ngoya (2019) shows that well-structured learning resources enhance student understanding and retention. Again, curriculum support materials are important to trainers in planning and delivering instruction in accordance with the CBET curriculum framework. According to Leshay and Rambuda (2018), the materials offer guidelines on desired competencies to be achieved by the trainee, general and specific learning outcomes together with content coverage approach. They therefore enable trainers design lessons that promote skill development and competency acquisition by the subjects. In order to make the best educational and pedagogical decision trainer again, necessarily need to select from and adapt these very materials to suit their own trainees in consideration of individual learning needs (Lemke, 2022). For instance, curriculum designs and lesson plans provide a structured approach to teaching, ensuring that instructional activities are aligned with the CBET objectives (Hall-Kenyon, Bull, & Dickelman, 2015). Also, according to Kriavėnaitė, Elert and Deflers (2019), the materials are important in offering a consistent and organized approach to delivering content that is aligned with the specific skills and competencies targeted by the CBET curriculum.

Curriculum support materials also allow collaboration among educators, curriculum developers, and industry stakeholders in the implementation of CBET curriculum y providing a guiding compass for all these stakeholders hence feedback realized. According to Matsumura et al. (2018), these resources provide a shared framework for curriculum development and delivery, fostering consistency and coherence in educational practices.

Additionally, support materials can serve as tools for professional development, offering trainers opportunities to improve their pedagogical practices, deepen their subject knowledge, and stay informed about emerging trends in agricultural education (Jenkins and Yoshimura, 2010). In agricultural education, curriculum support materials play a crucial role in contextualizing learning within the agricultural industry. CBET trainer guides help educators implement the curriculum effectively, incorporating training methods that foster hands-on learning and critical thinking (Odhiambo, 2018).

Learning guides for example, offers a variety of resources and activities that cater for the diverse learning needs of students. As noted by Adigun and Okebukola (2015), these resources help trainers to differentiate instruction and personalize learning experiences to meet the individual learning styles and abilities of each trainee, a key aspect of CBET implementation. As highlighted by Ruangprasert and Subsueb (2019), these resources also ensure proper evaluation and assessment thus, providing valuable feedback for both trainers and trainees. According to Khanal, Saha and Stassen (2019), these resources ensure that the learning experiences are relevant to the trainees hence they can develop skills that are directly transferable to the workplace environment.

In Kenya, TVET CDACC, designs and develops curricula for the training institutions. It also develops examination, assessment and competence certification and advise the Government on related matters (MoE, Sessional paper NO.2 of 2015). TVET CDACC has currently developed 406 National Occupational Standards and CBET curricula in different areas of specialization in consultations with industry players and trainers whose responsibility was to develop and validate them (TVET CDACC, 2021). Sector Skills Advisory Committees (SSACs) were formed to identify sector needs and evaluate and

advise on the requirements of their respective sectors (TVETA and TVET-CDACC,2021). In the agriculture sector, stakeholders together with AUDA-NEPAD developed some of the currently used CBET curricula and also formulated the occupational standards (AUDA-NEPAD, 2022). TVET CDACC has also developed curriculum support materials such as learning guides to provide guidance to both trainers and trainees to achieve the expected learning outcomes in various training sectors agriculture related courses inclusive. CDAAC currently lists 406 approved curricula and occupational standards, at levels 3-6, including roughly 80 in agriculture, forestry, fishery, and food related occupations. Despite all this effort especially in agriculture education alone, there's little feedback on the availability and adequacy of the curriculum support materials so far provided.

2.6 Summary of Literature Review and Gaps

Lee and Buxton (2013), note that trainer's pedagogical training provides content knowledge updates, a mutual understanding of trainee learning, appropriate practice time to acquire new abilities, and opportunities for professional cooperation with trainers. Similarly, Jaquith *et al*. (2010) hold that trainers pedagogical training enables them to keep updated in their profession after they have gained accreditation. Kolb (2014), hold that agricultural education ought to embrace experiential learning methods such as, discovery learning, demonstrations, problem-solving, practicum, field trips, question and answer, projects among others. On contrary, Adhiambo *et al* (2024) argues that lack of integration of ICT tools in agriculture education is a challenge in supporting diverse learning styles and facilitating access to information.

However, Kidane (2013) assert that lack of technological advancements and changing global needs that require human resource development and strategies for education and

training, are impediment to sought out challenges and adjust with the global advancement and needs in agriculture education. Bakar *et al* (2025) established that the content of agricultural education and training curriculum needs infrastructure that include; farms, classrooms, demonstration plots, laboratories, modern technology and equipped workshops. Nevertheless, inadequate Information Communication Technology facilities (Murithi & Yoo (2021), overcrowded classrooms (Yangambi, 2023), workshops, sports fields and farms, libraries, furniture among others (Akomolafe & Adesua, 2016) hinders effective implementation of any curriculum.

Leshay and Rambuda (2018) assert that curriculum support materials present effective guidelines on required competencies, content coverage and learning outcomes.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter entails target population, design of the study, location of the study, the sampling procedures and size. It also details the research instruments, validity and reliability of research instruments, ethical issues, data analysis techniques and collection procedures.

3.2 Research Design

Descriptive research design was employed to collect both quantitative and qualitative data. The combined use of both qualitative and quantitative data offers a better understanding of research problem and is useful especially if one wants to bank on the strength of the data (Cresswell, 2012). Quantitative data involves those that are statistically analyzed using numerals while qualitative data is majorly in form of words and body language. Together quantitative and qualitative data complement each other.

Observation checklist and interview schedules were used to check on the availability of relevant infrastructure for agriculture education and their influence on CBET implementation in ATVETs (Cresswell, 2012). Data collected through observation checklist was immediately recorded by the researcher to avoid forgetting or omitting important information. The data was organized in form of content analysis and themes. Qualitative data was prioritized and collected first. Questionnaires were used to collect data from trainers. A different questionnaire was also given to selected trainees to collect qualitative data on the pedagogical methods that they are engaged in during training

together with assessing the availability and adequacy of both physical infrastructure and curriculum support materials. Key informant interview was used to collect data from principals of selected ATVETs.

3.3. Study Area

The study was conducted in Western Kenya counties of Bungoma, Busia, Kakamega, Kisumu, Siaya and Vihiga counties. This region, found along the shores of Lake Victoria, hosts some of the TVET institutions that piloted agriculture education when CBET was introduced in Kenya. The curriculum support materials that were developed by the AUD-NEPAD for various value chains were introduced in institutions found in this region. Owing to its good ecological potential in terms of production of most of food crops, this region has the capacity to feed the nation in case the training and learning of agriculture is properly done in the ATVETs. The region having diverse ecological zones with fertile lands, a long rainy season that supports agriculture, provides a good comparison on the agriculture value chains trained in the available ATVETs. Moreover, the urban and rural setups of the locations of ATVETs in this region offer a generalized understanding on how AET programs are implemented in the entire country, both rural and urban setups. These reasons render the region ideal for the study. This study was done in the 43 technical training institutes and vocational colleges and polytechnics that offer at least an agriculture related course using the CBET curriculum and found in the region.

3.4 Target Population

This is the whole group of individuals that are to be studied by the researcher (Cresswell, 2012). The research was conducted in TVETs found in western Kenya and offer agriculture related courses at either level 5 or level 6. The region has 43 TVETs most of where at least

one agriculture related courses is offered. The target population included 43 principals of TVET institutions found in the western Kenya. According to individual institutions data, a total of 142 trainers of agriculture related course all of which were targeted as respondents. Also, the institutions' individual data had a total of 800 trainees taking agriculture related courses at either level 5 or 6.

3.5. Sampling Design and Sample Procedure

Thomas and Thomas (2021) describe sample size as the number of participants involved in a study. It represents a portion of the total population from which the study is conducted. A sample enables researchers to generalize the characteristics under investigation to the entire population. Additionally, he states that sampling allows generalizations to be made based on careful observation. Sampling offers several advantages, including reduced costs, increased speed, greater potential for accuracy, and a higher degree of precision.

Stratified and simple random sampling technique was used to select principals, trainers and trainees. This study adopted the assertion by Neumann (2007) and Mugenda and Mugenda (2013) that a sample size of 10% to 30% is an ideal representation of the target population for the generalization of findings. To determine the required sample size, the study area was stratified into 6 counties that acted as the various strata. Each county out of the 6 produced at least 1 principal some with more institutions producing 2. This resulted into 9 principals. The individual institutions within the county were randomly sampled by use of random numbers. From the various counties, 8 trainers were selected to participate in the study. The 8 trainers were selected by obtaining 2 or 3 of them, depending on the population,

from each institution that participated in the study. This procedure was repeated to select the trainees where at least 4 trainees were sampled from each institution.

Accordingly, since the researcher aimed at in-depth understanding of the institutions, the study selected 20% of the principals' population (20 ÷ 100 × 43) which was appropriate for getting the required insight, resulting in a sample of 9 principals. 30% of the trainers' population (30 ÷ 100 × 142) was selected, yielding 42 trainers. This sample size was deemed appropriate as trainers are the educators at the epicenter of agriculture education implementation for job creation. Similarly, since trainees were slightly higher in number, 10% of the trainees' population (10 ÷ 100 × 800) was deemed appropriate, resulting in a sample of 80 trainees. This ensured effective management of the large group. Therefore, the total sample size for the study was 131, as shown in Table 3.1.

Table 3.1: Sampling Frame

Respondents	**Target population**	**Sample Size**	**Percentage**	**Sampling technique**
Principals	43	9	20%	Stratified and simple random
Trainers	142	42	30%	Stratified and simple random
Trainees	800	80	10%	Stratified and simple random
Total	**985**	**131**		

3.6. Research Instruments

Data was collected through primary data collection tools as well as secondary tools. Primary data collection tools included interviews schedules, questionnaires and observation checklist. Interview method was used since it provides flexibility to the interviewer (Adosi, 2020). This makes it easy to use and also enable reliability of data as the researcher expound on unclear questions. The interview guide was used to examine the principals because the researcher aimed to gather more detailed information from them as they are among the immediate key AET program implementers in TVETs. Observation method was used to observe the adequacy and efficiency of institutional infrastructure in enabling implementation of AET or the probable challenges in the institution (Trigueros & Sandoval 2017). Observation guide was used as a tool to observe the disparity in the infrastructure in ATVETs. Natural observation entails passively observing and recording the behavior and phenomenon or some other events in its natural background, the state of physical facilities and their effect on AET implementation were observed by the researcher (Thomas and Thomas 2021).

Questionnaires were employed as a tool formulated for trainees as well as trainers who are relatively more and too busy hence, they could fill at convenient times. A Likert scale was used to measure the extent to which one agrees or disagrees with a statement; it is commonly used to measure attitudes. A five-point Likert scale was used to measure the trainers' and trainees' feeling on availability of and adequacy of physical facilities and curriculum support materials essential in training. The respondents were either to agree or disagree with the convenient responses provided concerning their feelings regarding a

statement (Mcleod, 2019). Openended questions were also included hence qualitative data obtained.

Secondary data collection method involved document analysis. According to Bowen (2009) document analysis entails the systematic procedure of reviewing or evaluating documents- both printed and electronic material. The researcher requested the sampled institutions' department of agriculture access to documents such as time table, internship assessment results, mentoring tools, occupational standards, prepared learning plans, session plan, teaching aids, and departmental inventories for learning aids for analysis.

3.7 Validity of Research Instruments

According to McLeod (2024), validity is the extent to which results obtained represents the phenomenon under study. Validity is the accuracy and the meaningfulness of inferences determined from results of the research (Cresswell, 2014). To increase internal validity, content, construct and face validity the instruments were subjected to expert advice from university supervisors and colleagues. This process involved consultation with professionals in the fields of technical and vocational education and training and educational research. Their feedback focused on the relevance, clarity, and alignment of the items with the study objectives.

Content validity was assessed by evaluating whether the items adequately represented the constructs being measured (Merkus, 2024). The experts provided suggestions for improving wording, eliminating ambiguity, and ensuring that each item was appropriate

for the target population. Necessary modifications were made based on this feedback to enhance the accuracy and appropriateness of the instruments.

Construct validity was considered through alignment with the theoretical framework guiding the study, ensuring that the items reflected the key concepts under investigation (Lee, 2025). In addition, a pilot study was conducted in a comparable setting to test the instruments' performance and to identify any items that may require refinement. Data obtained from the pilot test were analysed to assess consistency and coherence across items. Face validity assessed the extent to which a measuring tool appears to measure what it is intended to, based on face value (Lee, 2025). Overall, the validity process helped to strengthen the quality of the instruments, thus ensuring that the data collected would be credible and relevant to addressing the research questions.

3.8. Reliability of research instruments

Reliability refers to the degree to which research methods produce consistent and stable results (Taherdoost, 2016; Mugenda, 2013). Reliability determines how well the data is collected, measured, and is free from corruption and bias (Adams, Khan & Hafiz 2014). A reliability coefficient of r = 0.8 was used to determine the suitability of reliability of the instruments. Reliability was achieved through pilot study in two (2) TVETs in western Kenya that were not used for selection during the actual study because they possessed similarities with that of the actual study. The study purposively sampled one principal, four trainers and eight trainees, who were excluded from the actual study due to their prior knowledge to the instruments, in order to enhance the validity and reliability of the instruments. It involved administering instruments on same respondents twice after a

duration of two weeks between the first and second test. The fully completed instruments were coded and scored again. Pearson's Product Moment Correlation Coefficient (PPMCC) was utilized for the final test-retest analysis. The data was carefully collected, measured and analyzed without any form of manipulation. Data collected was immediately recorded to get accurate analysis and avoid omission of vital details. The pilot study facilitated assessment of research instruments used in terms of wordings and language used (Mugenda and Mugenda, 2013). The respondents were convinced to answer questions appropriately to increase the results of instruments' reliability.

3.9. Data collection Procedures

Data collection procedures entail identifying and choosing individuals for research, getting their permission and collecting information by observation and asking questions (Cresswell, 2014). Therefore, before the study, the researcher obtained a letter from the University of Eldoret, School of Education, Department of Curriculum and Instruction Management, to enable obtaining research permit from the National Council for Science, Technology and Innovation (NACOSTI). These were also used to obtain permits from respective regional and county education offices as well as regional and county commissioners offices of the visited counties.

The institutions that were used for the study included their respective principals. The researcher booked for appointment of the institutional principals and trainers of TVETs in order to administer the face-to-face interviews to principals and also gave the questionnaires to the trainers. Permission was sought from the principals to engage the trainees in data collection and therefore distributed them with the questionnaires. Before

the actual interview, the researcher held an introductory familiarization with the principal. This was done also before distributing trainers and trainees with their respective questionnaires. It was during this session that the importance of the study was clearly explained that it was the study was purely for education purposes.

The respondents were also assured of anonymity and confidentiality of their responses. After acceptance, all the sampled respondents were issued with a consent form to fill as an acceptance to participate in the research. The researcher then distributed to the trainers and trainees the questionnaires that had cover letters and instructions to the respondents attached to them. These filled in questionnaires were collected after two weeks.

During the study, the researcher sought permission to access laboratories, agriculture farms, and workshop, as well as other infrastructure and equipment used for training and learning of agriculture courses. Also, access to the curriculum support materials and relevant documents used in the agriculture training was also sought. This was key to filling the observation checklist form to solicit factual and observable information based on the objectives of the study. The observation checklist helped to triangulate the findings with those of the interview and questionnaire instruments.

3.10. Data Analysis Procedures

This is the process of organizing and giving meaning to vast amount of data gathered during the study. Both qualitative and quantitative data were obtained using interview and observation checklist and questionnaires respectively. Qualitative data was obtained from personal interviews and open-ended questions and analyzed qualitatively through content analysis. The findings were organized into content and subsequent themes.

The quantitative data was analyzed using, Statistical Package for Social Science (SPSS-Version 25). The results of the analysis were presented in form of tables. Inferential statistics, regression analysis in particular, was employed to indicate the relationship between independent variables and dependent variable. Descriptive statistics was used to identify trends in common pedagogical approaches, infrastructure available used in AET implementation from questionnaires. Multiple regression analysis was used to examine relationships between independent and dependent variables while controlling for intervening variables. This is summarized in Table 3.2.

Table 3.2: Summary of Descriptive Data Analysis

Objective	Description		Inferential statistics
	Quantitative	**Qualitative**	
1. Establish the competence of trainers involved in implementation of agriculture education for job creation in TVETs	Frequencies Percentages	Narrative Prose	Regression Analysis
2. Assess the adequacy and efficiency of physical infrastructure and training equipment used in implementing agriculture education for job creation in TVETs	Frequencies Percentages	Narrative Prose	Regression Analysis
3. Assess the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs	Frequencies Percentages	Narrative Prose	Regression Analysis
4. Assess curriculum support materials used in implementation of agriculture education for job creation in TVETs	Frequencies Percentages	Narrative Prose	Regression Analysis

3.11: Study Ethical Issues to be Considered

Before conducting the study, the researcher ensured that ethical clearance was obtained from the University of Eldoret, the National Commission for Science, Technology and Innovation (NACOSTI), the Regional Commissioner of the Western Region, the County Commissioner of Kakamega, and the respondents. Prior to the commencement of data collection, informed consent was sought from all participants to ensure they understood the aim and purpose of the study. Participants were assured of their right to withdraw from the study at any time without facing any consequences. The study maintained strict confidentiality and anonymity of the participants to protect their identities and personal information. The research process avoided any form of coercion or undue influence, particularly when engaging with the respondents. Participants were informed that the data collected would be used solely for educational purposes and would be securely stored to prevent unauthorized access. Furthermore, the study was conducted in a manner free from bias, and the findings were reported honestly and accurately. Throughout the research process, respect for the dignity, rights, and welfare of all participants was upheld.

CHAPTER FOUR

ANALYSIS, INTERPRETATION AND DISCUSSIONS OF THE FINDINGS

4.1 Introduction

The chapter centered on the presentation, analysis, interpretation, and discussion of data gathered through a descriptive research approach. The study focused to investigate agriculture education implementation in technical and vocational education and training in western Kenya for job creation. The main objectives of the study were;

i) To establish the competence of trainers for implementation of agriculture education for job creation in TVETs in Western Kenya

ii) To assess the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya

iii) To assess the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs in Western Kenya

iv) To assess the curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya.

4.2 Questionnaire Return Rate

This refers to the total returned and accepted questionnaire out of the total issued expressed as a percentage. This is represented in Table 4.1.

Table 4.1: Questionnaire return rate

Respondents	Number Dispatched	Number Returned	Percentage response
Trainers	42	32	76%
Trainees	80	62	78%
Total	**122**	**102**	

From table 4.1, it can be noted that the percentage response rate for trainers was 76% while that of trainees was 78% and therefore, deemed appropriate for generalization of the findings of the study. Taherdoost and Madanchian agree that a high response rate increases the validity, reliability, and dependability of the findings of the study. Likewise, Mugenda and Mugenda (2003) noted that a response rate of above 50% is adequate while a response rate of 70% and above is excellent for statistical data analysis. Therefore, the average questionnaire return rate of above 75% was considered ideal for this study's data analysis.

4.3 Respondents Background Information

The researcher sought to investigate respondents' data for the study including gender, age and training experience.

4.3.1 Respondents Gender

Information from respondents' gender was considered vital because it determines gender considerations in employment and trainees' representation in agricultural education training institutions for job creation. This is indicated in table 4.2.

Table 4.2: Respondent's gender

Respondents	Male	Female	Total
Principals	5 (71.4%)	2 (28.6%)	**7**
Trainers	20 (62.5%)	12 (37.5%)	**32**
Trainees	39 (62.9%)	23 (37%)	**62**
Total	**64**	**37**	**101**

The results show that the majority of principals, 5 out of 7 (71%), and 20 out of 32 trainers (62.5%) were male. In comparison, there were only 2 female principals (28.6 per cent) and 12 female trainers (37.5%). This suggests a possible imbalance in employment opportunities for women in technical and vocational education and training institutions in Kenya. The findings also suggest that the government's policy on gender representation in appointments has not been fully realized in these institutions in western Kenya, especially in relation to job creation. This outcome contrasts with a study by Lee and Rudolf (2019) in Francophone African countries, which found that female teachers had a positive influence on girls' academic performance, and the same applied to male teachers and boys. However, Timmermans and Rubie-Davies (2023) found that a teacher's gender does not have a significant effect on students' educational outcomes.

Regarding the trainees, the findings show that the majority, 39 out of 62 (62.9%), were male, while 23 trainees (37%) were female. This difference may be due to the sampling method used, limited interest among females, socio-economic factors, and cultural

practices that affect the participation of women in technical and vocational education and training institutions. As a result, agriculture courses in these institutions are largely dominated by male trainees.

4.3.2 Respondents Age

The study sought to establish respondents' age in order to determine the maturity of the principals and trainers. This was premised on the fact that age determines how long an individual has been exposed to the teaching and learning process in their various institutions. This is shown in table 4.3.

Table 4.3 Respondents Age

Respondents	20 - 30 years	31 - 40 years	41 - 50 years	Above 50 years
Principals	-	-	3	4
Trainers		8	16	8
Trainees	52	6	4	-

The findings show that all principals were over 41 years old, and all trainers were over 31, indicating that the respondents were mature and capable of implementing agricultural education for job creation in western Kenya. Their age suggests they were also advancing their skills and knowledge in the field. This supports Shah and Udgaonkar (2018), who argued that mature and experienced tutors are better at helping students understand concepts and access education. However, Mazzetti *et al* (2022) found that older teachers may experience burnout, which can negatively affect student progress. Similarly, Hervie

and Winful (2018) agreed that experienced older teachers have strong subject knowledge, understand assessment methods, and can improve student performance.

The findings show that most trainees, 52 out of 62 (83.8 per cent), were over 20 years old. This suggests that they had completed secondary education and were motivated to pursue further learning for their professional growth. It also indicates that they were working to improve their skills, knowledge, and competencies through agricultural education in technical and vocational training for job creation.

4.3.3 Respondents Experience

The researcher wanted to gather data on experience of the principals and trainers on training in TVET institutions. The responses were presented on 10 years of range. Respondent's experience is indicated in table 4.4.

Table 4.4 Respondents Experience

Respondents	1 - 10 years	11- 20 years	21 - 30 years	Above 31 years	Total
Principals	1 (14.3%)	2 (28.6%)	3 (42.8%)	1 (14.3%)	7
Trainers	8 (12.9%)	29 (46.8%)	16 (25.8%)	9 (14.5%)	62
Total	**9**	**31**	**19**	**10**	**69**

The findings show that many principals and trainers had long experience, which helped them give reliable information and support the implementation of agricultural education. A principal's experience affects leadership, motivation, and relationships within the

institution. Similarly, trainers' experience helps trainees gain knowledge and skills. Greater experience leads to better skills, knowledge, and attitudes in delivering agricultural education for job creation in western Kenya.

4.4 Data Analysis

This section presents the analysis of four main variables to assess how well agriculture education is being implemented to meet job creation needs in TVETs in Western Kenya. The variables include trainer competence, use of practical and trainee-centered teaching methods, availability of infrastructure and equipment, and curriculum support materials. A five-point Likert scale of SD = strongly disagree = 1, D = disagree = 2, N = neutral = 3, A = agree = 4 and SA = strongly agree = 5 was used in the questionnaire. The aim was to analyze the relationship between the independent variables and job creation as the dependent variable.

4.4.1 Competence of trainers for implementation of agriculture education for job creation in TVETs in Western Kenya

The first objectives sought to establish the competence of trainers for implementation of agriculture education for job creation in TVETs in Western Kenya. The study also sought to test the following Null Hypothesis:

H_{O1}: "There is no statistically positive relationship between trainers' competence and implementation of agriculture education in TVETs in Western Kenya for job creation."

The results were modeled on a five-point Likert scale that ranged from SD = strongly disagree = 1, D = disagree = 2, N = neutral = 3, A = agree = agree = 4, and SA = strongly agree = 5 as tabulated in Table 4.5.

Table 4.5: Trainers competence for implementation of agriculture education for job creation in TVETs

Statement	SD	D	N	A	SA
Trainers have received pedagogical training	6 (18.8%)	4 (12.5%)	2 (6.3%)	13 (40.6%)	7 (21.9%)
Trainers have attended a workshops and seminars on CBET implementation in the last 3 years	8 (25.0%)	9 (28.1%)	3 (9.4%)	7 (21.9%)	5 (15.6%)
Trainers have higher qualification levels for what they teach	7 (21.9%)	6 (18.8%)	1 (3.1%)	11 (34.3%)	7 (21.9%)
Trainers have been trained in competency-based assessment methods and in creating tools for assessment and mentoring in AET.	5 (15.6%)	10 (31.2%)	3 (9.4)	10 (31.2%)	4 (12.5%)
Trainers have attended industrial attachment in the last 2 years	7 (21.9%)	10 (31.2%	4 (12.5%)	6 (18.8%	5 (15.6%)
Trainers have been trained on the development of training programs on agricultural courses	3 (9.4%)	8 (25.0%	5 (15.6%)	11 (34.3%)	5 (15.6%)
Trainers are able to develop, or have already developed, key professional documents needed for training such as session plans and learning guides.	4 (12.5%)	5 (15.6%	3 (9.4%)	13 (40.6%)	7 (21.9%)

It can be noted from descriptive statistics that a majority of the trainers 20 (62%) agree that they had attended pedagogical training in agricultural education for job creation. Similarly, one of the principals noted that;

> "Most of our trainers have pedagogical training either through post graduate diplomas from universities or from Kenya School of TVET, this has enabled them to vary their training strategies significantly (principal 3)."

This suggests that the trainers used suitable teaching methods such as discussions, field trips, explanations, experiments, and hands-on activities to help trainees understand agricultural skills for job creation. This finding agrees with Dixon et al. (2014), who found that more training in varied teaching methods improves trainer effectiveness.

The descriptive statistics show that of the trainers, 9 (28.1%), disagreed and 8 (25%) strongly disagreed that they had attended workshops or seminars on CBET implementation in the past three years. This was supported by a principal who stated the following:

> "Trainers are continuously being re-trained to meet the 21st-century demand for a skilled and knowledgeable workforce. However, they lack modern equipment and tools needed for practical training (Principal 6)."

This suggests that the training given during retooling does not fully prepare trainers to equip trainees for current job opportunities. A focus on theory alone is not enough to address the practical challenges in agricultural training. This finding agrees with

Nsengimana *et al* (2021), who found that after introducing competency-based education in Rwanda, issues such as lack of proper teaching materials were observed.

The findings show that 11 (34.3%) trainers agreed that they hold qualifications higher than the level they teach. Tertiary institutions require trainers to have higher professional qualifications than their trainees. This view was supported by Principal 4, who stated:

> "Most trainers have undergraduate degrees, and a few hold master's degrees, which qualify them to teach trainees taking diploma and certificate courses in agriculture. Many of these trainees did not meet the minimum university entry grade of C+ or higher".

According to Ngware *et al*. (2024) effective agricultural education and training helps create jobs for many school leavers by providing practical skills for self-employment and entrepreneurship. As a result, learners should be able to carry out farming-related tasks. In line with this, the findings showed that 10 trainers (31.2 per cent) disagreed, while another 10 trainers (31.2 per cent) agreed that they had received training on competency-based assessment techniques and the development of tools for assessment and mentoring in agriculture education. Assessing trainees is important to measure how well they understand the concepts before moving to the next stage of learning. A principal observed that:

> "CBET requires trainees to be assessed on the skills they have learned because the current job market values what a person can do rather than what they were taught (Principal 7)."

According to Deißinger and Hellwig (2011), trainers should have skills and knowledge in criterion-referenced assessment rather than norm-referenced methods. This finding agrees with KICD (2017), which stated that trainees' skills and abilities should be measured through continuous assessment methods such as interviews, projects, peer and self-assessments, portfolios, presentations, and observations. Therefore, AET trainers should regularly use these methods to track the development of skills and knowledge needed for job creation.

Also, 10 (31.2%) of trainers, disagreed that they had attended industrial attachment in the last two years. Industrial training is important for trainers because it helps them gain practical skills that trainees need for the job market and for self-reliant farming. Without this attachment, trainers tend to focus more on theory than practical training. One principal stated that:

> "Most of our trainers rarely attend industrial training while working. We must admit that some are not familiar with current industry needs, which affects how well they deliver the required skills. This is mainly due to heavy workloads, limited funding, and similar challenges. Those with industrial training are mostly new recruits who previously worked in the industry (Principal 8)."

This finding agrees with Torres (2018), who found that industrial growth and development help trainees gain a wide range of skills, knowledge, and competencies needed for modern work practices. These skills improve their chances of getting a job and becoming self-reliant.

A large number of trainers, 11 (34.3%), agreed that they have received training on how to develop agricultural training programs. These programs help in organizing learning activities and skills in a clear sequence. They also make training more flexible and structured by guiding the choice of teaching methods used to achieve specific learning goals. This finding supports Amutabi (2019), who observed that competency-based education in agriculture is flexible and meets the changing needs of society, including food security and reducing unemployment.

Descriptive statistics show that most trainers, 13 (40.6 per cent), agreed that they can develop or have already developed key training documents such as session plans, training programs, assessment tools, and portfolios of evidence. These documents, based on CBET, help trainers deliver agricultural lessons effectively through both classroom and online methods. This helps trainees understand the learning process better. Most principals reported that trainers in all ATVETs are undergoing CBE training to align with curriculum changes. The finding agrees with Lee and Buxton (2013), who noted that pedagogical training helps trainers update their subject knowledge, understand how trainees learn, practice new skills, and work together professionally.

The study also tested for descriptive statistics using means and standard deviations to show the relationship between trainers' competence and implementation of agriculture education for job creation in TVETs. The rating ranged from a minimum of strongly disagree = 1 to a maximum of strongly agree = 5 on the stated statements. This is shown in Table 4.6.

Table 4.6: Descriptive statistics between trainers' competence and agriculture education for job creation in TVETs

Statement	Mean	Std. Dev	Min	Max
Trainers have received pedagogical training	3.34	1.43	1	5
Trainers have attended workshops on CBET	2.75	1.44	1	5
Trainers have higher qualifications	3.16	1.50	1	5
Trainers trained in assessment and mentoring tools	2.94	2.32	1	5
Trainers attended industrial attachment	2.75	1.39	1	5
Trainers trained on training program development	3.22	1.24	1	5
Trainers developed key professional documents	3.44	1.32	1	5

From the descriptive statistics, it can be observed that the highest competence area is development of professional documents (Mean = 3.44, SD = 1.43). This means that while the average trainer acknowledges pedagogical training, not all have had equal access or quality of training.

The weakest areas are attendance at CBET workshops (Mean = 2.75, SD= 1.44) and industrial attachment (Mean = 2.75, SD = 1.39). This implies that attendance at CBET workshops is generally low, which may limit the trainers' ability to deliver competency-based education effectively. This indicates insufficient exposure to key frameworks and industry practices critical for effective delivery of Competency-Based Education and Training (CBET).

The most inconsistent response was training in assessment and mentoring tools (Mean = 2.94, SD = 2.32). This finding reveals that training in assessment and mentoring is inconsistent and likely a key area needing standardization and investment. Likewise, the high variability in responses related to training in assessment and mentoring tools (SD = 2.32) reflects inconsistency in professional development across institutions. These findings highlight the need for targeted capacity-building, especially in CBET and practical exposure, to enhance job-creation readiness. These gaps point to a clear need for standardized and systematic capacity-building initiatives, particularly in the areas of CBET pedagogy and practical, industry-based experiences. Such interventions are essential to equip trainers with the practical and instructional competencies necessary for preparing trainees for self-employment and current job market demands. According to Njenga (2022) successful implementation of CBET in agricultural training requires trainers to undergo continuous professional development, including industry exposure and updated pedagogical training, to effectively link learning outcomes with labor market needs.

The study also tested the hypothesis that,

"H_{O1}: There is no statistically positive influence between trainers' competence and implementation of agriculture education for job creation in TVETs in Western Kenya." Regression analysis test was used to compare the information from trainers' response as shown in table 4.7.

Table 4.7: Regression - Trainer's competence and implementation of agriculture education for job creation

Model	Sum of Squares	df	Mean Score	F	Sig.
Regression	46.969	18	2.609	22.615	.000
Residual	1.500	13	.115		
Total	**48.469**	**31**			

a. Dependent Variable: Dependent

b. Predictor: (Constant), Pedagogy, Seminars, Assessment, Qualifications, Industrial Attachment, Learning Guides, Professional Documents

The regression analysis presented in Table 4.6 indicates that trainers' competence significantly predicts the implementation of agricultural education for job creation in TVETs in Western Kenya, as shown by $F(13, 18) = 22.615$, $p < 0.000$. The regression model shows a total sum of squares of 48.469, out of which 46.969 is attributable to the regression and only 1.500 to the residual. With an F-value of 22.615 and a significance level of $p = .000$, which is less than the conventional threshold of 0.05, the results indicate that the model is statistically significant. This suggests that the independent variables included in the model collectively explain a significant proportion of the variance in the implementation of agricultural education for job creation.

Therefore, the findings confirm that trainers' competencies have a substantial and statistically significant influence on the implementation of agricultural education. The strength of the model highlights the importance of equipping trainers with relevant

pedagogical, technical, and assessment skills to effectively deliver competency-based agricultural training that meets labor market demands in Western Kenya. The finding is consistent with a study by Cherng and Davis (2019) who established that trainers in the classrooms are supposed to be competent enough to teach in multicultural settings. Thus, the newly introduced CBET in TVETs requires competent trainers to ensure alignment of their methodological and assessment techniques for trainees' needs of job creation in western Kenya.

4.5: Physical infrastructure and agriculture education for job creation in TVETs in Western Kenya.

The second objective established the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs in Western Kenya. Trainers, trainees and principals provided responses to assess the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs. The responses were modeled on a five-point Likert scale ranging from SD = strongly disagree = 1, D = disagree = 2, N = neutral = 3, A = agree = agree = 4, and SA = strongly agree = 5.

4.5.1: Physical infrastructure and training equipment used for agriculture education for job creation in TVETs in Western Kenya.

The trainers were asked to provide responses on the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs. The results were tabulated in Table 4.8.

Table 4.8: Physical infrastructure and training equipment used for agriculture education for job creation

Statement	SD	D	N	A	SA
Classrooms in the department are adequate to support AET implementation in CBET	6 (18.7%)	12 (37.5%)	2 (6.3%)	5 (15.6%)	7 (21.9%)
Laboratories in the institution are adequate and well-equipped to support AET implementation in CBET	7 (21.9%)	11 (34.4%)	3 (9.4%)	8 (25.0%)	3 (9.3%)
The electronic equipment e.g., digital cameras, computers, projectors, stable internet, in the department are available and adequate to support AET implementation in CBET	6 (18.7%)	13 (40.7%)	2 (6.3%)	6 (18.7%)	5 (15.6%)
The department has adequate and adequately equipped workshop to support CBET implementation	8 (25.0%)	11 (34.4%)	1 (3.1%)	7 (21.9%)	5 (15.6%)
The agriculture farm is available and enough for AET implementation in CBET	6 (18.8%)	12 (37.5%)	1 (3.1%)	6 (18.7%)	7 (21.9%)
There is a spacious and adequately equipped library to support CBET implementation of AET	7 (21.9%)	13 (40.7%)	4 (12.5%)	5 (15.6%)	3 (9.4%)
Equipment is adequate and relevant for training	9 (28.1%)	14 (43.8%)	4 (12.5%)	4 (12.5%)	1 (3.1%)

From descriptive statistics, most trainers 12 (37.5%) disagree that their institutions do not have adequate classrooms to support agriculture education during implementation of Competency Based Education and Training. Most principals stated that classrooms for implementation of agricultural education are inadequate compared to high trainees' enrollment and low trainer-trainees ratio. Inadequate agriculture education is a barrier to trainees' individual attention especially those with diverse individual differences. The finding is in line with Yangambi (2023) who echoed that an overcrowded class size and limited space yield to trainees' decreased engagement, aggression behavior, and detrimental learning. Nevertheless, Ooko (2019) assert that an adequate and well-designed classroom is pivotal for effective for trainer-trainee interaction and peer group learning competencies for successful implementation of competency-based education.

It can be noted from the finding that most of the trainers' response 11 (34.4%) disagree and another 7 (21.9%) strongly disagree that laboratories in the institution are adequate and well-equipped to support AET implementation in CBET. Unavailability of adequate workshops is a challenge to trainers' capability to enhance trainees' practical oriented teaching and learning that is needed for job creation. This finding was supported by one of the principals, who said,

> "Our laboratories are insufficiently equipped for effective trainers' implementation of agricultural education and training and due to low funding and high trainees' enrollment, it difficult to equip them to cope with the rising number of users (Principal, 3)."

This finding is consistent with Waweru (2019) and Chisi (2018) and Wambua and Waweru (2019) whose study revealed that insufficient educational and physical infrastructure is a barrier to effective implementation of competency-based education. This results to trainees' inability to acquire the requisite skills, problem solving, and critical thinking skills needed for the 21st century agricultural competences and job creation. Similarly, a study by Odhiambo and Ndirangu (2019) argue that inadequate furniture and overcrowded classrooms hinders adequate space for practical demonstrations and collaborative work and effective implementation of the curriculum.

A large percentage of trainer's response 13 (40.7%) disagree that electronic equipment such as; digital cameras, computers, white boards, lap tops, tablets, projectors, availability and electricity supply, stable internet, in the department are available and adequate to support AET implementation in CBET. Most principals reported that although connection of electricity is available, ICT devices and constant internet is a barrier to agricultural education training and implementation for job creation. Thus, blended learning including online learning is under-utilized compared to physical learning hence, excluding trainees who would prefer online platform due to different circumstances during the course of learning. Besides, inconsistent power supply interferes with practical courses such as milk storage, storage of animal semen and medicines, and irrigation of farms during dry season. As recommended by Murithi and Yoo (2021) provision of ICT devices to institutions of learning are crucial to trainers and trainees' incorporation of ICT technology during implementation of the competency-based education.

Still, a large percentage of trainer's response 11 (34.4%) disagree that their departments have adequate and sufficiently equipped workshops to support implementation of

competency-based education training equipment for agriculture education for job creation. As noted by a majority principals, their institutional trainers lack modern and equipped workshops for successful trainees' acquisition of competencies needed for agriculture education for job creation. A lack of well-equipped workshop is detrimental to trainers and trainees practical-oriented learning that is important implementation for agriculture education for job creation. Trainees need to manipulate agricultural training machines to ensure trainees are exposed to practical-oriented learning which are crucial in skill development and competencies for job creation. This finding agrees with Abubakar (2020) whose study revealed that most public learning institutions face challenge of insufficient educational infrastructure, resulting to detrimental trainee's competencies.

Descriptive analysis shows that most trainers 12 (37.5%) disagree that their institutions have spacious and enough agriculture farms for AET implementation in CBET to support trainees' competencies for job creation. One of the principals had this to say,

> "Our agricultural farms are not adequate to support different agricultural training such as; animals, aquatics, livestock and crops. It's making it impossible for trainees to have individualized projects as well as restricting our institutions to limited agricultural value chains which is a barrier to trainees' areas of interest. (Principal, 1)."

Agricultural training requires large farms to accommodate all types of value chains so as to produce workforce that can work in a variety of agriculture settings. Restricting trainers and trainees to certain value chains is detrimental as it can also lead to under exploitation of certain sectors hence reduced production and limited opportunities for job creation. The

finding is similar to that by Karanja (2020) who echoed that implementation of agriculture education in TVETs is aimed at producing different categories of graduates in different disciplines who are skilled and competent hence, can contribute to agricultural development.

The finding from Table 4.8 shows that majority trainers' response 13 (40.7%) disagree that their institutions lack spacious and adequately equipped library to support CBET implementation of AET. Most principals supported this finding by stating that their institutions have only a single library which carters for the entire courses offered in the institution. They further explained that their libraries lack sufficient text books, reading space and ICT components for effective implementation of agricultural education for job creation. Inadequate digital devices, financial constraints, lack of trained and qualified human resource and outdated and ill-equipped library facility contributes to a situation that compromise quality of training in TVETs institutions. This finding is inconsistent with Njagi (2019) who asserted that library facilities with well-equipped books and ICT devices are important for successful implementation of the CBE.

From Table 4.8, most trainers' response 14 (43.8%) opined that all the available equipment are not relevant to the objectives of training. As noted by one principal,

> "Most of our institutions have outdated and dilapidated equipment that do not get along with current agriculture education to enable trainers equip trainees with skills and competencies needed for job creation. We need to equip our training institutions with current the equipment to make CBET a success (Principal, 2)"

This finding corroborates with Ngware *et al*. (2024) who argued that effective agriculture education is a determinant to increased youth employment through provision of the required practical skills that results to entrepreneurship and self-employment.

The study further presented the findings using descriptive statistics, as shown in Table 4.9

Table 4.9: Descriptive statistics between agricultural training infrastructure and agriculture education for job creation in TVETs

Statement	Mean	Std Dev	Min	Max
Classrooms are adequate	2.85	1.42	1	5
Laboratories are adequate and well-equipped	2.45	1.33	1	5
Electronic equipment is available and adequate	2.72	1.42	1	5
Workshop is adequate and equipped	2.39	1.47	1	5

The findings presented in Table 4.9 indicate that the availability and adequacy of physical and technological infrastructure to support Agricultural Education and Training (AET) implementation within the Competency-Based Education and Training (CBET) framework vary considerably across departments. The statement on classroom adequacy recorded a mean score of 2.85 (SD = 1.42), suggesting that while some respondents found the classrooms fairly adequate, overall perceptions leaned slightly below the neutral point on the Likert scale, indicating a general sense of inadequacy.

Similarly, laboratories were perceived less favorably, with a lower mean score of 2.45 (SD = 1.33). This points to a prevalent view among respondents that the laboratories are neither sufficient nor well-equipped to support the practical demands of AET under CBET. Electronic equipment, including items such as computers, projectors, and internet access, was rated with a mean of 2.72 (SD = 1.42), reflecting a moderate level of dissatisfaction, albeit slightly more positive than the perception of laboratory resources.

The statement regarding the adequacy of workshops scored the lowest mean of 2.39 (SD = 1.47), indicating that workshops are considered the least sufficient facility in supporting CBET implementation. The high standard deviation values across the items reflect notable variation in respondents' experiences and perceptions, possibly due to disparities in resource distribution across institutions or departments.

Overall, the data suggests that while certain infrastructure components exist, they fall short in meeting the requirements of effective CBET delivery in AET. This implies a need for institutional and policy-level interventions to improve physical and technological infrastructure across departments.

The finding is supported by Wangeci and Mwaura (2019), who established that in many public Technical and Vocational Education and Training (TVET) institutions in Kenya, workshops and laboratories are either under-resourced or non-functional, limiting students' practical learning experiences. On contrary, Mureithi (2017) revealed that in institutions benefiting from donor funding or government capitation, classrooms and training facilities were not only adequate but also equipped with up-to-date technologies, thus supporting effective teaching and learning under CBET.

The study also tested for the hypothesis that,

H_{02}: There is no significant relationship between physical infrastructure and training equipment used for agriculture education for job creation.

Regression analysis was used to test the information from trainers' response as shown in table 4.10.

Table 4.10: Relationship between agricultural training infrastructure and job creation

Source	Sum of Squares	Df	Mean Sore	F	Sig.
Regression	46.969	14	3.355	38.22	.000
Residual	1.5000	17	.088		
Total	48.469	31			

a. Dependent Variable: dependent

b. Model: (Intercept), classrooms, laboratories, electronic, workshop, farm, library, equipment

It is evident from table 4.10, that the physical infrastructure of ATVETs trainers is a predictor of implementation of agriculture education for job creation in which F (14, 17) = 38.22, $p < 0.000$, that is less than significant level of 0.05. It implies that the null hypothesis that:

"There is no significant relationship between physical infrastructure and training equipment used for agriculture education in TVETs in western Kenya for job creation.''

was rejected and the alternate hypothesis “there is a significant relationship between physical infrastructure and training equipment used for agriculture education in TVETs in western Kenya for job creation” accepted.

The finding aligns with the finding by Gupta and Singh (2019), Tan and Lim (2019) and Bakar *et al* (2025) whose studies revealed that inadequate physical infrastructure is a constrain to successful implementation of the competency-based education. In agriculture education, physical infrastructure such as spacious classrooms, functional and equipped laboratories, availability of electronic equipment, functional workshop, spacious farm, equipped library and other related equipment are vital ingredients for implementation for agriculture education in Western Kenya for job creation.

Likewise, the regression analysis was used to indicate the correlation between physical infrastructure and training equipment used for agriculture education for job creation. Trainers’ opinion physical infrastructure was run against influence of implementation of for agriculture education for job creation. Table 4.11 illustrates the statistical Regression analysis between the physical infrastructure and agriculture education for job creation as shown in table 4.11.

Table 4.11: Model Summary of Regression Analysis between physical infrastructure and agriculture education for job creation.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.859a	.737	.661	.72837

a. Predictors: (Constant), classrooms, equipment, farm, library, workshop, laboratories, electronic

Table 4.11 provides the values of R and R^2. The regression value of R^2 indicates the value of independent variable (physical infrastructure and training equipment) that can be established in the dependent variable (agriculture education for job creation) in the shown expression. The assumed value of R runs from -1 to 1. The closer the value of 1, the absolute importance of the value of R being the indicator of stronger Correlation among the variables. The value of R indicates the importance of independent variable (physical infrastructure) to the dependent variable (agricultural education for job creation). The value of R is .859 that illustrates Multiple Correlation, which indicates high Correlation. The adjusted R Square is meant to normalize R square in order to assume the population fit model. From the analysis, the R Square is 0.737 implying that 73.7% of the dependent variable is premised to the independent variables in any given expression.

4.5.2 Availability of infrastructure in agriculture education for job creation

Trainees were also asked to provide responses on availability of infrastructure in agricultural education for job creation. This was key because implementation of AET curriculum needs availability of adequate infrastructure to enable equip trainees with

hands-on practical's education before availing themselves for various job creation after training. Trainees' response was established on 5 - point Likert scale that ranged from SD = strongly disagree, D = disagree = 2, N = neutral = 3, A = agree = 4, and SA = strongly agree = 5 as illustrated in table 4.12.

Table 4.12 Trainees responses on availability of physical infrastructure for job creation

Statement	SD	D	N	A	SA
The agriculture farm is available and being used for practical sessions	6 (9.7%)	23 (37.1%)	5 (8.1%)	19 (30.6%)	9 (14.5%)
We always use the available workshop, laboratory and electronic equipment for practical lessons without straining them	14 (22.6%)	27 (43.5%)	3 (4.8%)	11 (17.7%)	7 (11.3%)
All equipment required for every learning task is available	14 (22.6%)	32 (51.6%)	2 (3.2%)	9 (14.5%)	5 (8.1%)s
The equipment available for practical sessions are similar to those found in the field of work.	10 (16.1%)	37 (59.7%)	1 (1.6%)	8 (12.9%)	6 (9.7%)
The equipment available for learning makes agriculture lively and lovely to me	17 (27.4%)	29 (46.8%)	4 (6.4%)	7 (11.3%)	5 (8.1%)s
I can use the equipment available for this course for my own farming activities in future	6 (9.6%)	12 (19.4%)	8 (12%)	24 (38.7%)	12 (19.4%)
Physical infrastructure a determinant for trainees training and job creation	3 (4.8%)	10 (16.1%)	2 (3.2%)	30 (48.4%)	17 (27.4%)

The majority of respondents (46.8%) disagreed or strongly disagreed with the statement, suggesting that nearly half of the trainees perceive limited access or underutilization of agricultural training farms. This signals a perceived lack of access or effective use of agricultural farms in training. This may also imply underuse of training farms implies missed opportunities for trainees to gain practical, job-creating skills. In contrast, only 45.1% agreed or strongly agreed indicate that in some institutions, farms are functional and utilised. This highlight regional or institutional disparities in infrastructure availability, which could be influenced by donor support, management efficiency, or geographic factors. Only a marginal group (8.1%) remained neutral indicating some trainees might not have had direct experience due to being in institutions without an operational farm. The data points to a concerning reality: while some training institutions appear to harness agricultural farms effectively, a significant proportion of trainees' report limited or no engagement with these resources.

The finding suggests an uneven implementation of practical learning infrastructure, potentially undermining the core goal of TVET — to empower youth with market-ready, entrepreneurial skills. The inconsistent use of agricultural farms may limit trainees' exposure to real-world agricultural practices, thus weakening their readiness for employment or self-employment in one of the most viable sectors for job creation in Kenya and other agrarian economies. This finding is supported by the Ministry of Education Kenya (2019), Chisi (2018) and Wambua and Waweru (2019) that acknowledges disparities in the use of institutional resources such as training farms, especially in rural areas, due to inadequate funding and staffing. On contrary, ILO (2020) noted that in a few contexts, overemphasis on agriculture as a job creation path can be misleading if not

accompanied by modernization and entrepreneurial training, implying that mere availability of a farm is not enough — what matters is the quality of engagement and learning outcomes.

The finding revealed that most trainees 27 (43.5%) disagree that they always use the available workshop, laboratory and electronic equipment for practical lessons without straining them. However, it was noted that most learning institutions had fewer workshop, laboratory and electronic equipment for practical lessons. This implies that these facilities were overstretched and needed upgrading besides replacement with modern facilities to match the ever-changing global needs. This finding is in line with recommendations provided by Bakar *et al* (2025) that there is need to provide adequate infrastructure such as classrooms, farms, demonstration plots, equipped workshops and laboratories as well as modern technology devices for effective agricultural education.

It can be noted from the finding that most trainees 32 (51.6%) disagree that all equipment required for every learning tin agricultural TVET's institutions are available. Nevertheless, the study further revealed unavailability of modern related equipment such as workable technological learning equipment. This implies that agriculture education implementation in technical and vocational education and training do not comply with current trends of teaching and learning.

It can be noted from the finding that most trainees 29 (46.8%) disagree that the equipment available for learning makes agriculture lively and lovely to trainees. It was also noted that most agricultural equipment was not modern. Use of old-fashioned equipment in agricultural education training is a barrier to trainees' acquisition of skills, knowledge and

attitude use in modern agricultural technology and job creation. The finding is in line with Makunja (2016) who recommended increased quantity and quality of educational infrastructure in training institutions.

Likewise, majority trainees 24 (38.7%) agree that they can use the equipment available for agricultural education for their own farming activities in future. This implies that the agricultural education curriculum could be utilized by trainees to apply in their own farms for job creation. As noted by Wario (2019), education and training is shifting from knowledge-based curriculum to a competency-based education in view to grater acquisition of current technical and transferable skills for job creation.

Conversely, a majority of agriculture education trainees 30 (48.4%) agree that physical infrastructure a factor for trainees training and job creation. Therefore, agricultural education training needs infrastructure that properly equips trainees with requisite knowledge and skills for implementation in technical and vocational education and training. Lack of sufficient and obsolete infrastructure negatively influence implementation of the competency-based curriculum. The finding is supported by Gupta and Singh (2019), Tan and Lim (2019) and Johnson and Smith (2019) who reiterated that infrastructural deficit including insufficient and modern laboratories, workshops, classrooms and ICT integration are challenges facing effective implementation of the competency-based education.

Further, the study analyzed the descriptive statistics on trainees' responses on availability of physical infrastructure for job creation as indicated in Table 4.13.

Table 4.13: Descriptive analysis of availability of physical infrastructure for job creation

Statement	Mean	Std dev	Min	Max
The agriculture farm is available and being used for practical sessions	3.03	1.37	1	5
We always use the available workshop, laboratory and electronic equipment for practical lessons without straining them	2.53	1.35	1	5
All equipment required for every learning task is available	2.33	1.26	1	5
The equipment available for practical sessions are similar to those found in the field of work	2.39	1.18	1	5
The equipment available for learning makes agriculture lively and lovely to me	2.27	1.25	1	5
I can use the equipment available for this course for my own farming activities in future	3.39	1.29	1	5
Physical infrastructure is a determinant for trainees' training and job creation	3.78	1.27	1	5

The mean score of 3.03 indicates that respondents were generally neutral to slightly agreeing that the agriculture farm is available and in use. However, the relatively high standard deviation of 1.37 suggests varying opinions among trainees, indicating inconsistency in farm access or usage across institutions or regions. A mean of 2.53 suggests that respondents generally disagreed with this statement, indicating that available equipment may be overused or insufficient. The large standard deviation again indicates mixed views, pointing to disparities in resource availability or scheduling.

The low mean of 2.33 suggests that respondents largely disagreed, implying that many essential tools for learning are not consistently available. This can negatively affect skill acquisition and practical training effectiveness. With a mean of 2.39, most respondents disagreed with the statement. This indicates a significant gap between training equipment and real-world agricultural tools, which may affect trainees' readiness for employment. The mean of 2.27 reflects general disagreement, suggesting that learners do not find the equipment engaging or inspiring, potentially influencing their motivation negatively.

With a mean of 3.39, there is a tendency toward agreement, showing some optimism among trainees that the equipment they interact with could be useful in real-life farming scenarios. However, the high variability suggests not all trainees feel this way. A mean of 3.78 suggests agreement with the statement. Trainees perceive physical infrastructure as essential in facilitating both learning and future employment, which aligns with broader educational infrastructure research.

The findings indicate that while most trainees recognize the importance of physical infrastructure for effective training and future job creation, a significant proportion

expressed dissatisfaction with the adequacy, availability, and relevance of agricultural equipment and facilities. This suggests a pressing need to improve access to modern and sufficient practical resources to enhance agricultural training outcomes. Overall, the descriptive analysis shows that although there is moderate access to agricultural learning infrastructure, several gaps exist—especially in equipment availability and quality. The interpretation highlights the need for policy reforms and investment to align training tools with industry needs.

Ngugi & Were (2019) emphasize that access to adequate training infrastructure significantly improves learners' competency development in agricultural training institutions. Afande, Maina & Maina (2015) found that inadequacy in agricultural training resources hampers skill acquisition, especially when school resources are not aligned with workplace standards. On the contrary, Mwangi and Kariuki (2017) argue that learner motivation and self-initiative often outweigh infrastructural limitations, especially in institutions where peer collaboration and instructor support are strong.

The study also examined the relationship between physical infrastructural and agriculture education implementation in technical and vocational education and training. This is represented in table 4.15. Regression analysis was used to test the hypothesis that "There is no significant relationship between physical infrastructure for agriculture education in TVETs in Western Kenya for job creation." This is indicated in table 4.14.

Table 4.14: Regression Analysis between physical infrastructure and agriculture education for job creation.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	72.775	5	12.129	66.287	.000
	Residual	10.064	55	.183		
	Total	82.839	61			

a. Dependent Variable: dependent variable

b. Predictors: (Constant), learning equipment, learning lessons, agricultural farm, practical lessons, equipment, learning tasks

Table 4.14 shows that the physical infrastructure of ATVETs trainers is a predictor of implementation of agriculture education for job creation. This is illustrated with $F(5, 55) = 66.287$, $p < 0.000$, indicating that the model is highly statistically significant. This means that the physical infrastructure variables jointly explain a significant proportion of variance in job creation outcomes. The variance of $R2=72.775 \div 82.839 \approx 0.878$ suggests that approximately 87.8% of the variance in trainees' perceptions of job creation is explained by the availability and quality of physical infrastructure. The low residual Mean Square Error (0.183) implies that the model fits the data well, with minimal unexplained variation. The regression results demonstrate a compelling relationship between physical infrastructure availability and perceived job creation potential among trainees. The high R^2 value indicates that physical infrastructure, potentially encompassing training workshops, ICT facilities, power supply, and transport networks plays a central role in equipping

trainees with the skills and conditions conducive to employment or self-employment. Such infrastructure likely influences practical skills acquisition, entrepreneurial incubation, and access to job opportunities. The statistical strength of the model underlines that where infrastructure is sufficient and well maintained, trainees are more optimistic about post-training employment outcomes.

This regression analysis offers strong empirical backing for the claim that physical infrastructure is a significant determinant of job creation as perceived by trainees. While the findings align with many proponents of skills development theory, it is vital to adopt a holistic approach that recognizes both hard (infrastructure) and soft (training relevance, linkages) components in vocational education planning. The research further supports policy advocacy for equitable resource distribution and strategic investments in infrastructure to scale up employment readiness in TVET sectors. Majumdar (2011) also supports that the presence of simulation labs, industry-grade equipment, and access to ICT strengthens learners' readiness for self-employment and boosts job absorption rates. On the contrary, Tikly et al. (2013) caution that while infrastructure is important, its impact on job creation is mediated by other factors such as teacher quality, curriculum relevance, and market linkages. Overemphasizing infrastructure may lead to underestimation of these soft but critical variables.

The study further examined the model summary of regression analysis between physical infrastructure and agriculture education for job creation as indicated in Table 4.15.

Table 4.15: Model Summary of Regression Analysis between physical infrastructure and agriculture education for job creation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.937[a]	.879	.865	.42776

a. Predictors: (Constant), learning equipment, learning sessions, agricultural farm, practical lessons, equipment, learning tasks

Table 4.15 indicates that R (.937) indicates a very strong positive correlation between the predictor variables (likely elements of physical infrastructure) and the outcome variable (perceived job creation potential).R Square (.879) reveals that 87.9% of the variation in the dependent variable can be explained by the availability and quality of physical infrastructure. Adjusted R Square (.865) confirms that this high explanatory power remains stable even when adjusted for the number of predictors—suggesting a well-fitted model with minimal overfitting. Standard Error of the Estimate (0.42776) indicates a relatively low average deviation of predicted values from actual responses, reinforcing the model's precision and reliability. This model demonstrates a robust linear relationship, suggesting that physical infrastructure plays a decisive role in how trainees perceive their opportunities for employment or self-employment. These findings affirm that job creation in the context of skills development is not merely a function of curriculum delivery, but equally dependent on the enabling environment, which in this case is defined by the presence and functionality of physical infrastructure.

4.6: Pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya

The third objective investigated assess the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya. This aimed to ascertain the most probable pedagogical methods adopted by trainers during teaching.

4.6.1 Trainers responses on pedagogical approaches used in agriculture education for job creation in TVETs

The trainers provided responses pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya. The responses were analyzed in frequencies and percentages. The results are indicated in Table 4.16.

Table 4.16: Trainers pedagogical approaches used in AET and training

Pedagogical approaches	Frequency	Percentage
Lecturer methods	32	100%
Field trips	23	71.87%
Group Discussions	28	87.5%
Demonstration methods	32	100%
Industrial attachments	28	87.5%
Project methods	19	59.37%
Direct methods	30	93.75%
Online platforms	15	46.87%

The analysis of pedagogical approaches reveals that all respondents (100%) reported that lecturer methods and demonstration methods are consistently used in training. Direct methods were also reported by a large majority (93.75%), followed closely by group discussions and industrial attachments, each cited by 87.5 percent of respondents. Field trips were identified by 71.87%, suggesting they are a commonly used but slightly less frequent approach. Project-based methods were reported by 59.37%, indicating moderate usage. Notably, only 46.87% of respondents cited the use of online platforms, making it the least utilised method among those listed.

The findings suggest that traditional face-to-face teaching approaches, such as lecturer delivery and demonstrations, remain dominant in the pedagogical practices within the training institutions. The frequent use of direct instruction and group discussions highlights a preference for teacher-led engagement and collaborative learning. Industrial attachments and field trips, which are crucial for bridging theoretical knowledge with practical industry experience, appear to be well integrated into the training programs, though there is room for wider application.

The comparatively lower adoption of project-based methods suggests that opportunities for learners to engage in self-directed or experiential learning may be underutilized. Even more significant is the minimal use of online platforms, which may reflect limitations in digital infrastructure, lack of digital literacy, or inadequate policy support for e-learning. This is particularly concerning in the context of global shifts toward blended and remote learning. Overall, the findings point to a training environment that values hands-on and instructor-led methods, but one that may benefit from a more diversified and modernised pedagogical mix that incorporates technology and learner autonomy more fully. The finding contrasts

with Mutai *et al* (2024), who advocated for collaborative learning methods such as group projects and peer learning, as these promote communication and teamwork skills and enable trainees to grasp complex agricultural competencies through shared experiences.

Trainers were further asked to rate the form of partnership used with agricultural related firms to enhance practical CBET implementation of agriculture education. This is represented in Table 4.17.

Table 4.17: Forms of partnership with agricultural related firms

Form of Partnership	Frequency	Percentage
Industrial attachment	29	90.62%
Job Placement	2	6.25%
Exchange Programme	5	15.62%
Workshops and Seminars	18	56.25%
Mentorship	7	21.87%

The analysis shows that industrial attachment is the most common form of partnership between training institutions and industry, reported by 90.62% of respondents. This highlights its central role in providing trainees with practical, hands-on experience in real work environments. Workshops and seminars were also reported by a significant

proportion (56.25%), indicating that periodic knowledge-sharing sessions and exposure to industry trends are moderately integrated into training programs.

In contrast, mentorship and exchange programs were mentioned by only 21.87% and 15.62% of respondents respectively, suggesting that these potentially impactful forms of partnership are less developed or underutilized. Notably, job placement was cited by only 6.25% of respondents, which may reflect weak institutional linkages with industry for post-training employment or limited tracking of graduate outcomes.

The findings indicate that while industrial attachments are well established as a key strategy for practical skills development, other valuable forms of industry partnership such as mentorship, exchange programs, and job placements remain significantly underutilized. This suggests a need for training institutions to diversify and strengthen their collaboration with industry to better support trainees' transition into the labour market.

The finding is against Sheng-Shiang (2019) who advocated for the Kenyan education and training reforms that are geared towards the Competency Based Education and Training (CBET), from the previous content-based curriculum (8-4-4 system in the Kenyan context) for job creation and self-reliant.

4.6.2 Trainees responses on pedagogical approaches and agriculture education for job creation TVETs

Trainees were further asked to rate the form of partnership with agricultural related firms to enhance practical CBET implementation of agricultural education and training and job creation. The responses were analyzed using descriptive statistics in frequencies and percentages as illustrated in Table 4.18.

Table 4.18: Trainees responses on applicability of pedagogical methods used in agricultural education and job creation

Form of Partnership	Frequency	Percentage
Industrial attachment	58	93.5%
Job Placement	10	16.1%
Exchange Programme	17	27.4%
Workshops and Seminars	21	33.9%
Mentorship	30	48.4%

The data indicates that industrial attachment is perceived by the majority of trainees (93.5%) as the most applicable pedagogical method for supporting job creation in agricultural education. This reflects its effectiveness in linking theoretical learning with practical industry experience. Other methods such as mentorship (48.4%) and workshops and seminars (33.9 percent) show moderate levels of applicability, suggesting their value in enhancing employability skills, though not as widely implemented. Exchange programmes (27.4%) and job placement (16.1%) were identified by fewer respondents,

highlighting underutilization of these potentially impactful strategies in facilitating job market entry for agricultural trainees.

The findings suggest that industrial attachment is the most valued pedagogical approach for enhancing job readiness in agricultural education, owing to its strong practical relevance. However, the limited use of mentorship, workshops, exchange programs, and job placement indicates missed opportunities that, if strengthened, could significantly improve trainees' transition into the agricultural labour market. The finding is contrary to FAO (2015) which emphasize that agricultural education act as sources of transformation of agriculture into a more productive and competitive sector capable of creating jobs across the agriculture value chain from farms to distribution and marketing.

4.6.2: Applicability of pedagogical methods in agriculture education for job creation.

Trainees were asked to rate their most preferred pedagogical methods used by trainers in agriculture education for job creation. The responses were analyzed using descriptive statistics and presented in frequencies and percentages as illustrated in Table 4.18.

Table 4.18: Trainees responses on applicability of pedagogical methods and job creation

Pedagogical approaches	Frequency	Percentage
Lecturer methods	47	75.8%
Field trips	25	40.3%
Group Discussions	54	87.1%
Demonstration methods	45	72.6%
Industrial attachments	50	80.6%
Project methods	47	75.8%
Direct methods	49	79.0%
Online platforms	29	46.8%

The findings reveal that group discussions (87.1%), industrial attachments (80.6%), direct methods (79.0%), project methods (75.8%), and lecturer-based methods (75.8%) were the most frequently applied pedagogical approaches among trainees in TVET institutions. These methods, which emphasise practical engagement and learner-centered delivery, are closely linked to the development of job-related competencies and self-employment readiness. Conversely, field trips (40.3%) and online platforms (46.8%) were less commonly utilised, suggesting limited exposure to experiential learning and digital integration, both of which are essential in the modern labour market.

This was corroborated by principal 4 who echoed the following excerpt;

> "Inadequate financial capitation, inability of students fees payment and expensive ICT integration is a factor that inhibits effective teaching and learning in agricultural education training and subsequent job creation."

The finding posits that limited financial capitation, coupled with students' inability to meet fee obligations and the high cost of ICT integration, significantly impedes the effective delivery of teaching and learning in agricultural education. These constraints not only undermine the quality of instructional practices but also diminish the potential of such training to contribute meaningfully to job creation and self-employment. The findings underscore the necessity of increased financial support and affordable technological infrastructure to enhance pedagogical effectiveness and foster employability among graduates.

The alignment of pedagogical methods with job creation is supported by Oketch (2007), who argues that competency-based training and interactive teaching approaches in TVET enhance graduates' ability to transition into the workforce or create their own employment opportunities. Similarly, Afeti (2009) emphasises that industry-linked pedagogies, such as attachments and projects, equip trainees with relevant skills for self-reliance.

However, this view is contested by Tikly et al. (2013), who caution that while pedagogical reforms may improve skill acquisition, without structural labour market reforms and entrepreneurial support, the mere application of active teaching methods may not significantly lead to job creation. Likewise, King (2012) contends that unless pedagogy is

integrated with broader economic and policy frameworks, its impact on employment outcomes remains limited.

4.7 Curriculum support materials and implementation of agriculture education for job creation in TVETs in Western Kenya.

The fourth objective assessed curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya.

4.7.1 Trainers responses on curriculum support materials and implementation of agriculture education for job creation

The trainers were asked to provide responses based on curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya. A five-point Likert scale ranging from SD = strongly disagree = 1, D = disagree = 2, N = neutral = 3, A = agree = agree = 4, and SA = strongly agree = 5 as shown in Table 4.19.

Table 4.19: Curriculum support materials and agricultural education training

Statement	SD	D	N	A	SA
Occupational standards and curricula are available and being used	1 (3.1%)	1 (3.1%)	9 (28.1%)	10 (31.3%)	11 (34.4%)
Learning guides are available and being used	5 (15.6%)	12 (37.5%)	6 (18.8%)	6 (18.8%)	3 (9.4%)
Mentoring tool are available and are being used to assess trainees during industrial attachment and project work	3 (9.4%)	5 (15.6%)	3 (9.4%)	14 (43.8%)	7 (21.9%)
The department has developed and is using training schedule	4 (12.5%)	5 (15.6%)	3 (9.4%)	13 (40.6%)	7 (21.9%)
Portfolio of evidence is well maintained and assessment plan is available	3 (9.4%)	6 (18.8%)	2 (6.3%)	17 (53.1%)	4 (12.5%)

The finding depicts that slightly one-third of the trainers' responses 11 (34.4%) strongly agree that occupational standards and curricula are available and being used during training. It was observed that although most institutions had occupational standards and curricula. The availability of occupational standards enables effective termly or yearly

work coverage. The finding was contrary to Mutembei *et al.* (2024) who noted insufficient curriculum support materials such as syllabus and textbooks and laboratory equipment for experiments practical learning.

As noted from the finding, most trainers' response 12 (37.5%) disagree that most of their learning institutions lacked learning guides for training. It was also noted that learning guides were insufficient in most ATVET institutions. The unavailability of learning guides pause hindrance to effective dissemination of the course content of agriculture education implementation in technical and vocational education as there is little direction on further reading by trainees, self-assessment items and even illustrations for better understanding. This finding corroborates with Nsengimana (2021) who reported that inadequate teaching and learning materials, curriculum support materials, increased teaching load and reduced teaching time interferes with syllabus coverage.

As deduced from the finding, slightly two-fifth of trainer's response 14 (43.8%) agree that mentoring tool are available and are being used to assess trainees during industrial attachment and project work. A spot checklist observed availability of mentoring tool used during trainees' attachment that is provided by TVET-CDACC. Availability of mentoring tool means ATVET's effective production of trainees that are knowledgeable, skilled and are aligned with the job market. The finding aligns with Tarus et al., (2021) who established that CBET is a trainee-centered and adaptive to the ever-changing needs of students and society in a given learning environment.

Still, most trainers 13 (40.6%) agree that their departments have developed and using training schedule. The study also established availability of training schedules that align with effective termly and daily teaching and learning preparation for implementation of

agriculture education for job creation in TVETs. The finding gets along with Foster (2009) who argue that a good trainer needs to have pedagogical training so as to involve a variety of teaching and training methods. The finding is also contrary to Tambwe (2019) and Makunja (2016) who established that one of the major obstacles to the successful implementation of CBET was the lack of suitably trained trainers and effective pedagogical techniques and lesson preparations. Thus, trainers face the challenge of implementing CBET due to lack of more practical and trainee-centered approaches to training and teaching.

As evidenced from table 4.14, more than half of trainers' response 17 (53.1%) agree to the assertion that portfolio of evidence is well maintained and assessment plan is available for implementation in technical and vocational education. This is crucial due to its effectiveness in detecting the strength and weaknesses of trainees' performance at each level of learning. According to Fischer et al., (2018) and Cherng and Davis (2019) trainers should be conversant with formative and summative assessment and adjust the curriculum and methodological practices in line with trainee acquisition of skills, knowledge and attitude during agriculture education implementation in technical and vocational education and training.

The study further presented the findings using descriptive statistic (means, standard deviation, maximum and minimum) as shown in Table 4.20.

Table 4.20: Descriptive statistics between curriculum support materials and agriculture education for job creation in TVETs

Statement	Mean	Std Dev	Min	Max
Occupational standards and curricula are available and being used	3.91	1.03	1	5
Learning guides are available and being used	2.69	1.18	1	5
Mentoring tools are available and used during industrial attachment and project work	3.53	1.34	1	5
The department has developed and is using a training schedule	3.44	1.38	1	5
Portfolio of evidence is well maintained and an assessment plan is available	3.81	1.10	1	5

The findings suggest varying levels of implementation of key CBET instructional tools and processes across departments. The highest rated item was the availability and use of occupational standards and curricula (M = 3.91, SD = 1.03), indicating that most respondents agreed or strongly agreed that these are in use, reflecting a strong alignment with CBET requirements. The portfolio of evidence and assessment plans also recorded a relatively high mean (M = 3.81, SD = 1.10), reinforcing the notion that documentation and assessment frameworks are generally well maintained.

On the other hand, learning guides received the lowest mean score (M = 2.69, SD = 1.18), suggesting a notable gap in their availability and utilization, with a considerable proportion of respondents expressing disagreement. Similarly, while mentoring tools (M = 3.53, SD = 1.34) and training schedules (M = 3.44, SD = 1.38) were rated moderately, the higher standard deviations for these items indicate diverse experiences among respondents, potentially reflecting uneven implementation across departments or institutions. Overall, while certain CBET-aligned tools are relatively well integrated, others, particularly learning guides, require further attention and improvement to ensure uniform and effective implementation of AET under CBET.

The findings indicate inconsistent implementation of competency-based education and training support tools across departments. While occupational standards and curricula (M = 3.91) and portfolios of evidence with assessment plans (M = 3.81) are widely available and used, other essential elements like learning guides (M = 2.69) and training schedules (M = 3.44) are less consistently utilized. The mentoring tools (M = 3.53) are moderately available but still reflect gaps in application across institutions. The relatively high standard deviations indicate variation in implementation across different settings.

UNESCO-UNEVOC (2019) highlighted that in sub-Saharan Africa, including Kenya, the operationalisation of CBET is often slowed down by the lack of structured learning materials and consistent training plans, despite availability of general curriculum frameworks. Kemei and Mburugu (2018) – Argued that implementation of CBET in several Kenyan institutions had reached an advanced stage, with structured schedules, mentoring systems, and competency-based assessment strategies already institutionalized.

The study also tested for the hypothesis that,

H_{02}: There is no significant relationship between curriculum support materials and training equipment used for agriculture education for job creation.

Regression analysis was used to test the information from trainers' response as shown in table 4.21.

Table 4.21: Regression Analysis between curriculum support materials and agricultural education training for job creation

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41.056	5	8.211	28.802	.000
	Residual	7.412	26	.285		
	Total	48.469	31			

a. Dependent Variable: dependent

b. Predictors: (Constant), portfolio, occupational standards, mentoring tools, learning guides, training schedule

The regression analysis demonstrates a statistically significant relationship between curriculum support materials and the effectiveness of agricultural education training, as indicated by an F-value of 28.802 and a significance level of $p = .000$. Similarly, the hypothesis stating that there is no significant relationship between curriculum support materials and training equipment used for agricultural education for job creation is rejected, as the regression analysis yielded a statistically significant result ($F = 28.802$, $p < .001$),

indicating a strong and meaningful association between the variables. This suggests that the availability and utilization of curriculum support materials—such as textbooks, teaching aids, and practical equipment—play a critical role in shaping the quality and outcomes of agricultural training. The model accounts for a substantial proportion of the variance in training effectiveness, with the regression sum of squares (41.056) far exceeding the residual (7.412), implying a strong predictive capacity of curriculum materials on training outcomes.

The findings of this study affirm that curriculum support materials are integral to the delivery of effective agricultural education in TVET institutions. Adequate instructional resources not only enhance theoretical understanding but also bridge the gap between classroom learning and practical application, thereby fostering technical competence and increasing graduates' prospects for employment or self-reliance. Without such resources, training is likely to remain abstract and disconnected from real-world agricultural practices.

This position is supported by Kitainge (2003), who argues that relevant and sufficient teaching and learning materials are essential for competency-based training, particularly in agricultural disciplines where practical exposure is crucial. Similarly, Makunja (2016) maintains that curriculum materials significantly influence learners' performance and skill acquisition in vocational settings. However, Bennell (2007) challenges the assumption that curriculum materials alone guarantee quality training outcomes. He contends that broader systemic issues such as trainer competence, institutional governance, and market alignment must also be addressed. Likewise, Lauglo (2005) argues that while support materials are necessary, they are not sufficient in isolation to drive job creation unless supported by relevant curricula and labour market linkages.

Using regression analysis, the study further tested for model summary between curriculum support materials and agriculture education for job creation in TVETs in western Kenya. This is illustrated in Table 4.22.

Table 4.22: Model Summary of Regression Analysis between curriculum support materials and agriculture education for job creation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.920[a]	.847	.818	.53394

b. Predictors: (Constant), portfolio, occupational standards, mentoring tools, learning guides, training schedule

The regression model reveals a very strong relationship between the predictor variables and the dependent variable, with a correlation coefficient (R) of .920. The R Square value of .847 indicates that 84.7% of the variance in the outcome variable is explained by the model, while the adjusted R Square of .818 accounts for the number of predictors and confirms the model's reliability. The standard error of the estimate (.53394) is relatively low, suggesting good precision in the model's predictions and minimal deviation between predicted and actual values.

The results of this regression analysis indicate a highly predictive and statistically robust model, with the independent variables collectively explaining a substantial proportion of the variance in the dependent outcome. The strength of the correlation (R = .920) and the high R Square value reflect a well-fitting model, suggesting that the selected predictors are

not only statistically significant but also practically meaningful in explaining the phenomenon under investigation. The relatively low standard error further reinforces the reliability of the model's estimates. This strong association signals a well-constructed model with practical implications for improving outcomes in educational or training contexts.

Field (2013) supports the interpretation that an R Square value above .80 reflects an excellent model fit in social science research, particularly when paired with a low standard error and consistent theoretical grounding. Pallant (2020) also affirms that high R and R Square values, when adjusted appropriately, demonstrate reliable predictive power, particularly in regression models within educational and psychological studies.

4.7.2 Trainees responses on availability of curriculum support materials and in agriculture education for job creation.

Trainees were asked to provide responses on availability of curriculum support materials and in agricultural education for job creation. The responses were premised on a 5-point Likert scale ranging from SD = strongly disagree = 1, D = disagree = 2, N = neutral = 3, A = agree = agree = 4, and SA = strongly agree = 5 This is illustrated in table 4.23.

Table 4.23: Trainees responses on availability of curriculum support materials AET and job creation

Statement	SD	D	N	A	SA
I have a learning guide for all the units I take	25 (40.3%	11 (17.7%)	9 (14.6%)	7 (11.3%)	10 (16.1%)
I have a portfolio of evidence well maintained	6 (9.7%)	10 (16.1%)	5 (8.1%)	27 (43.5%)	14 (22.6%)
Curriculum support material are pivotal for AET and job creation	3 (4.8%)	10 (16.1%)	2 (3.2%)	30 (48.4%)	17 (27.4%)

This is evidenced by the high proportion of trainees (58%) who reported not having a learning guide for all their units. Most principals responded that learning guides for both trainers and trainees assist to evaluate and provide systematic presentation of competencies needed in agricultural courses for job creation. Learning guide provides trainees with areas for further research as well as providing specific competences to be acquired together with assessment item for that competence. According to Hall-Kenyon, Bull and Dickelman (2015) training guides and lesson plans provide a structured approach to teaching by ensuring that instructional activities are consistent are in line with the CBET objectives.

On a more positive note, a majority (66.1%) indicated that they maintain a portfolio of evidence, suggesting some level of structured documentation of their learning progress despite gaps in formal curriculum support. The portfolio is crucial for monitoring and

improving trainees' strength and weaknesses performance during agricultural education implementation in technical and vocational education and training. One of the principals said,

> "The portfolio assists trainers to track the progress of trainees achievement during agricultural education agriculture training implementation in technical and vocational education and training (Principal,4)."

The finding corresponds to Ruangprasert and Subsueb (2019) finding that, curriculum support materials are important during implementation of formative and summative assessments that align with the CBET framework, providing valuable feedback for both trainers and trainees.

The findings indicate that while a majority of respondents acknowledge the importance of curriculum support materials for Agricultural Education and Training (AET) and job creation (75.8% agreed or strongly agreed), there is a notable shortfall in the actual provision and accessibility of such resources. Unavailability of agricultural support materials hinders trainees' hand-on-practical activities. Besides, they directly engage trainees with real-life agricultural challenges and experiences. In agricultural education training, these materials take care of the different learning needs and experiences of trainees. Most principal were in agreement that curriculum support materials help facilitate collegial interaction between trainers and trainees to realize agricultural education implementation in technical and vocational education and training for job creation. This finding is consistent with Khanal, Saha and Stassen (2019) whose study established that

training support materials promote the authenticity and relevance of learning experiences, enabling trainees to acquire skills that are directly transferable to the workplace and industry settings.

The data reflect a disjunction between the perceived importance of curriculum support materials and their availability within AET settings. While trainees overwhelmingly recognize the critical role these materials play in enhancing learning and supporting job creation, the widespread lack of access to unit-specific learning guides suggests institutional or systemic deficiencies in resource provision. This disparity may hinder the effectiveness of training programs and compromise graduates' readiness for employment or self-employment. Nonetheless, the strong presence of maintained portfolios suggests a degree of resilience and adaptability among learners, who continue to engage with alternative forms of documentation and reflection on learning outcomes.

This is consistent with Makunja (2016), who highlighted that the lack of adequate teaching and learning materials in vocational education limits the delivery of competency-based curricula. Similarly, UNESCO (2015) maintains that effective curriculum support materials are central to skill acquisition and employability, particularly in technical and agricultural education. The findings reinforce the urgent need for investment in structured learning resources to bridge the gap between policy intent and practical training delivery.

The study also tested for descriptive analysis for the relationship between curriculum support materials and agricultural education training for job creation in TVETs. This is shown in Table 4.24.

Table 4.24: Descriptive analysis between curriculum support materials and agricultural education training for job creation in TVETs.

Statement	Mean	Std Dev	Min	Max
I have a learning guide for all the units I take	2.46	1.49	1	5
I have a portfolio of evidence well maintained	3.53	1.27	1	5
Curriculum support materials are pivotal for AET and job creation	3.78	1.12	1	5

The findings reveal that most trainees disagreed or strongly disagreed with having learning guides for all units, as reflected by a low mean of 2.46, suggesting significant gaps in learning resource provision. Conversely, the majority agreed that they maintained a portfolio of evidence and recognized the value of curriculum support materials in promoting agricultural education and job creation, with mean scores of 3.53 and 3.78 respectively, indicating strong positive perceptions in those areas.

The analysis indicates that the provision of learning guides is notably inadequate, potentially hindering structured learning and independent study among trainees. However, the maintenance of learner portfolios and the acknowledged importance of curriculum support materials demonstrate a commitment to competency-based learning and career readiness, aligning with the views of Makulilo (2020) who underscores the significance of instructional support tools in vocational education. In contrast, Wanjala *et al* (2020) argue

that inconsistent access to such resources across institutions creates inequity in learning outcomes, a concern echoed in this data.

Using regression analysis, the study further tested for the relationship between availability of curriculum support materials and agricultural education training for job creation. This was based on the hypothesis that:

"There is no statistically significant relationship between availability of curriculum support materials and agricultural education training for job creation in TVETs in Western Kenya." This is indicated in table 4.25.

Table 4.25: Regression Analysis between availability of curriculum support materials and AET for job creation.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.731	2	35.865	190.503	.000[b]
	Residual	11.108	59	.188		
	Total	82.839	61			

a. Dependent Variable: dependent variable

b. Predictors: (Constant), portfolio assessment, learning guides

The regression analysis reveals a highly significant model, as indicated by an F-value of 190.503 with a significance level of $p < .001$. The regression model explains a substantial portion of the variance in the dependent variable, with the regression sum of squares (71.731) accounting for the majority of the total variance (82.839). The mean square for regression (35.865) is considerably higher than that of the residual (0.188), suggesting that the independent variables in the model are strong predictors of the outcome. With only 2 degrees of freedom for regression, the result implies that even a small number of predictors significantly explain variations in the dependent construct.

The present study demonstrates that the variables included in the regression model have a strong and statistically significant influence on the outcome variable, as evidenced by the high F-statistic and extremely low p-value. This finding underscores the predictive strength of the selected factors and highlights their critical role in shaping the observed outcome. The minimal residual variance suggests that the model captures nearly all the explainable variation, reinforcing its robustness and relevance in addressing the research objectives.

The study also established the model summary of regression analysis between availability of curriculum support materials and AET for job creation as indicated in table 4.26.

Table 4.26: Model Summary of Regression Analysis between availability of curriculum support materials and AET for job creation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.931[a]	.866	.861	.43390

a. Predictors: (Constant), portfolio assessment, learning guides

The regression model demonstrates a very strong positive relationship between the independent and dependent variables, as reflected by a high correlation coefficient (R = .931). The R Square value of .866 indicates that approximately 86.6% of the variance in the dependent variable is explained by the model. After adjusting for the number of predictors, the adjusted R Square (.861) still confirms a robust fit, suggesting minimal over fitting. The standard error of the estimate (.43390) is relatively low, further supporting the model's accuracy in predicting the outcome variable.

The findings strongly affirm that the predictors included in the model are highly effective in explaining the outcome variable, with over 86% of the variance accounted for. This reflects a well-constructed model with excellent explanatory power. The narrow standard error enhances the reliability of predictions derived from the regression, highlighting the practical significance of the identified variables in understanding the phenomenon under investigation.

Field (2013) supports the notion that an R Square value exceeding .80 reflects an exceptionally strong model fit, especially in behavioral and educational research where such high values are rare but meaningful when observed. Tabachnick and Fidell (2019) argue that a high adjusted R Square alongside a low standard error of the estimate confirms model robustness and suggests the regression coefficients are likely to generalize well beyond the sample.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study on the purpose, objectives, methodology and also a summary of the findings of this study. It also presents the major conclusions, of the study based on the findings. Lastly this section also provides recommendations based on the findings before crowning it all with suggestions for further study.

5.2 Summary of the Study

The purpose was to investigate agriculture education implementation in technical and vocational education and training institutions in Western Kenya for job creation. The study was premised on the following objectives.

i. To establish the competence of trainers for implementation of agriculture education for job creation in TVETs in Western Kenya.

ii. To assess the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs in Western Kenya

iii. To assess the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs in Western Kenya

iv. To assess the curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya.

The study utilized the functional curriculum theory and descriptive research design approach with a combination of mixed methods of data collection. The study had a sample of 131 that included 7 principals, 42 trainers and 80 trainees selected from a population of 985 that encompassed 43 principals, 142 trainers and 800 trainees. Stratified and simple random techniques were used to sample respondents of the study. Questionnaire and interview schedule were used to collect data. Principals, trainers and trainees were respondents of study from TVET institutions in Western Kenya. Descriptive statistics that included frequencies and percentages and inferential statistics ANOVA, were used to test for the hypothesis of the study. Qualitative data was analyzed in prose and narrative form based on the variables of the study.

5.3 Summary of the Findings

5.3.1: Competence of trainers for implementation of agriculture education for job creation in TVETs

The first objective, established the competence of trainers for implementation of agricultural education for job creation in TVETs in Western Kenya. The findings revealed that the trainers have received pedagogical training, have qualification levels higher than what they teach, and have undergone capacity building on competency-based assessment techniques as well as development of assessment and mentoring tools for assessing agricultural education training. The trainers also developed relevant professional documents required for training including session plan, curriculum design and occupational standards. Also, the trainers were found to have been trained on the development of training programs and have attended industrial attachment in the last 2 years on agricultural courses.

The trainers, however, had not acquired adequate retooling through workshops and seminars and also not undergone capacity building on competency-based assessment techniques as well as development of assessment and mentoring tools for assessing agricultural education training. This hindered implementation of agriculture education for job creation in the TVET institutions.

The study established a statistically significant influence between trainers' competence and implementation of agriculture education for job creation in Western Kenya in which $F(4, 27) = 45.004$, $p < 0.000$, which is less than a significant level of 0.05.

5.3.2: Adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs

The second objective assessed the adequacy and efficiency of physical infrastructure and training equipment used for agriculture education for job creation in TVETs in Western Kenya. The study established that a majority of TVETs face the problem of such as inadequate and spacious classrooms, inadequate and ill-equipped laboratories, insufficient electronic equipment and devices such as laptops, internet, inconsistent power supply, ill-equipped and dilapidated workshops tools and equipment some of which were literally obsolete hence inefficient. The farms were also found to be insufficient to accommodate a variety of agricultural value chains hence couldn't allow training of variety of agricultural concepts. Besides, libraries were also not well stocked with required reference materials thus impeding further learning.

Inferential statistics revealed that physical infrastructure of ATVETs trainers is a predictor of implementation of agriculture education for job creation in which $F(14, 17) = 38.22$, $p < 0.000$, that is less than significant level of 0.05.

5.3.3: trainers' incorporation of practical and trainee-centered pedagogical approaches in agriculture education for job creation in TVETs

The third objective investigated the extent to which trainers incorporate practical and trainee-centered pedagogical approaches in agricultural education for job creation in TVETs in Western Kenya.

The study revealed that lecture method was used by all trainers indicating use of traditional pedagogical methods. Besides, group discussions and demonstrations methods were also preferred pedagogical teaching techniques. Field trips, project learning and online platforms were not preferred pedagogical approaches by trainers hence impeding hands-on skill acquisition. The study noted inadequate mentorship programs, job placement, exchange programmes and workshops and seminars hence rendering training ineffective and irrelevant to the trainees.

5.3.4: Curriculum support materials used in implementation of agriculture education for job creation in TVETs

The fourth objective investigated on curriculum support materials used in implementation of agriculture education for job creation in TVETs in Western Kenya. The study established that, those occupational standards and curriculum are available and being used adequately by trainers to align the content to be taught. Training schedule has been developed by TVET institutions and are being used by the trainers.

The trainees have developed portfolio of evidence which are well maintained and periodically checked by trainers. The assessment plans are also available, well used and well maintained by the trainers. Trainers, however, were found to have inadequate mentoring tools for all the offered courses to assess trainees during industrial attachment and project work.

The regression analysis revealed that there is a significant relationship between curriculum support materials used for agriculture education in TVETs in Western Kenya for job creations in which $F(5, 26) = 28.802$, $p < 0.000$, that was less than significant level of 0.05.

5.4 Conclusion

The findings indicate that although trainers demonstrate the ability to develop professional training documents and design agricultural training programs, most have not participated in recent workshops, seminars, or industrial attachments that are essential for updating their practical skills and aligning their instruction with contemporary industry standards. This lack of ongoing professional development and limited exposure to practical industrial experiences undermines the delivery of competency based, practical-oriented learning crucial for equipping trainees with relevant skills for job creation and self-employment. The regression analysis yielded an F-statistic of 22.615 with a p-value less than 0.000, which is below the conventional threshold of 0.05, confirming that the relationship is significant. Consequently, the trainers' competence has a meaningful positive impact on how effectively agricultural education programs are implemented to equip trainees with skills for employment and self-reliance.

The findings indicated that most TVET institutions lack essential infrastructure and resources such as inadequate classrooms, outdated equipment, limited ICT facilities, and

overcrowded learning spaces that hinder practical, learner-centered training needed for skill development and job creation for effective CBET implementation in agricultural education. These challenges reduce trainee engagement, restrict exposure to modern agricultural practices, and compromise the relevance of training. The results indicate a strong, significant relationship between physical infrastructure and training equipment and the implementation of agricultural education for job creation in TVETs. The high R value (.859) and R Square (0.737) demonstrate that 73.7% of the variation in agricultural education outcomes is explained by the adequacy of infrastructure and equipment. The regression analysis confirmed this relationship as statistically significant $F(14,17) = 38.22$, $p < 0.000$), leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis that better infrastructure and equipment positively influence agricultural education outcomes for job creation.

The data analysis indicates that industrial attachment is the most commonly used form of partnership between agricultural education training institutions and agricultural-related firms, primarily because it is a compulsory requirement for practical skill assessment. In contrast, job placement, exchange programs, and mentorship are the least utilized partnership forms, likely due to limited industrial development and inadequate employment opportunities for graduates.

The findings of the study revealed that while a significant proportion of trainees lack access to comprehensive learning guides for all units, such guides are essential for systematically presenting the competencies required in agricultural education and facilitating assessment aligned with CBET objectives. Conversely, most trainees reported maintaining a portfolio of evidence, which plays a critical role in tracking progress, identifying strengths and

weaknesses, and supporting formative and summative assessments. Furthermore, nearly half of the trainees acknowledged the importance of curriculum support materials in enhancing hands-on practical activities, fostering authentic learning experiences, and addressing diverse learning needs. These findings underscore that the availability and effective use of curriculum support materials, learning guides, and portfolios are vital in implementing agricultural education training and equipping trainees with relevant skills for job creation in the agricultural sector.

The regression results, $F(2, 59) = 190.503$, $p < 0.000$, indicate a statistically significant relationship at the 0.05 significance level. Ensuring adequate curriculum support materials for trainers is critical in effectively delivering agricultural education programs that equip trainees with the competencies necessary for employment and self-employment in the agricultural sector.

5.5: Recommendations of the Study5.5.1: The Ministry of Education should mount adequate seminars and workshops to retool the trainers on competence-based education so that trainers to equip trainees with requisite quality education for job creation.

5.5.2: Education stakeholders should ensure provision of sufficient and updated physical infrastructure including laboratories, classrooms, workshops and demonstration farms as a means of improving teaching and learning environment to enhance appropriate skill and competence among trainees for job creation.

5.5.3: Effort should be made to provide partnership between agricultural education training institutions and agricultural-related firms to ensure availability modern equipment and

tools that can be useful in training as well as providing market-oriented competences to improve employment opportunities among ATVET graduates.

5.5.4: The government and TVETs institutions should ensure provision of adequate curriculum support materials to be used in implementation of agriculture education for job creation among graduate trainees.

5.6: Suggestions for Further Research

5.6.1: Since this study was conducted in TVETs in Western Kenya, a similar study should be carried out on implementation of agriculture education for job creation in public Universities in Kenya.

5.6.2: Because the current study was conducted in Western Kenya, similar comparative study should be conducted in other regions in Kenya.

5.6.3: This research generalized many agricultural programmes offered in TV ETs. A study on

specific agriculture competency should be carried out.

REFERENCES

Abubakar, M. B. (2020). Impact of instructional materials on student's academic performance in Physics, in Sokoto-Nigeria. In *IOP Conference Series: Earth and Environmental Science, 476* (1), https://doi.org/10.1088/1755-1315/476/1/012071.

Adams J., Khan, T.A. Hafiz, F. S. (2014). Research Methods for Business and Social Science Students.2nd Edition. Sage publication.

Adigun, J. O., & Okebukola, P. A. O. (2015). Competency-Based Education Curriculum in Nigerian Universities: Benefits and Challenges. *The Journal of Education, Culture, and Society, 6(1), 260-269.*

Adhiambo, L. O., Koros, P., & Barat, M. S. (2024). Influence of teacher competencies on the Implementation of Competency-Based Curriculum in Public Junior Schools in Kajiado North Sub-County, Kajiado County, Kenya. *Journal of Popular Education in Africa*, *8*(9), 166-183.

Adosi, C. M. (2020). Qualitative Collection Instruments–the most challenging and easiest to use. *Retrieved (April, 15, 2023) from Research Gate: https://www. researchgate. net/publication/344251614*.

Akomolafe, C. O., & Adesua, V. O. (2016). The impact of physical facilities on students' level of motivation and academic performance in senior secondary institution in South West Nigeria. *Journal of Education and Practice, volume 4, issue 7, page 38–39.*

Ambei M.C, Kum I.N, and Ambei R.F (2018) The Competency Based Curriculum Implementation: Appraisal from the Perspective of Teachers use of Resources. *International Journal of Trend in Scientific Research and Development* (IJTSRD)ISSN NO: 2456-6470 VOL 2 ISSUE 4

Amutabi, M. N. (2019). Competency based curriculum (CBC) and the end of an era in Kenya's education sector and implications for development: Some empirical reflections. *Journal of Popular Education in Africa*, *3*(10), 45-66.

African Union Development Agency (AUDA-NEPAD). (2019). *AUDA-NEPAD 2019 annual report*

Ball, D.L., and D.K. Cohen. (1996). Reform by the book: What is—or might be—the role of curriculum materials in teacher learning and instructional reform? Educational Researcher 25(9):6-14. https://doi.org/10.3102/0013189x025009006

Bakar, S. Z. A., Mohamed, N. R., Maskur, H., & Chamidy, H. N. (2025). The Transformation of TVET Education through Modernized Facilities: Challenges and Opportunities. *Pena Modern Practices in Teaching and Learning*, *1*(1), 44-53.

Becker, G. S. (1993). *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (3rd ed.). University of Chicago Press.

Bold, T., Kimenyi, M. S., & Sandef200220022002ur, J. (2013). Public and private provision of education in Kenya. *Journal of African Economies, volume 22, issue 2, page 39-56.*

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, *9*(2), 27-40.

Cherng, H.-Y. S., & Davis, L. A. (2019). Multicultural matters: An investigation of key assumptions of multicultural education reform in teacher education. *Journal of Teacher Education*, 70(3), 219–236. https://doi.org/10/ghwg9s.

Chisi, Z. M. (2018). Assessing quality assurance in the Technical and Vocational Education and Training system in Malawi [PhD Thesis]. University of Pretoria.

Choppin, J., Roth McDuffie, A., Drake, C., & Davis, J. (2018). Curriculum ergonomics: Conceptualizing the interactions between curriculum design and use. *International Journal of Educational Research, 92, 75–85*. https://doi.org/10.1016/j.ijer.2018.09.015

Cohen, L. M., & Morrison, K. (2013). *Research methods in education (7th ed).* Routledge: DOI: 10.432/9780203720967.

Cresswell, W. J. (2012). *Education Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research.* Pearson Education.4th edition

Cresswell, W. J. (2014). Research Design, Qualitative, Quantitative and Mixed Methods Approaches.4th Edition.Sage.

Curry, L. & Docherty, M. (2017). Implementing Competency-Based Education. Collected Essays on Learning and Teaching, volume 10, page 61-73. Available at https://files.eric.ed.gov/fulltext/EJ1147189.pdf.Accessed 21 August 2022

Deißinger, T., & Hellwig, S. (2011). Structures and functions of competencybased education and training (CBET). *Development, 14*(1), 54-64.

Dixon, F. A., Yssel, N., McConnell, J. M., & Hardin, T. (2014). Differentiated instruction, professional development, and teacher efficacy. *Journal for the Education of the Gifted, 37*(2), 111-127.

Egbule, P.E (2004). Fundamentals and Practice of Agricultural Education. Owerri: Totan Publishers Ltd. *Journal of Centre for Technical Vocational Education, Training and Research (JOCETVETAR)* Vol.3 No.1: June 2018

Ejiofor, T., Bassey, N., Onu, F., Okechukwu, C. F., & Nwoke, R. C. (2021). *Integration of ICT tools in agricultural education curriculum for quality instructional delivery*.

Food and Agriculture Organization of the United Nations (2015). The state of of food and agriculture 2015: Social protection and agriculture-Breaking the cycle of rural poverty. Rome: FAO

Field, A. (2013). Discovering Statistics Using IBM SPSS Statistics (4th ed.). SAGE Publications.

Fischer, C., Fishman, B., Dede, C., Eisenkraft, A., Frumin, K., Foster, B., Lawrenz, F., Levy, A. J., & McCoy, A. (2018). Investigating Relationships Between School Context, Teacher Professional Development, Teaching Practices, and Student Achievement in Response to a Nationwide Science Reform. Teaching and Teacher Education, 72, 107–121. https://doi.org/10/gdhrm5.

Forbes, C.T., and E.A. Davis. 2010. Curriculum design for inquiry: Preservice elementary teachers' mobilization and adaptation of science curriculum materials. *Journal of Research in Science Teaching 47(7):820-839.* https://doi.org/10.1002/tea.20379

Forster-Heinzer, S. (2018). Responsibility as the principle denominator of pedagogical ethos: an empirical analysis of pedagogical responsibility from the vocational trainers' perspective. In *Professionals' ethos and education for responsibility* (pp. 89-105). Brill.

Gainsburg, J. (2012). Why new Mathematics Teachers do or don't use practices emphasized in their credential program. *Journal of Mathematics Teacher Education*, 15(5), 359–379. https://doi.org/10/fzj8vt

Deutsche Gessellschaft fur Internationale Zusammenarbeit (GIZ)(2024). Youth employment in the agri food sector in Western Kenya. GmbH

Gupta, R., & Singh, M. (2019). Infrastructure Challenges in Implementing Competency-Based Education in India. *Indian Journal of Educational Development*, volume 15, number 2, page 32-47.

Hall-Kenyon, K., Bull, M. A., & Dickelman, M. S. (2015). Preservice Teachers' Perceptions of Considering Target Language Use in Relation to Prior Competencies. The New Educator, 11(2), 149-172.

Halpern, A. S. (1985). Transition: A look at the foundations. *Exceptional Children, 51*(6), 479–486. https://doi.org/10.1177/001440298505100604

Hervie, D. M., & Winful, E. C. (2018). Enhancing teachers' performance through training and development in Ghana education service (A case study of Ebenezer senior high school).

IBE-UNESCO. (2017). Why, What and How of Competency Based Curriculum Reforms: The Kenya Experience. *Journal on Current and Critical Issues in Curriculum, Learning and Assessment.* No.11 June 2017.

International Labour Organization. (2020). *Skills for a greener future: A global view based on 32 country studies*. International Labour Office. https://www.ilo.org/skills/pubs/WCMS_732214/lang--en/index.htm

Jaquith, A., Mindich, D., & Wei, R. C. (2010). Pockets of Excellence. The Learning Professional, 31(5), 52.

Jenkins, A. A., & Yoshimura, J. (2010). Not another inservice! Meeting the special education professional development needs of elementary general educators. Teaching Exceptional Children, 42(5), 36–43. https://doi.org/10/gmkgp5

Johnson, A. B., & Smith, C. D. (2019). Infrastructure and Competency-Based Education in the United States. *Journal of Educational Infrastructure*, volume 12, issue 3, page 45-58.

Kanyonga, L., Mtana, N., & Wendt, H. (2019). Implementation of competence-based curriculum in technical colleges: The case of Arusha City, Tanzania. *International Journal of Vocational and Technical Education*, *11*(1), 1-20.

Karanja, J. (2020). The Role of Practical Learning in Agricultural education. African Journal of Agricultural Research.

Kauffman, J. M., & Hallahan, D. P. (2005). *Special education: What it is and why we need it*. Boston: Allyn & Bacon.

Kelly, A. V(2009). The curriculum: Theory and practice (6th Education) Sage.

Kennedy, T. J., & Sundberg, C. W. (2020). 21st century skills. In *Science education in theory and practice: An introductory guide to learning theory* (pp. 479-496). Cham: Springer International Publishing.

KICD,(2017a). Basic Education Curriculum Framework.

KICD,(2017b). Pre-Primary One. Kenya Institute of curriculum Development.

KICD (2019), Curriculum Reforms in Kenya. Where are we? Nairobi: KICD.

Kidane, T. T. (2013). Dimensions of agricultural educational training in formal education centres: in the case of KwaZulu-Natal, South Africa (Doctoral dissertation).

Khanal, A., Saha, S., & Stassen, H. (2019). Integrating Competency-Based Education and Training (CBET) in the Vocational Curriculum: A Case Study from Nepal. Advances in Social Sciences Research.

Kisumu, D. (2020). Competency-Based Assessment Practices in Agricultural education. East African Journal of Education.

Koech, D. K., & Molnár, D. E. Leveraging Study Abroad for Cognitive, Affective, Behavioural and Intercultural Competence Development Among International Students In Central Europe. *Affective, Behavioural and Intercultural Competence Development Among International Students In Central Europe*.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT press.

Komba, C.S. & Mwandanji M. (2015) Reflection on the implementation of Competence Based Curriculum in Tanzanian secondary institution. *Journal of Education and Learning*; 4 (2) 73-80

Krejcie, R.V., & Norgan, D. W. (1970). Determining Sample Size for Research Activities. Educational and Psychological Measurement.

Kriavėnaitė, K., Elert, B., & Deflers, H. (2019). Competency-Based Curriculum Design and Development: Benefits and Challenges. European Conference on Curriculum Studies Proceedings, 988-993.

Kufaine, N., & Chitera, N. (2013). Competency based education and training in technical education problems and perspectives. *International Journal of Vocational and Technical Education*, *5*(3), 37-41.

Kyule M. N., Jacob J. J. O. Konyango, Agnes O. Nkurumwa. (2018) "Teachers in the implementation of practical agriculture curriculum in Kenya's arid and semi-arid secondary institution" Problems of Education in the 21st Century Vol. 76

Lave, J., & Wenger, E. (1991). Learning in doing: Social, cognitive, and computational perspectives. *Situated learning: Legitimate peripheral participation*, *10*, 109-155.

Lawson M. J & Williams H.A (2007). Outcome-based Education, Discussion Paper Prepared for the Association of Independent Institution of SA in April 2007.

Lee, S. (2025). *Mastering Construct Validity: Best Practices* & *The Ultimate Guide to Construct Validity*.

Lee, O., & Buxton, C. A. (2013). Teacher Professional Development to Improve Science and Literacy Achievement of English language learners. Theory Into Practice, 52(2), 110–117. https://doi.org/10/f4whvz.

Lee, J., Rhee, D. E., & Rudolf, R. (2019). Teacher gender, student gender, and primary school achievement: Evidence from ten Francophone African countries. *The Journal of Development Studies*, *55*(4), 661-679.

Lemke, Mercedes, (2022). "Curriculum Development of Agricultural Educators in South Dakota" Electronic Theses and Dissertations. 438. https://openprairie.sdstate.edu/etd2/438

Leshay, E., & Rambuda, A. (2018). Designing Competency-Based Learning Objects to Enhance Pedagogical Content Knowledge of Pre-Service Teachers. Journal of Community Positive Practices, 2(18), 48-62.

Lewa, K. K., & Ndungu, J. M. (2012). Does educational level influence the choice of farming as a livelihood career.

Ligami, C. (2018). World Bank invests in vocational education in three countries. *University World News*, *13*(218), 1.

Mackatiani, C. I. (2017). Influence of Physical Facilities on Quality Primary Education in Kenya in post UPE and EFA Era. European *Journal of Education Studies.*

Majumdar, S. (2011). Emerging trends in TVET: Vision for the twenty-first century. In S. Majumdar (Ed.), *Emerging trends in TVET: Vision for the twenty-first century* (pp. 7–24). UNESCO-UNEVOC International Centre.

Makunja, G. (2016). Challenges facing teachers in implementing competence-based curriculum in Tanzania: The case of community secondary institution in Morogoro municipality. *International Journal of Education and Social Science*, 3(5), 30–37.

Matsumura, M., et al. (2018). Collaboration, Competition, and Consolidation: A Multi-Method Analysis of the Network Formation, Rivalry, and Merger in the Agricultural Sector. Journal of Agricultural and Resource Economics, 43(3), 382.

Mazzetti, G., Vignoli, M., Guglielmi, D., Van der Heijden, B. I., & Evers, A. T. (2022). You're not old as long as you're learning: Ageism, burnout, and development among Italian teachers. *Journal of Career Development*, *49*(2), 427-442.

Mbachu, C. E., & Dorgu, T. E. (2014). Making the Nigerian School Environment and Curriculum More Functional and Responsive for Human Capacity Development for the Year 2020. *Journal of Curriculum and Teaching*, *3*(1), 28-35.

Mbwillo, J. S. (2023). Competency Based Education and Training (CBET) on Students' Engagement in Learning Process at Tanzania Public Service College-Mbeya Campus. *JOURNAL OF PUBLIC SECTOR MANAGEMENT*, *7*(1), 135-150.

Merkus, J. (2024). *"What Is Content Validity? | Definition & Examples.*

McLeod, S. (2024). *Validity in Research* [PDF]. ResearchGate. According to McLeod:

McLeod, S. A. (2019). *Likert Scale*. Simply Psychology. www.simply.

Ministry of Education. (2019). *Education sector report 2019/2020–2021/2022*. Government of Kenya. https://www.education.go.ke/index.php/online-services/file/170-education-sector-report-2019

Morris, T. H. (2020). Experiential learning–a systematic review and revision of Kolb's model. *Interactive learning environments*, *28*(8), 1064-1077.

Mugenda, O.M., & Mugenda, A. G. (2013). Research Methods: Quantitative and Qualitative Approaches. Acts Press.

Munienge, M., Telisa, J., and Kikunga, M. (2013) Integration of ICT in Education: Key Challenges.

Murithi, J. & Yoo, E. (2021). Teachers' use of ICT in implementing the competency-based curriculum in Kenyan public primary institution. Innovation and Education, vol. 3, issue 5, page 1-11.

Mutai, E. C., Chebet, E., & Oranga, J.(2020) Competency Based Curriculum Implementation and Teacher Preparedness in Public Schools in Moiben Sub-County, Uasin Gishu County, Kenya.

Mutai, E. C., Chebet, E. & Oranga, J. (2024). Competency based curriculum implementation and teacher preparedness in public schools in Moiben Sub-County, Uasin Gishu County, Kenya. Journal of Research Innovation and Implications in Education, 8(3), 356 - 365. https://doi.org/10.59765/kzxwy84.

Mutembei, L. N., Kibaara, T., & Gichohi, P. M. (2024). Teaching-Learning Resources and Employability Skills Development of TVET Graduates in Meru County. *Journal of Education*, *4*(6), 18-30.

Mutungi, G., & Muriuki, S. (2021). Handbook of TVET: Historical and recent developments in the changing world of work.

Mwashighadi, M. P., Kerre, W. B., & Kitainge, K. (2020). Trainees' perception on the CBET curriculum in Kenya: The case of TVET institutions in coast region.

Neuman, W. L. (2007). *Basics of social research: Qualitative and quantitative approaches* (2nd ed.). Allyn & Bacon.

Ngoya, F. (2019). Learning Resources in Agricultural education. *Kenyan Journal of Agricultural Sciences.*

Ngware, M. W., Ochieng', V., Kiroro, F., Hungi, N., & Muchira, J. M. (2024). Assessing the acquisition of whole youth development skills among students in TVET institutions in Kenya. *Journal of Vocational Education & Training, 76*(1), 197-222.

Njagi, P. (2019). Enhancing CBC Implementation: The Role of Library Resources in Kenyan Institution. *Kenya Educational Review*, volume 6, issue 2, page 45-56.

Njenga, M. (2022). Professional competencies and the continuing professional development needs of Technical, Vocational Education and Training (TVET) teachers in Kenya. *Hungarian Educational Research Journal*, *12*(4), 475-492.

Nsengimana, T., Mugabo, L. R., Ozawa, H., & Nkundabakura, P. (2021). Science competence-based curriculum implementation in Rwanda: A multiple case study of the relationship between a school's profile of implementation and its capacity to innovate. *African Journal of Research in Mathematics, Science and Technology Education, 25*(1), 38-51.

Odhiambo, G. (2018). Trainer Guides and Their Impact on Learning Outcomes. Journal of Education Research.

Odhiambo, A., & Ndirangu, B. (2019). Challenges of Classroom Infrastructure in Implementing CBC in Kenyan Primary Institution. *Journal of Education in Africa, volume 12, issue* 1, page 78-92.

Offorma, G. C. (2009). Curriculum implementation in distance learning.

Oguntunde, G. A. & Mustapha, Y. (2014). Human Resource Development Programmes in Nigeria: Implication for Agricultural Education. *Journal of Vocational and Technical Education, 4 (1) 68-72.*

Omariba, A., & Miima, F. A. (2024). Enhancing green learning in education and training in TVET for sustainable development through e-Libraries in Kenya. *Journal of Innovation, Technology and Sustainability*, *2*(1), 16-29.

Ooko, F. (2019). Leveraging Technology for Effective CBC Implementation: The Role of ICT Infrastructure in Kenyan Institution. *Journal of Information Technology in Education, volume 5, issue* 4, page 210-225.

Orodho, J.A. (2012). *Elements of education and social science research methods.* Maseno; Kanezja Publishers.

Osinem E.C. (2008). Managing Agricultural Education and Training:Resources, Principles and Methods. Enugu: *Belony International Publishers.*

OUMA, P. (2021). Readiness for Competence Based Learning of Agriculture Education in Secondary Schools in Uasin Gishu County, Kenya.

Owala, O. R. (2021). Successes and Challenges of the Implementing the Competency Based Curriculum in Kenya.*Researchgate*.351411294.

Parajuli, M., & Thapa, A. (2020). Gender Differences in the Academic Performance of Students. Journal of Development and Social Engineering, Volume 3, Issue 1, pp 39-47.

Priestley, M., Edwards, R., Priestley, A., & Miller, K. (2012). Teacher Agency in Curriculum Making: Agents of Change and Spaces for Manoeuvre. *Curriculum Inquiry*, 42(2), 191–214. https://doi.org/10/gdpd62.

Raelin, J. A. (2008). *Work-based learning: Bridging knowledge and action in the workplace*. John Wiley & Sons.

Recha, J. W. (2022). AUDA-NEPAD Gender Climate Change and Agriculture Support Program Training Of Trainers.

Ringeera, C. K., Ngeera, F. G., & Murithi, S. (2025). Influence of Infrastructure Adequacy on the Preparedness of Curriculum Implementation of CBET in Public Technical Institutions in Mt. Kenya East Region, Kenya. *Journal of Education*, *5*(4), 14-25.

Rivera, W. M. (2006). Rural Knowledge and Information Systems for Non Agricultural Rural Needs. *The Journal of Agricultural Education and Extension. 12 (1): 17-23. Doi: 10.1080/13892240600740803*

Ruangprasert, V., & Subsueb, K. (2019). Competency-Based Education and Training: Implications for Assessment and Evaluation. *International Journal of Vocational Education and Training Research*, 5(2), 21-32.

Rutayuga, A. B. (2012). The emerging Tanzania concept of competence: Condition for successful implementation and future development, PhD Dissertation, Institute of Education: University of London.

Shah, S. R. & Udgaonkar, S.S. (2021). Influence of Gender and Age of Teachers on Teaching: Students Perspective. International Journal of Current Microbiology and Applied Sciencess, Volume 7 Number 01, page 2436-2441.

Sistermans, I. J. (2020). Integrating Competency-Based Education with a Case-based or Problem-based learning Approach in online Health Sciences. *Asia Pacific Education Review*,21(4), 683–696. https://doi.org/10/gmkfxn.

Tabachnick, B. G., & Fidell, L. S. (2019). Using Multivariate Statistics (7th ed.). Pearson.

Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. International Journal of Academic Research in Management (IJARM) Vol. 5, No. 3, 2016, Page: 28-36.

Taherdoost, H., & Madanchian, M. (2024). The Impact of Survey Response Rates on Research Validity and Reliability. University Canada West, Canada & Global University Systems (GUS), London, UK.

Tambwe, M. A. (2019). Challenges Facing the Implementation of a Competency-Based Education and Training (CBET) System in Tanzanian Technical Institutions. Education in Tanzania in the Era of Globalisation: Challenges and Opportunities, 242–255. *ResearchGat*e https://doi.org/10/gmn7tn.

Tan, S. H., & Lim, L. K. (2019). Infrastructure Support for Competency-Based Curriculum in Singapore. *Singapore Journal of Educational Technology*, volume 7, issue 1, page 88-102.

Tarus J, Ouma P and Waswa P (2022), "An Investigation of Agricultural Training Competencies Needed In Vocational Colleges In North Rift Region*," Kenya International Journal of Scientific and Research Publications,* Volume 12, Issue 9, September 2022 196 ISSN 2250-3153

Tikly, L., Joubert, M., Barrett, A. M., Bainton, D., Cameron, L., & Doyle, H. (2013). Education, skills and work in Africa: Review of the literature. University of Bristol, Department of Education. https://assets.publishing.service.gov.uk/media/57a08a7de5274a27b20004cc/Education-skills-literature-review.pdf

Timmermans, A.C. and Rubie-Davies, C.M. (2023) 'Gender and minority background as moderators of teacher expectation effects on self-concept, subjective task values, and academic performance', European Journal of Psychology of Education, 38(4). Available at: https://doi.org/10.1007/s10212-022-00650-9.

Trigueros, R., Juan, M., & Sandoval, F. (2017). Qualitative and quantitative research instruments: Research tools. *Handbook of research methods and applications in political science, 2*.

The Technical and Vocational Education and Training Act, 2013 *(No. 29 of 2013)*

Ughamadu, K.A (2006). Curriculum: Concept, Development and Implementation. Onitsha: *Lincel Publishers.*

Thomas, C. G., & Thomas, C. G. (2021). *Research methodology and scientific writing* (pp. 135-151). Thrissur: Springer.

U.S Department of Education, Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service (2016). Issue brief*: Competetence-Based advancement. Washington, DC: U,S. department of Education*

Wambua, M. E., & Waweru, S. N. (2019). *Constraints facing successful implementation of the Competency-Based Curriculum in Kenya*. *American Journal of Educational Research, 7*(12), 943–947. https://doi.org/10.12691/education-7-12-8

Wangu, M.J. (2014). The impact of gender differences on student's academic performance in secondary schools in Ndumberi division, Kiambu county, Kenya in science subjects and languages. (A postgraduate diploma in education research project), University of Nairobi, Kenya.

Wanjala, G., Chepkoech, S., & Khatete, I. (2020). Impact of infrastructure at technical vocational education institutions on human resource development on realization of sustainable development goals in Western Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies*, *11*(1), 18-24.

Wolfensberger, W. (1972). *The principle of normalization in human services*. Toronto: National Institute on Mental Retardation.

World Bank. (2007). Cultivating Knowledge and Skills to Grow African Agriculture: A Synthesis of an Institutional, Regional and International Review. Agricultural and Rural Development Notes. Washington D.C.

Yangambi, M. (2023). Impact of School Infrastructures on Students Learning and Performance: Case of Three Public Institution in a Developing Country. *Creative Education*, page 788-809.

APPENDICES

APPENDIX I: Questionnaires for trainers

Kindly fill in the questionnaire below accordingly. If any of the questions may not be appropriate to your circumstances, you are under no obligation to answer. Tick accordingly:

Section 1: Background Information

1. County…….

2. Type of Institution

☐Private

☐Public

3. Institutional Category

☐ National Polytechnic

☐Vocational Training Centre

☐ Technical and Vocational College

☐ Ministry of Agriculture, Livestock and Fisheries

4. Specify whether you are a Trainer or Head of department (HOD)

☐Trainer

☐ HOD

5. Gender

☐Male

☐Female

6. Age group (years)

☐ Less than 30

☐31 - 40

☐41 - 50

☐ Above 50

7. Training experience in ATVET

☐1 to 5 years

☐5 to 10 years

☐10 to 15 years

☐15 to 20 years

☐Over 20 years

8. which level(s) of training are you instructing

Level 4 (craft) ☐

Level 5 (certificate) ☐

Level 6 (Diploma) ☐

9. What is the total enrollment in the department of agriculture? ☐

10. How many agriculture-related courses (AET programs)

does your institution offer? ☐

11. How many of the Courses above are CBET ? ☐

Section 1: Competence of Trainers to offer CBET Courses for AE

Using a scale of SD = strongly disagree = 1, SD = strongly disagree = 2, N = neutral = 3, A = agree = 4 and SA = strongly agree = 5, choose your most appropriate statement from the given choices by use of a tick [√] in the box against each of the statements.

Item	Statement	SD	D	N	A	SA
1	Trainers have pedagogical training					
2	Trainers have attended a workshop/ seminar on CBET implementation in the last 3 years					
3	Trainers have a qualification a level higher than what they teach					
4	Trainers have undergone capacity building on Competency based Assessment techniques as well as Development of					

	Assessment and Mentoring Tools for assessing AET					
5	Trainers have attended industrial attachment in the last 2 years					
6	Trainers have been trained on the development of training programs on agricultural courses					
7	Trainers have been trained on Learning guides and can/have developed relevant professional documents required for training like, session plan, scheme of work,					

Section 2: Availability of infrastructure in ATVET institutions for CBET implementation

Use a scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree to tick [√] in the box against each of the statements

No	Statement	1	2	3	4	5
1	classrooms in the department are adequate to support AET implementation in CBET					
2	Laboratories in the institution are adequate and well-equipped to support AET implementation in CBET					

3	The electronic equipment e.g., digital cameras, computers, projectors, stable internet, etc. in the department are available and adequate to support AET implementation in CBET					
4	The department has adequate and adequately equipped workshop to support CBET implementation					
5	The agriculture farm is available and enough for AET implementation in CBET					
6	There is a spacious and adequately equipped library to support CBET implementation of AET					
7	All the available equipment are relevant to objectives of training					

Section 3: pedagogical approaches used in Agriculture Education in CBET Implementation

4.1: Which pedagogical approaches do you use mainly during training of agriculture courses? Tick those you use mainly.

- Lecture method ☐
- Project method☐
- Field trips ☐
- group discussion☐

- Demonstration methods☐
- Industrial attachment☐
- Direct instruction☐
- Others (specify)

……

4.2 Do you have any form of partnership with agriculture related firms to enhance Practical CBET implementation of Agriculture Education and Training? (Yes, no) If yes, tick all that apply

● Industrial attachment☐

● Mentorship☐

● Job placements☐

● Exchange programs☐

● Workshops/Seminars☐

●Others (specify)

……

Part 4: curriculum support materials available and used in ATVET institutions for AET implementation

Use a scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree to tick [√] in the box against each of the statements

No	Statement	1	2	3	4	5
1	Occupational standards and curricula are available and being used					
2	Learning guides are available and being used					
3	Mentoring tools are available and are being used to assess trainees during industrial attachment and project work					
4	The department has developed and is using training schedule					
5	Portfolio of evidence is well maintained and assessment plan is available					

Part 5: Other factors that influence proper Implementation of AET in ATVETs

5.1: In your own opinion, what factors influence proper AET implementation in Agriculture Education and Training?

…….……

……

5.2: What strategies can be used mitigate the challenges you've mentioned to facilitate proper implementation of the AET programs in ATVETs?

…….……

……..

Appendix II: Questionnaires for Trainees

Kindly fill in the questionnaire below accordingly. If any of the questions may not be appropriate to your circumstances, you are under no obligation to answer. Tick Accordingly:

Section 1: Background Information

1. County…….

2. Type of Institution

☐Private

☐Public

3. Institutional Category

☐ National Polytechnic

☐Vocational Training Centre

☐ Technical and Vocational College

☐ Ministry of Agriculture, Livestock and Fisheries

4. Specify whether your level of study

☐level 6

☐ level 5

☐ level 4

5. Gender

☐Male

☐Female

6. what is your previous qualification before starting your current level of training?

☐ KCPE

☐ KCSE

☐ RPL CERTIFICATE

☐ Lower-level training with CDACC/KNEC/NITA

☐ Others (specify)……

…..……

7. Current year of study

☐1st year

☐2nd year

☐3rd year

9. what is the total enrollment in the course that you are undertaking?

…..……

……

10. Have you been taken through any orientation on CBET curriculum?

….……

……..……

Section 2: Availability of infrastructure in ATVET institutions for AET implementation

Use a scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree to tick [√] in the box against each of the statements

No	Statement	1	2	3	4	5
1	The agriculture farm is available and being used for practical sessions					
2	We always use the available workshop, laboratory and electronic equipment for practical lessons without straining them					
3	All equipment required for every learning task is available					
4	The equipment available for practical sessions are similar to those found in the field of work.					
5	The equipment available for learning makes agriculture lively and lovely to me					
6	I can use the equipment available for this course for my own farming activities in future					

Part 4: pedagogical approaches used in Agriculture Education and Training in AET Implementation

4.1: Which pedagogical approaches do your trainers use to enhance their content delivery? Tick those you use mainly.

- Lecture method ☐
- Project method☐
- Field trips ☐
- group discussion☐
- Demonstration methods☐
- Others (specify)

Field work and practical sessions☐

Online learning☐

Mentorship☐

Direct classroom instruction☐

Industrial attachment☐

……

…….……

4:2 Do you have any form of partnership with agriculture related firms to enhance Practical CBET implementation of Agriculture Education and Training? (Yes, no)

If yes, tick all that apply

● Industrial attachment☐

● Mentorship☐

● Job placements☐

● Exchange programs☐

● Workshops/Seminars☐

● Others (specify) ……..……

….……..

Part 5: curriculum support materials available and used in ATVET institutions for CBET implementation

Use a scale of 1-strongly disagree, 2-disagree, 3-neutral, 4-agree and 5-strongly agree to tick [√] in the box against each of the statements

No	Statement	1	2	3	4	5
1	I have a learning guide for all the units I undertake					
2	I have a portfolio of evidence well maintained					

Part 5: Other factors that influence proper Implementation of AET in ATVETs

5.1: In your own opinion, what factors influence proper CBET implementation in Agriculture Education and Training? ……

….……..…

5.2: What strategies can be used mitigate the challenges you've mentioned to facilitate proper implementation of the CBET programs in ATVETs? …….

….……

……

Appendix III: Observation Checklist

Part A: General information

Date of observation…….

Institution type and name…….

County…….

Part B: Availability of physical infrastructure to enable implementation of AET

Aspect observed	**Status**	**Observation comment**
There is an agriculture farm set aside for agriculture students		
Workshop with relevant tools, equipment and machinery		
Library with resources that enable trainee learning		
Animal farms with different species of livestock are present for those taking courses n livestock production		
The classrooms are available and spacious enough for the learning sessions		
There is evidence of electronic equipment thus incorporation of ICT in training		

Does the institution have modern equipment and infrastructure for modern agriculture and use them for training		

Part C: Availability of curriculum support material for implementation of AET

Aspect observed	**Status**	**Observation comment**
Students have learning guides at their disposal		
Trainers have access to curricula and occupational standards		
Mentoring tools are present and in use by trainers		
Both trainees and trainers have kept portfolio of evidence for assessment		

Part D: Pedagogical approaches used in AET training in ATVETs and trainer competence

Aspect observed	**Status**	**Observation comment**
Project plots in the farm with trainees' projects		
There is evidence of assessment of both summative and formative assessment kept by the trainer		

There's evidence of partnership with industry or prospective employers in training in terms of internship or industrial attachment, etc.		
Students are actively engaged in practical sessions more than theory classes		
The practical skills are relevant to industrial needs		
There is evidence of assessment of both summative and formative assessment kept by the trainer		
Is there evidence of using modern agricultural technology in training in the plots		

Appendix IV: Interview schedule for principals

Background information

1. County…….

2. Type of Institution

☐Private

☐Public

3. Institutional Category

☐ National Polytechnic

☐Vocational Training Centre

☐ Technical and Vocational College

☐ Ministry of Agriculture, Livestock and Fisheries

4. Is your institution offering CBET courses in Agriculture?..... If yes, how many courses.....?

5. which curriculum support materials are available and enough for all the agriculture courses offered? Which ones need to be provided?

6. what resources are your institution using exclusively for agriculture courses to deliver CBET curriculum?

7. Are the required resources e.g.; farm, workshop, laboratory, library, electronic equipment, etc. adequate and well-equipped to enable effective training?

8. what resources if provided would improve training effectiveness?

9. how many trainers are the department of agriculture….

10. Is the number of trainers adequate for the number of courses offered?

11. What is the pedagogical and industrial training of the trainers?

12. How recent have there been a training on CBET implementation?

13. How useful is the agriculture farm in training of agriculture?

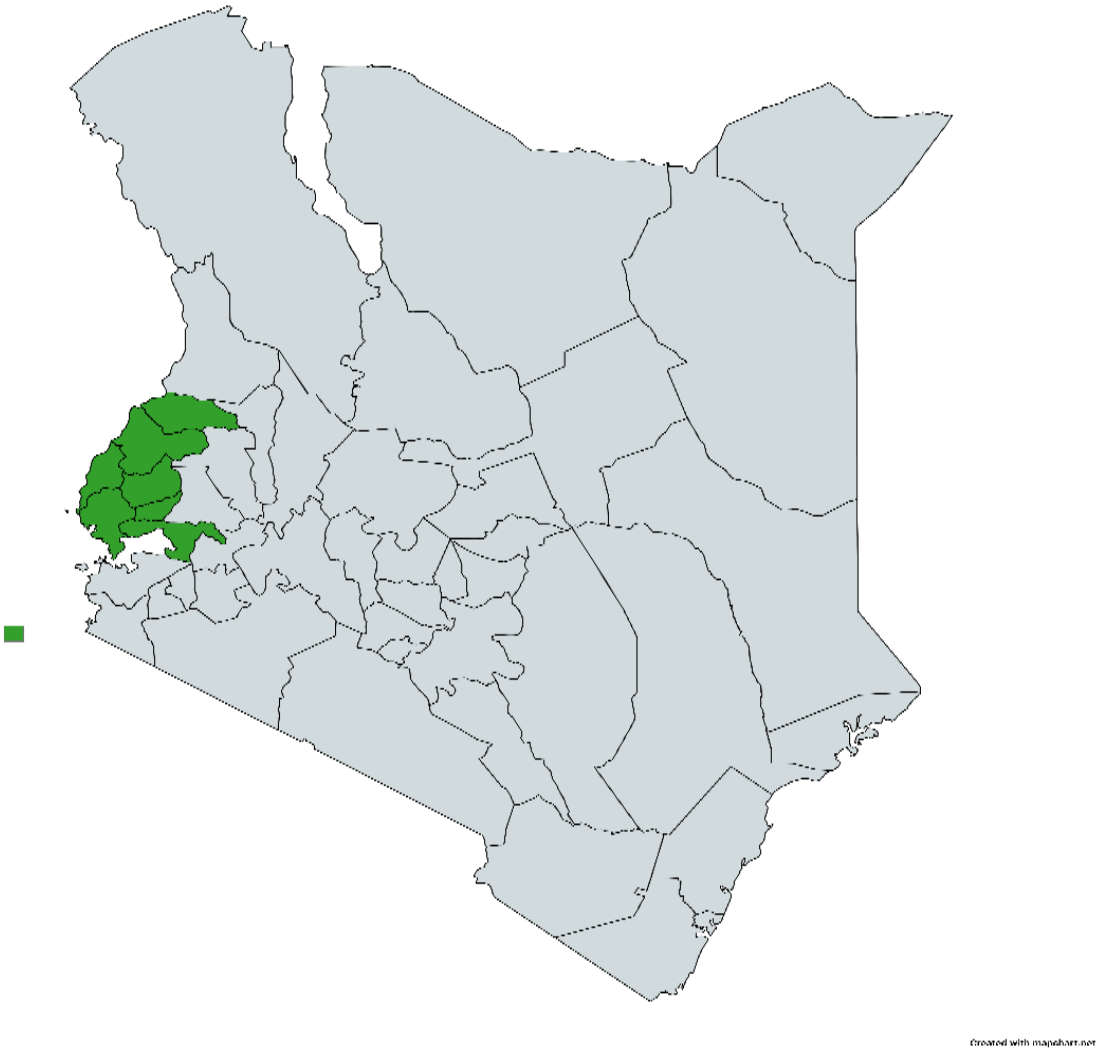
14. Which infrastructure in the institution are being used by agriculture department to enable practical engagement with trainees?

15. How do you relate or collaborate with the local agriculture industry players?

Thank you

Appendix V: Map of study area

The shaded area of the map below shows the area from where the data will be collected. It encompasses the western region counties of Kisumu, Siaya, Busia, Bungoma, Vihiga, and Kakamega



Appendix VI: University of Eldoret permit

University of Eldoret
Flame of knowledge and innovation

P.O. Box 1125-30100, ELDORET, Kenya
Tel: 053-2063111/8 Ext 2032
Fax No. 20-2141257
Email: soe@uoeld.co.ke
www.uoeld.ac.ke

UNIVERSITY OF ELDORET

SCHOOL OF EDUCATION
CURRICULUM AND INSTRUCTION

Ref: UOE/B/CIM/RP/122 **Date**: 4th March, 2025

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

Dear Sir/Madam,

SUBJECT: **RESEARCH PERMIT FOR: OLUOCH BASIL OWUOR**
REG NO: SEDU/CIM/M/006/22

This is to confirm that the above-named Post Graduate Student has completed Course Work and has successfully defended his thesis proposal.

He is currently preparing for a Field Research Work on his thesis entitled: ***AGRICULTURAL EDUCATION AND TRAINING IMPLEMENTATION IN ACCREDITED TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN WESTERN KENYA FOR JOB CREATION.***

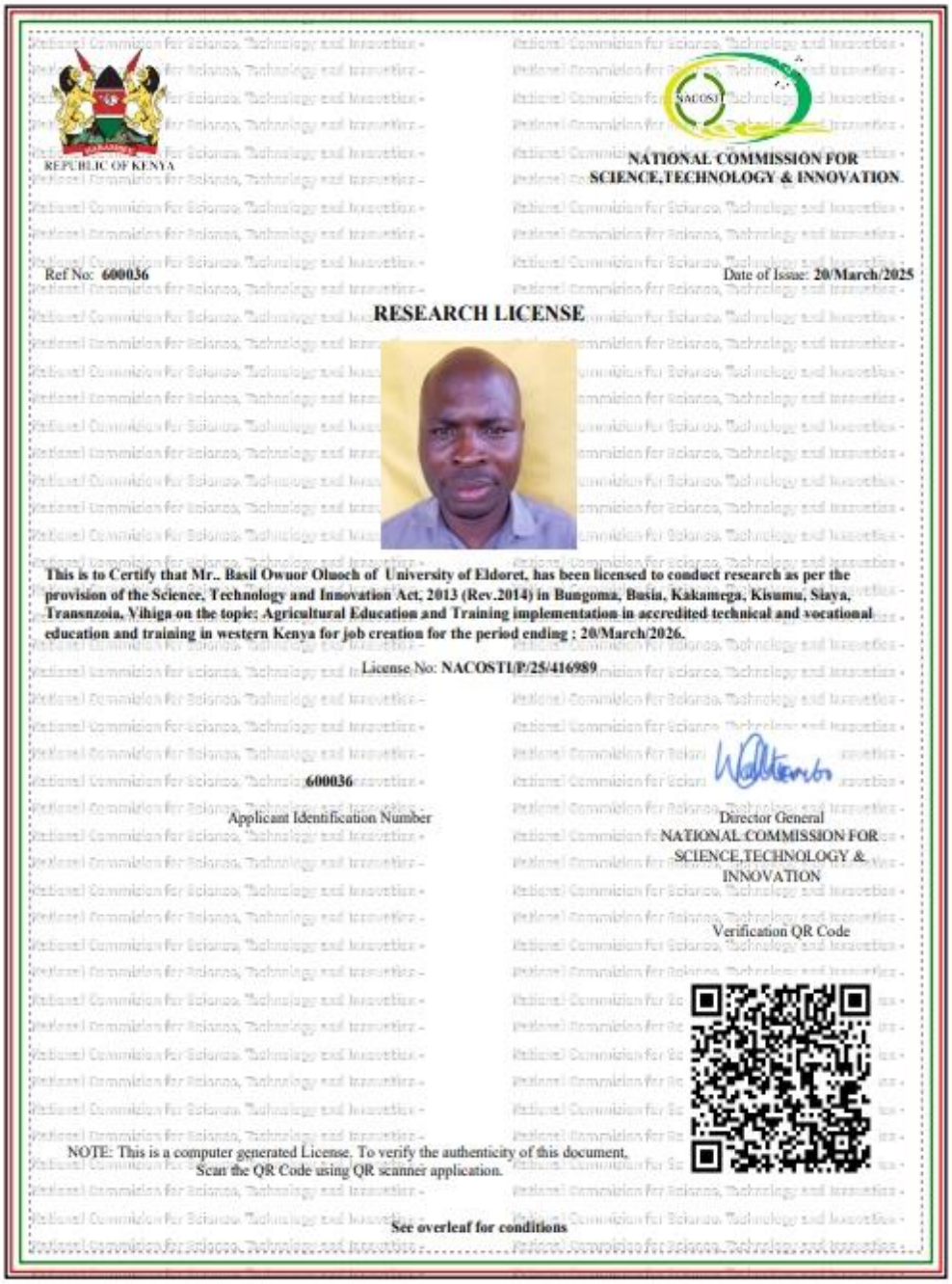
Any assistance accorded to him to facilitate successful conduct of the research will be highly appreciated.

Yours Faithfully,

Head of Department
Curriculum & Instruction
UNIVERSITY OF ELDORET

DR. BETTY J. CHERUIYOT
HEAD, CURRICULUM & INSTRUCTION

Appendix VII: NACOSTI Permit



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **600036**

Date of Issue: **20/March/2025**

RESEARCH LICENSE

This is to Certify that Mr.. Basil Owuor Oluoch of University of Eldoret, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Bungoma, Busia, Kakamega, Kisumu, Siaya, Transnzoia, Vihiga on the topic: Agricultural Education and Training implementation in accredited technical and vocational education and training in western Kenya for job creation for the period ending ; 20/March/2026.

License No: **NACOSTI/P/25/416989**

600036

Applicant Identification Number

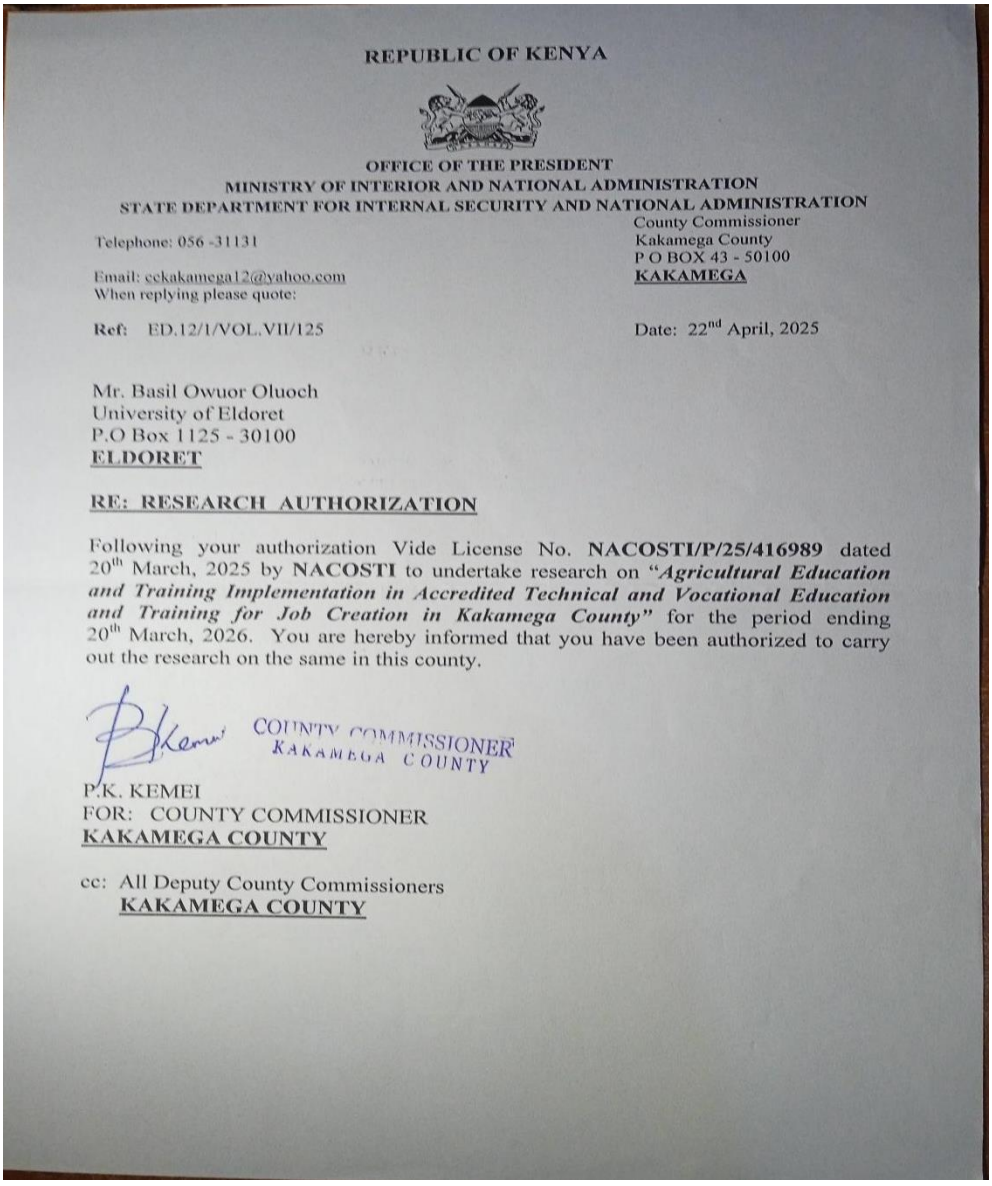
Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

Appendix VIII: Permit from Western region education office



REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
STATE DEPARTMENT FOR INTERNAL SECURITY AND NATIONAL ADMINISTRATION

Telephone: 056 -31131

Email: eckakamega12@yahoo.com
When replying please quote:

County Commissioner
Kakamega County
P O BOX 43 - 50100
KAKAMEGA

Ref: ED.12/1/VOL.VII/125

Date: 22nd April, 2025

Mr. Basil Owuor Oluoch
University of Eldoret
P.O Box 1125 - 30100
ELDORET

RE: RESEARCH AUTHORIZATION

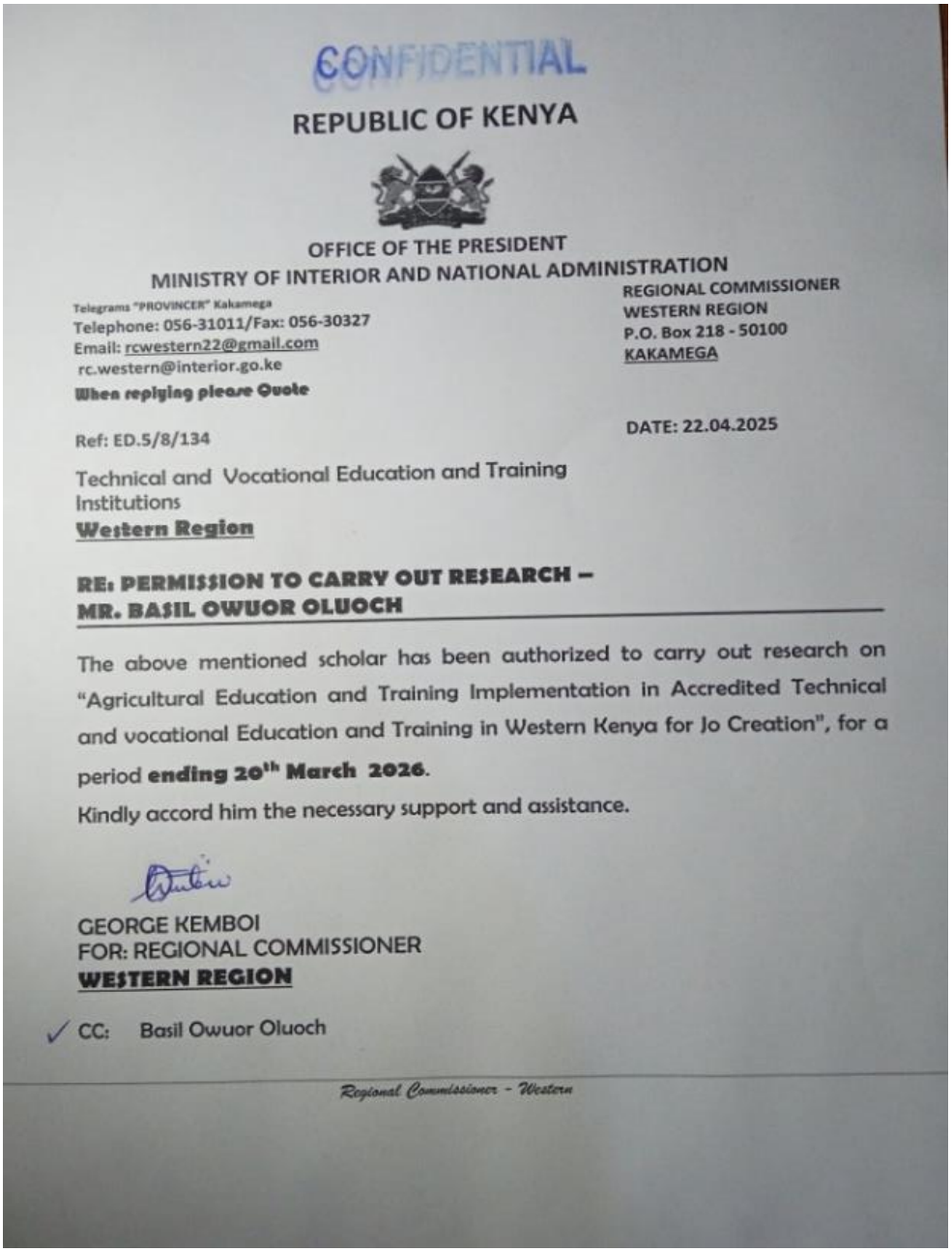
Following your authorization Vide License No. **NACOSTI/P/25/416989** dated 20th March, 2025 by **NACOSTI** to undertake research on "***Agricultural Education and Training Implementation in Accredited Technical and Vocational Education and Training for Job Creation in Kakamega County***" for the period ending 20th March, 2026. You are hereby informed that you have been authorized to carry out the research on the same in this county.

COUNTY COMMISSIONER
KAKAMEGA COUNTY

P.K. KEMEI
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

cc: All Deputy County Commissioners
KAKAMEGA COUNTY

Appendix IX: Permit from Western region commissioner's Office



CONFIDENTIAL

REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION

Telegrams "PROVINCER" Kakamega
Telephone: 056-31011/Fax: 056-30327
Email: rcwestern22@gmail.com
rc.western@interior.go.ke
When replying please Quote

REGIONAL COMMISSIONER
WESTERN REGION
P.O. Box 218 - 50100
KAKAMEGA

Ref: ED.5/8/134

DATE: 22.04.2025

Technical and Vocational Education and Training Institutions
Western Region

RE: PERMISSION TO CARRY OUT RESEARCH – MR. BASIL OWUOR OLUOCH

The above mentioned scholar has been authorized to carry out research on "Agricultural Education and Training Implementation in Accredited Technical and vocational Education and Training in Western Kenya for Jo Creation", for a period **ending 20th March 2026**.

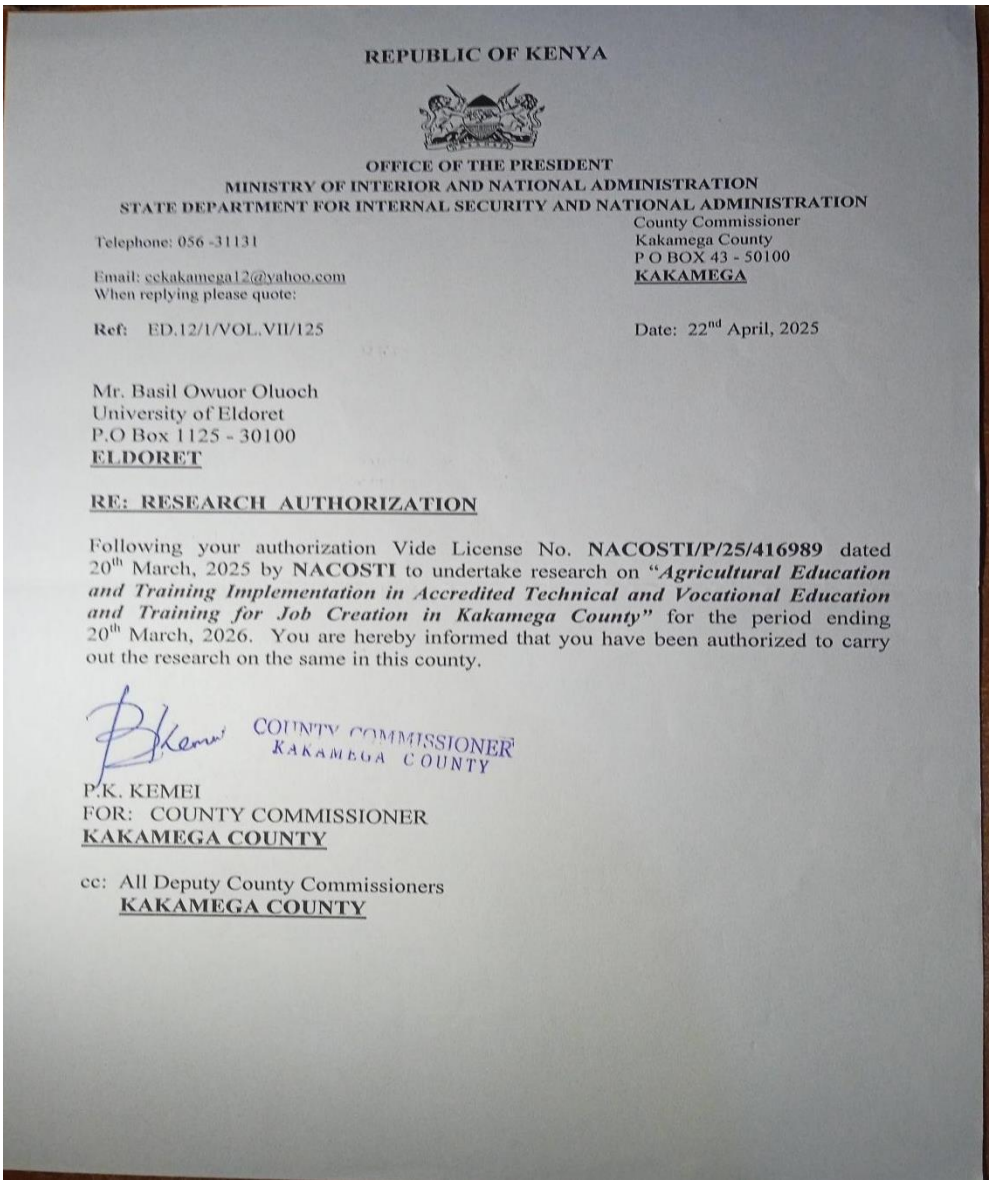
Kindly accord him the necessary support and assistance.

GEORGE KEMBOI
FOR: REGIONAL COMMISSIONER
WESTERN REGION

✓ CC: Basil Owuor Oluoch

Regional Commissioner - Western

Appendix X: Permit from Vihiga County Commissioner's Office



REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
STATE DEPARTMENT FOR INTERNAL SECURITY AND NATIONAL ADMINISTRATION

Telephone: 056 -31131

Email: eckakamega12@yahoo.com
When replying please quote:

County Commissioner
Kakamega County
P O BOX 43 - 50100
KAKAMEGA

Ref: ED.12/1/VOL.VII/125

Date: 22nd April, 2025

Mr. Basil Owuor Oluoch
University of Eldoret
P.O Box 1125 - 30100
ELDORET

RE: RESEARCH AUTHORIZATION

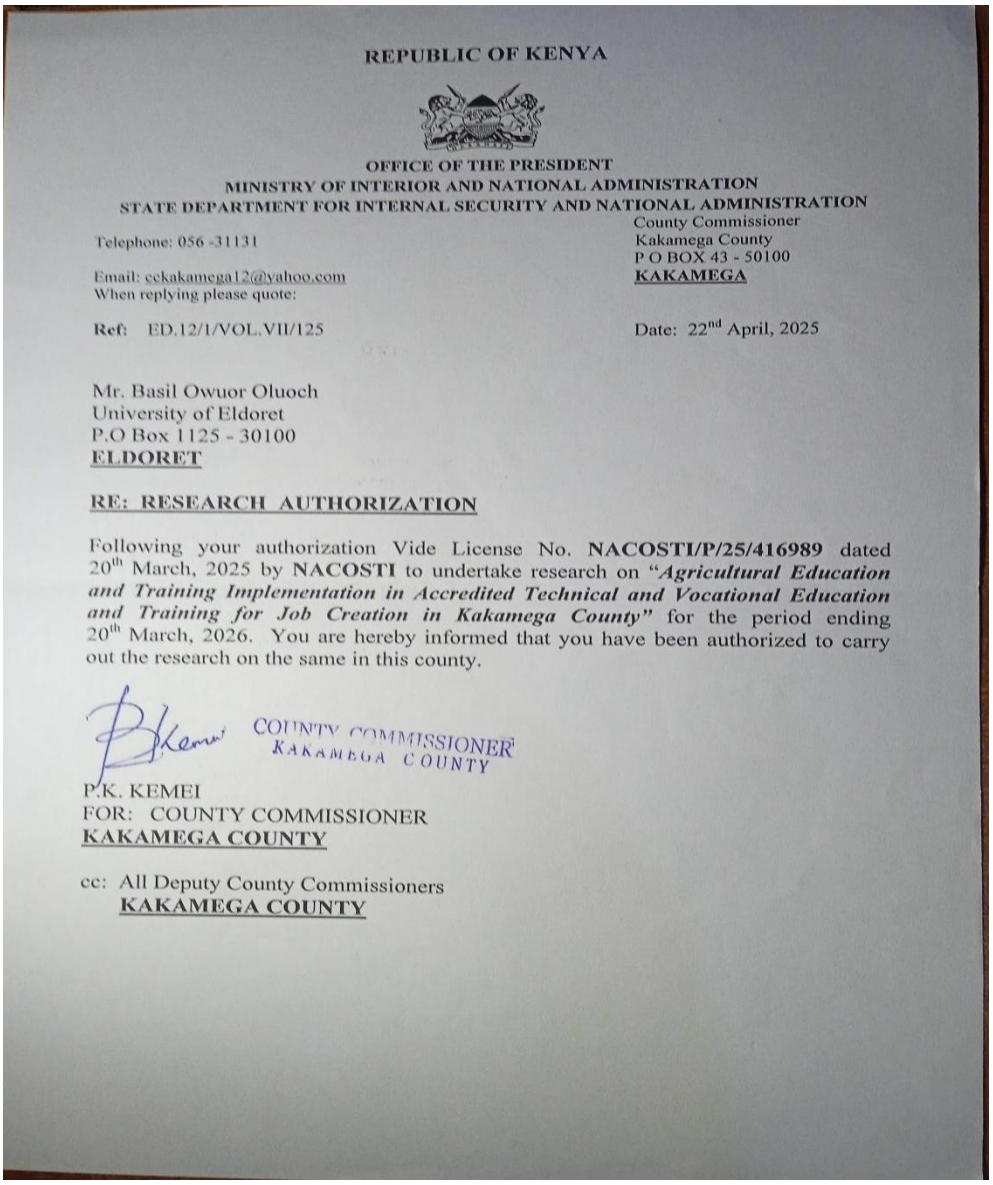
Following your authorization Vide License No. **NACOSTI/P/25/416989** dated 20th March, 2025 by **NACOSTI** to undertake research on ***"Agricultural Education and Training Implementation in Accredited Technical and Vocational Education and Training for Job Creation in Kakamega County"*** for the period ending 20th March, 2026. You are hereby informed that you have been authorized to carry out the research on the same in this county.

COUNTY COMMISSIONER
KAKAMEGA COUNTY

P.K. KEMEI
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

cc: All Deputy County Commissioners
KAKAMEGA COUNTY

Appendix XI: Permit from Kakamega County Education Office



REPUBLIC OF KENYA

OFFICE OF THE PRESIDENT
MINISTRY OF INTERIOR AND NATIONAL ADMINISTRATION
STATE DEPARTMENT FOR INTERNAL SECURITY AND NATIONAL ADMINISTRATION

Telephone: 056 -31131

Email: eckakamega12@yahoo.com
When replying please quote:

County Commissioner
Kakamega County
P O BOX 43 - 50100
KAKAMEGA

Ref: ED.12/1/VOL.VII/125

Date: 22nd April, 2025

Mr. Basil Owuor Oluoch
University of Eldoret
P.O Box 1125 - 30100
ELDORET

RE: RESEARCH AUTHORIZATION

Following your authorization Vide License No. **NACOSTI/P/25/416989** dated 20th March, 2025 by **NACOSTI** to undertake research on ***"Agricultural Education and Training Implementation in Accredited Technical and Vocational Education and Training for Job Creation in Kakamega County"*** for the period ending 20th March, 2026. You are hereby informed that you have been authorized to carry out the research on the same in this county.

COUNTY COMMISSIONER
KAKAMEGA COUNTY

P.K. KEMEI
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

cc: All Deputy County Commissioners
KAKAMEGA COUNTY

Appendix XII: Similarity Report

University of Eldoret

University of Eldoret

Certificate of Plagiarism Check for Thesis

Author Name	Oluoch, Basil Owuor SEDU/CIM/M/006/22
Course of Study	Type here...
Name of Guide	Type here...
Department	Type here...
Acceptable Maximum Limit	Type here...
Submitted By	similarity@uoeld.ac.ke
Paper Title	IMPLEMENTATION OF AGRICULTURE EDUCATION FOR JOB CREATION IN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN WESTERN KENYA
Similarity	8%
Paper ID	4582614
Total Pages	166
Submission Date	2025-10-27 22:01:47

Signature of Student

Signature of Guide

University of Eldoret LIBRARIAN P.O. Box 1125, ELDORET - 30100

Head of the Department

University Librarian

Director of Post Graduate Studies

This report has been generated by DrillBit Anti-Plagiarism Software