

**ASSESSMENT OF THE PREPAREDNESS OF TVET INSTITUTIONS FOR THE
IMPLEMENTATION OF COMPETENCY-BASED EDUCATION AND
TRAINING IN MECHANICAL ENGINEERING COURSES IN SELECTED
COUNTIES, KENYA**

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**A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF
MASTER OF EDUCATION IN TECHNOLOGY EDUCATION (MECHANICAL
AND AUTOMOTIVE TECHNOLOGY), UNIVERSITY OF ELDORET, KENYA**

OCTOBER, 2023

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 any format without prior written permission from the author and/or University of Eldoret.

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DEDICATION

This thesis is dedicated to my wife Charity, my daughter Chloe and my parents Mr. and Mrs. Ayieko who have always supported and encouraged me in my education.

ABSTRACT

Competence Based Education and Training (CBET) is an outcome based model through which skills, attitude and knowledge is imparted to individual learner. The model focuses on what a trainee can do and is practical in nature. In Kenya, this model was launched in 2018 and has since not been fully rolled out in Technical and Vocational Education and Training (TVET) institutions. The purpose of the study was to assess the preparedness of TVET institutions for the implementation of CBET in mechanical engineering courses in the selected counties of: Kakamega, Nandi and Uasin Gishu. Mechanical engineering course consist of automotive engineering, mechanical production, plant operations, welding and fabrication among others. The specific objectives were: To examine the adequacy of trainers required to implement CBET; To assess the current state of physical infrastructure for the implementation of CBET; To identify the existing instructional resources related to CBET; To investigate the strength of industrial partnerships and collaborations for the implementation of CBET; To find out the adequacy of financial resources to support training activities related to CBET in mechanical engineering courses. The study employed simple random sampling, purposive sampling, stratified sampling techniques. The study had a sample size of 810 participants out of which 629 took part in the study. The 629 respondents comprised of: 278 trainees, 150 trainers, 30 Industrial Liaisons Officers, and 33 Principals and 138 employers. Trainers and trainees were derived from 33 TVET institutions across the three counties. The employers were derived from both formal and informal sectors involved in mechanical engineering related works. The study was guided by diffusion of innovations theory. The study adopted a descriptive research design. Data was collected using questionnaire. The validity of the research instruments was established by having the instruments critiqued by three experts from the University of Eldoret and curriculum development experts from Kenya Institute of Curriculum Development (KICD). The internal consistence was established using Cronbach's coefficient which was above 0.70. The data was analyzed using descriptive statistics in form of frequencies, percentages and means. The analysis was aided by SPSS. The study revealed the following: Trainers, physical infrastructure and instructional resources were not adequate in TVET institutions; TVET institutions had weak partnerships and industrial collaborations. TVET institutions had insufficient financial resources to support mechanical engineering CBET courses. The study concluded that, TVET institutions were not sufficiently prepared for the effective implementation of CBET in mechanical engineering courses. Based on the findings of the study, the researcher recommended that the government to provide adequate funds, and employ more trainers; TVET institutions should support continuous professional development programs for trainers to enhance their expertise, teaching methodologies and instructional techniques; TVET institutions should establish and nature relationships with industry stakeholders to enhance partnerships and collaborations; TVET institutions should explore cost sharing strategies such as public-private partnerships to reduce the financial burden in TVET institutions.

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ABBREVIATIONS AND ACRONYMS

CAPA	- Commonwealth Association of Polytechnics in Africa
CBA	- Competency Based Assessment
CBET	- Competency Based Education and Training
CDF	- Constituency Development Fund
DTE	- Directorate of Technical Education
GOK	- Government of Kenya
ILO	- Industrial Liaisons Officer
IST	- Institutes of Science and Technology
KAM	- Kenya Association of Manufacturers
KICD	- Kenya Institute of Curriculum Development
KNEC	- Kenya National Examination Council
KNQA	- Kenya National Qualification Authority
KNQF	- Kenya National Qualification Framework
MIS	- Management Information System
MOEST	- Ministry of Education Science and Technology
NACOSTI	- National Commission for Science Technology and Innovation
NCA	- National Construction Authority
NITA	- National Industrial Training Authority
NPs	- National Polytechnics
OS	- Occupation standards
PSC	- Public Service Commission
PU	- Production unit
RPL	- Recognition of Prior Learning
SGR	- Standard Gauge Railway
SPSS	- Statistical Packages for Social Sciences
SSAC	- Sector Skills Advisory Committee
STET	- Towards Empowerment and Productivity
TEP	- Technical Education Program
TSC	- Teachers Service Commission

TTI	- Technical Training Institutes
TVCs	- Technical and Vocational Colleges
TVET	- Technical Vocational Education and Training
TVETA	- Technical Vocational Education Training Authority
TVETCDACC	- Technical Vocational Education and Training Curriculum Development, Assessment and Certification Council
VTCs	- Vocational Training Centers

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CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter deals with the introduction to the study. It narrates the background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, justification of the study, significance of the study, assumptions of the study, the scope and limitations, theoretical framework, conceptual framework and the operational definition of terms.

1.2 Background of the study

Competence Based Education and Training (CBET) is an innovation in education and training that was initiated in the United States in the 1970s and that has evolved over time and received growing acceptance and some criticisms, especially at its early stage of development (Mulder, 2004). CBET is a globally recognized methodology that has positively influenced the delivery of technical education as it focuses on specific industry needs. Kaaya (2012) perceives CBET as a program of study with clearly defined objectives of which every student going through it must have demonstrated mastery of competency upon the completion of the program. Deißinger and Hellwig (2011) views CBET as the specification of knowledge, skills and their application to the standard of performance expected at the workplace. Anane (2013) described CBET as an industry and demand driven education and training program based on well-defined industrial generated standards. Industrial standards are the measures arrived at by the industrial players to promote quality goods and services. These standards are the basis upon which

the program, assessment and learning materials are designed and developed. In this program, the focus is on what the learner can do at the end of the training as opposed to just having the theoretical knowledge. CBET can still be viewed as that training which is performance and standard based and related to realistic workplace practices. These are practices which represent things in a manner that is accurate and true at the work place. It allows the learner/student to learn individual trades/skills at their own pace, practicing and refining them.

Technical and professional education shall be accessible to all, it is a fundamental human right as articulated in articles 23 and 26 of the Universal Declaration of Human Rights which relate to the right to work and education. Therefore, the state is obligated to ensure that all learners have access to TVET in the formal school system. TVET is a comprehensive term referring to the educational process, in addition to general education; that involves the study of technologies and related sciences and the acquisition of practice, skills and knowledge relating to an occupation in various sectors of economic and social life (UNESCO, 1984). The focus in TVET is on the preparation of individuals to specific occupations in industries. Therefore, it's the graduates of TVET institutions that provides the necessary labor force for sustainable industrial growth and development. Globally, CBET is used as a means through which many nations enhance the TVET sector towards meeting the industrial needs in terms of skilled manpower. Emphasis has been increasingly given to skills development through TVET.

In Tanzania, the CBET was introduced in the tertiary and non -University education in the early 2000 with the aim of enabling the TVET system to produce “hands on graduate”

with the skills and competencies to address the market challenges (Rutayuga, 2014). This brought a shift from knowledge based to competency based training.

In Kenya, the government has put a lot of investment into the TVET institutions. This is happening to address growing concerns over the skills insufficiency among graduates joining the manufacturing sector and the high rates of unemployment among the youth. Unemployment in the sense that, graduates cannot engage in self-employment to generate income to support themselves and the society. These skills includes: mechanics, plumbing, masonry, welding, machine operators, boiler operators, turners electrical installation computer repair and maintenance, repair and maintenance. The CBET curriculum was launched in 2018, piloted and is now being implemented in TVET institutions across the country. In 2018, the ministry of education, state department of vocational and technical training developed a policy framework to guide in the implementation of CBET programs in TVET institutions.

World Bank's STEP Employment Survey in Kenya 2017, found that when it comes to recruitment, lack of skills and experience contribute significantly to recruitment constraints. From the reports of KAM, employers were looking at the system of education as a failed system. The system has failed to produce individuals with practical skills to meet the demands of the industries. Furthermore, they stated that the majority of the graduates from TVET institutions do not meet the required skills. According to the employers, TVET institution have a role in producing competent workforce. It is vividly clear that the employers are blaming the training institutions for failing to provide qualified graduates to meet the need in the industry.

According to Kenya Association of Manufacturing (KAM), 2018, manufacturing sector in Kenya is faced with a number of challenges which are the inhibitors to the country's economic growth. From the report, in the automotive industry, there is a challenge of insufficient skills in machine tools. Also, in leather products and footwear, the sector is faced with a challenge of low level of technical skills such as tannery and leather technology, leather products designers. The challenge is also evident in energy, electricity and electronics and building as these sectors are also faced with a challenge of skills development where there is lack of emphasis on the capacity to handle equipment and materials by the employees. To curb this, KAM recommended the introduction of suitable training programs in technical institutions.

According to (KEBS, 2022) Kenya has inadequate specialists in welding and fabrication. According to the report, there are no specialists in sophisticated welding skills such as MIG and TIG. This is a clear indication on the need to review the curriculum. To have a curriculum that will result to skilled and competent work force. CBET is such a curriculum that is learner driven, places a great emphasis on the learner ensuring that the learner is able to do or perform that which is being taught. The study assessed the preparedness of TVET institutions in their bid to implement mechanical engineering (CBET) courses.

According to Ministry of Education (MoE, 2018), through a circular from the director of Technical and vocational education, all heads of TVET institutions were instructed to

have collaboration with at least three private sector organizations including Micro Small and medium Enterprises (MSMEs) and *Jua Kali* by December 2018

Kenya vision 2030; to transform Kenya into a "newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030. As a country there is need to enhance and build a vibrant labor force that will cater for the current and future industrial needs. According to Kenya Economic Survey 2019, in the year 2018 unemployment rate stood at 9.3%. In the ten years World Bank Survey, unemployment rate in Kenya is projected to rise to 10.5% in 2019.

The study was conducted in the three counties of Kakamega, Nandi and Uasin Gishu. The three counties were selected due to the following: these counties have TVET institutions of different categories; Kakamega and Uasin Gishu each has a national polytechnic (NP), Technical Training Institute, Technical Vocational Colleges and Vocational Training Centres. The county of Kakamega is among the largest county in terms the number of TVET institutions, there are 50 public TVET institutions. Both county and national governments have pumped resources in the TVET institutions towards provision of quality training. The new dispensation (CBET) was brought up to transform the TVET sector. The study therefore purpose to assess the preparedness of TVET institutions for the implementation of CBET in mechanical engineering courses in the selected counties of Kakemega, Nandi and Uasin Gishu.

1.3 Statement of the problem

Technical Vocational Education and Training (TVET) in Kenya has been faced with challenges on the effective implementation of the curriculum. Despite the rationale for the introduction of CBET curriculum in TVET institutions by the government of Kenya, there are increasing concerns regarding the ability and preparedness of TVET institutions. There has been increased reluctance to start CBET courses. Major concerns include: inadequate trainers; inadequate physical infrastructure; inadequate instructional resources; level of industrial collaborations between TVET institutions and industries; inadequate finances to cater for expenses involved in running the curriculum. This posed a challenge on the adequacy of these institutions towards effective implementation of mechanical engineering CBET courses.

1.4 Purpose of the study

The purpose of the study was to assess the preparedness of TVET institutions for the implementation of CBET in Mechanical Engineering courses, a case of three counties in Kenya. The findings of the study are key in ensuring that the curriculum is effectively implemented to fully realize its objectives.

1.5 Objectives of the study

The general objective of the study was to assess the preparedness of TVET institutions for the implementation of CBET in Mechanical Engineering courses in Kenya.

Specific objectives are:-

- i. To examine the adequacy of trainers required to implement CBET in mechanical engineering courses in TVET institutions, in Kakamega, Nandi and Uasin Gishu counties, Kenya.
- ii. To assess the state of physical infrastructure for the implementation of CBET in mechanical engineering courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya.
- iii. To identify the existing instructional resources for the implementation of CBET in mechanical engineering courses in Kakamega, Nandi and Uasin Gishu counties, Kenya.
- iv. To investigate the strength of industrial partnerships and collaborations in the implementation of CBET in mechanical engineering courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya.
- v. To find out the adequacy of financial resources needed to support the implementation of of CBET in mechanical engineering courses in Kakamega, Nandi and Uasin Gishu counties, Kenya.

1.6 Research questions

The study was guided by the following research questions,

- i. Are the trainers adequate to support the implementation CBET in mechanical engineering courses in TVET institutions in the selected counties?
- ii. What is the state of physical infrastructure in TVET institutions for the implementation of CBET in mechanical engineering courses in Kakamega, Nandi and Uasin Gishu counties, Kenya?

- iii. What are the existing instructional resources needed for the implementation of CBET in mechanical engineering courses in Kakamega, Nandi and Uasin Gishu counties, Kenya?
- iv. How are strength of partnerships and industrial collaborations between TVET institutions and industries to support the implementation of CBET in mechanical engineering courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya?
- v. How are the financial resources to support the implementation of CBET in mechanical engineering courses in Kakamega, Nandi and Uasin Gishu counties, Kenya?

1.7 Justification of the study

The CBET curriculum is a new approach in teaching and training that is being established in Kenya. The system of education is shifting from knowledge based to competency based. The focus is on what the learner or the trainee can do. This shift was a result of an outcry from the employers, institutions churning out graduates who have insufficient practical skills and increased unemployment among youths. With the government paradigm shift, this approach is being introduced into the education system; it was worth looking into critical issues underlying the implementation of CBET curriculum implementation. The study focused on mechanical engineering CBET course since there were more mechanical engineering CBET curricula and Occupation Standards (OS) that had been developed at the time the study commenced. This forms a strong foundation in ensuring that the CBET curriculum becomes a success in Kenya.

1.8 Significance of the study

The study focused on factors that were key in the implementation of the curriculum. These were: trainer's adequacy, physical infrastructure, instructional resources, partnerships and industrial collaborations and finance. The findings from this study will assist educational planners and policy makers in making informed and realistic decisions on educational matters especially in TVET. The study brings out the training needs for the realization of CBET curriculum which will assist the curriculum developers in streamlining the CBET curriculum. The study gives important recommendations related to: trainers, physical infrastructure, instructional resources, partnerships and industrial collaborations and the financial resources which are very paramount in the curriculum implementation. The findings were also directed to researchers to advance studies on implementation of the CBET curriculum in TVET institutions.

1.9 Assumptions

The study is based on the following assumptions:-

- i. The sample and population were from the similar environmental conditions.
- ii. Respondents were familiar with the guidelines of CBET courses.

1.10 The scope and limitations

The study focused on investigating the state of 33 public TVET institutions on their preparedness towards the implementation of mechanical engineering CBET courses in the three counties of Kakamega, Nandi and Uasin Gishu. The participants were: The

employers of TVET graduates, trainers, trainees, ILOs and heads of institutions (principals). The study was limited to mechanical engineering CBET courses from selected TVET institutions in the counties of Uasin Gishu, Nandi and Kakamega due to financial and logistical constraints. Therefore the findings might not be generalized to other CBET courses across the country.

1.11 Theoretical framework

The study adopted Diffusion of Innovations Theory which was developed by Rogers (1995). This theory shades light on processes of individual and social change that occurs when an innovation is introduced. There are five milestones in the success or failure in embracing of innovation over time: knowledge, persuasion, decision, implementation and confirmation. The five features of innovation with regard to decision on its adoption. These are: relative advantage, compatibility, complexity, trial ability and observability. These features of an innovation explain 49 percent to 89 percent of the variance in the rate of adoption. In the study, CBET is an innovation that is being introduced in TVET institutions. This theory helps the study in understanding the position of TVET institutions towards the adoption of the CBET curriculum. TVET administrators and trainers are the main stakeholders responsible of providing quality training. Therefore, this theory also helped the researcher to examine their behaviors in relation to the adoption of the CBET curriculum. Do they have the knowledge; their persuasion, decision making, implementation and confirmation of the CBET curriculum. The theory helps to predict the success in the spread of the adoption of CBET courses in the counties of Kakamega, Nandi and Uasin Gishu.

1.12 Conceptual framework

This study was conceptualized with preparedness of TVET institutions as the independent variable while implementation of CBET in mechanical Courses as the dependent variable.

Independent variables

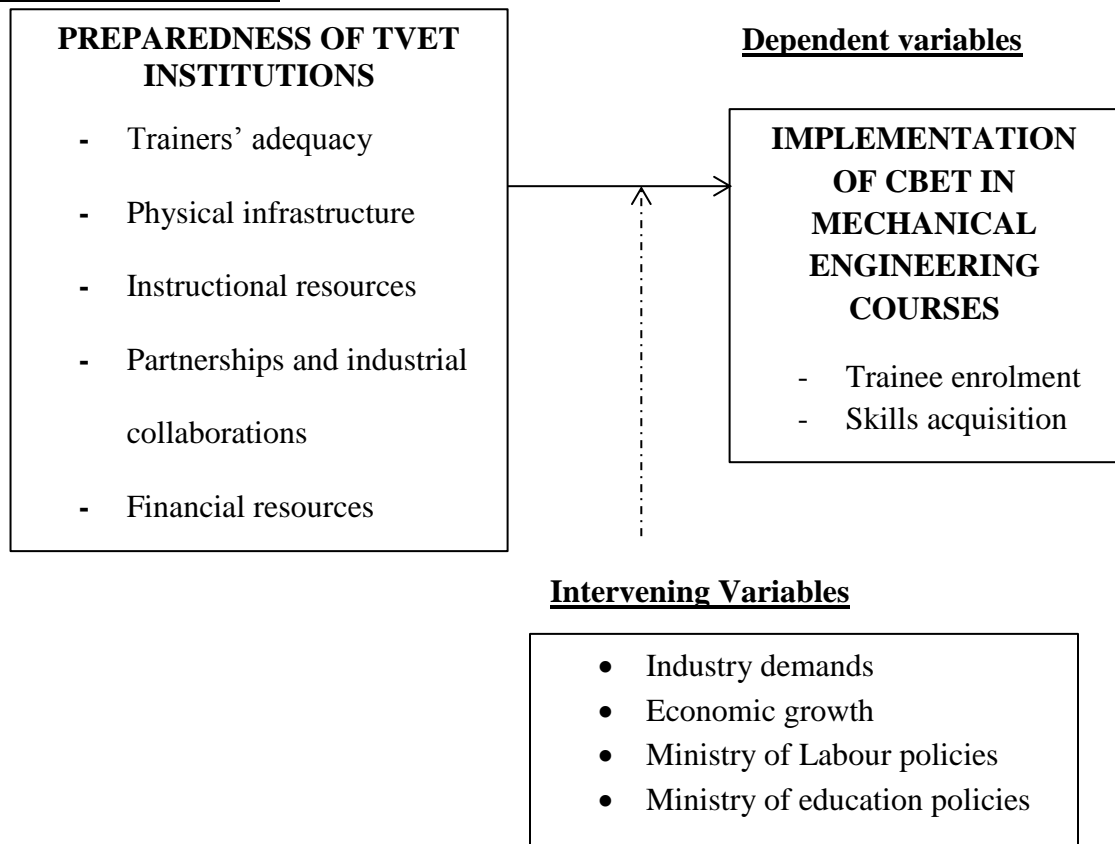


Figure 1: Conceptual frameworks

Source: Author, 2019

1.13 Controlling the intervening variables

The intervening variables are variables that are likely to interfere with the integrity of the findings of the study. Therefore there was the need to control them. The intervening variables for the study were: industrial demands, economic growth, ministry of labour policies and ministry of education policies.

Government policies from the ministry of labour and education. These are directives, regulations and policies that may affect the results of the study. The policies issued by the Ministry of Education Science and Technology (MOEST), state agencies and corporations such as: TVETA, TVETCDAAC, KNEC, NITA, KICD, KNQA and KEBS. MOEST provides funds for the employment of trainers, daily operations of the TVET institutions. TVETA established under (TVET Act 2013) contributes to the curriculum implementation through: Registration of TVET institutions, accreditation of CBET courses, approvals of the occupation standards (OS) as shown in appendix 1, registration and licensing of trainers. TVETCDAAC also established under (TVET Act 2013) form a crucial party towards the implementation of CBET curriculum through: Development of the OS's, training and registration of assessors/verifiers and curriculum developers. The operations of TVETCDAAC and TVET Authority are performed through consultations with KNQA and TVETA. KNQA was established to harmonize learning achievements nationally to meet the international standards; Development and management of the National Qualifications Framework. Recognize and evaluate qualifications. Equate qualifications. Credit transfers and exemptions. This authority sets quality standards and moderates fields of learning and levels of qualifications. The study adhered to the government policies to ensure consistency in the data obtained.

A complete national credit framework is shown in Appendix III. Table 1 below shows types of qualifications and their respective levels as proposed by KNQA. Summary of the interaction of variables is shown in the appendix XIII,

Table 1 KNQA qualifications and levels

Credits to be accumulated (1 credit is 10 national hours)	Qualification Type	Level
480	Bachelor of technology	7
240	Diploma	6
120	Crafts	5
60	Artisans	4
30	National Vocational Certificate	3

Source: KNQA, 2019

1.14 Operational definition of terms

Adequacy: Number of trainers, their experience and competency

Conducive environment: An environment with the necessary facilities and equipment

County: refers to Kakamega, Nandi and Uasin Gishu parts of Kenya

Employers: Refers to individuals working or owning firms or Company that employ or absorb graduates from TVET institutions.

Formal training: Training that takes place within the guidelines of an institutions of learning.

Implementation of CBET: This refers to the successes of TVET institutions towards the adoption of the CBET in mechanical engineering courses.

Industry: These are firms public and private related to dealing in mechanical engineering related works

Industrial Liaisons Officers: These are the trainers in TVET institutions in charge of trainees' industrial attachment

Jua kali: Informal or non-formal sector in Kakamega, Nandi and Uasin Gishu counties

Trainers: Individuals who conduct training in TVET institution

Mechanical engineering courses: Course related to the field of:

Automotive, mechanical production, Plant, Welding and Fabrication.

Occupational standards: These are sets of guidelines on training and assessment of various courses at various levels.

Physical infrastructure: This includes workshops, laboratories, classrooms, tools and equipment used for the purposes of learning

Preparedness of TVET institutions: The state of being able to effectively implement CBET in mechanical engineering Courses

Principals: Heads of TVET institutions

TVET programs: These are courses offered only in Mechanical Engineering Departments

TVET institutions: Refers to National polytechnics, Technical Vocational colleges, and Vocational Training Centres

TVCs: These are Technical Training Institutes and Institutes of Science and Technology

Trainers: Any person employed to offer training services in a TVET institution

Trainee: Any person admitted for a course in a TVET institution

1.15 Summary of the Chapter

In summary, CBET was seen as an innovation in education and training that was initiated in the United States in the early 1970s. The global perspective of CBET was seen as a means through which many nations enhance skilled manpower to meet the needs of

industries In Kenya, CBET was launched in 2018. Problem of the study was the ineffectiveness of TVET institutions in the implementation of curriculum to produce hands on graduates. The purpose of the study was to assess the preparedness of TVET institutions for the implementation of CBET in mechanical engineering courses. The main objectives of the study was to assess the preparedness of TVET institutions for the implementation of CBET in mechanical engineering courses in Kenya. The significance of the study was to give recommendations that could help educational planners in improving curriculum implementation. The study assumed that the respondents were familiar with the CBET guidelines. The study was limited to the three counties in Kenya. The study adopted the diffusion theory of innovations. The conceptual framework that guided the study was illustrated showing, the variable of the study. Finally, operational terms that were used in the study have been defined.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on aspects of CBET in TVET including: meaning of CBET and TVET, findings from other studies conducted by various scholars, TVET in Kenya and other countries. This chapter also looks at TVET institutions with respect of trainers' competency and adequacy, infrastructure, instructional resources, industrial linkages and funding. The chapter also focuses on the comparison between CBET and the conventional mode of training in TVET.

2.2 Specific literature

Definition of TVET

UNESCO (1984) looks at Technical and Vocational Education and Training (TVET) as educational process which involves in addition to general education, the study of technologies and related sciences and the acquisition of practice, skills and knowledge relating to an occupation in various sectors of economic and social life. TVET is an essential link between the training and employment in the industry. Individuals are prepared to take up various jobs in the industry. For this reason, the vibrancy of industries in a nation is merely determined by its TVET system.

Definition of CBET

Competency based education and training (CBET) also known as outcome based training focuses on what the learner/trainee is expected to do and not what he/she is expected to

learn about or know. These outcomes are derived from an analysis of tasks that a worker in a given job performs. In this curriculum, a need analysis is performed before curriculum is defined (TVETCDAAC, 2018)

According to TVET council of Barbados (2020) CBET is a training strategy that focuses on what the learner should be able to do. It is a modular based training that is flexible where learners can get modules as they so desire leading to the certification they need. CBET is based on the following essential elements: the competencies to be acquired, the method of assessment, instructional programmes and the learners' progress.

Raimi and Akhuemonkhan (2014) found out that the effectiveness of TVET on the national development is encumbered by the following factors: expertise, collaboration with industry and people's perception of TVET. In their recommendations, they suggested that for there to exist an effective TVET system, there is need for policy makers to work on the perception of the public, expertise policy implementation and curriculum review. In Kenya, the government is in the process of implementing CBET program in the education system. In this study, expertise and industrial collaborations are among the factors that will be examined. They play a major role in the success of CBET program.

2.3 Evolution of CBET, Globally

According to Hodge (2007) the origins of CBET can be traced from the United States of America between 1950s and 1970s. CBET was born as a result of popular held view by the general public on the quality of education in the United States.

CBET was synthesized from a movement which popularly known as Performance- Based Teacher Education. The theoretical origins of CBET was mainly derived from behaviorism and system theory which influenced educational thoughts in the United States during the initial stages of CBET. The contents of the CBET were from the contributions of professional and experts with background in behaviorism and system theory orientations.

The Soviet Union excelled in placing the first man made satellite by the name '*Sputnik I*' into orbit around the earth. This development was not received well by the Americans as they perceived it as demeaning their superiority in technology. At that very time, the Americans were also busy with their own satellite project, with the aim of becoming the first to explore the space. The launch by the Soviet Union, caught the America by surprise and left them wondering what could have gone wrong. The blame as was vividly clear was placed on the system of education. As reported by Harris et al, 1995, the Americans begun a deep assessment on its education and training system. The obvious source of the problem was the system of education and training and this resulted into debates that eventually transformed the sector.

Objectives of CBET in Kenya

According to the Directorate of Technical Vocational Education and Training (2018), CBET in Kenya is intended to achieve a number of objectives: To develop measurable occupational standards; to train individuals with transferable competency; to bring a connection between training and skills required by the employers; to develop a quality

assurance system that accommodates views of all the stakeholders; to promote lifelong learning through progression and credit transfer; to encourage individuals to achieve their full potential and finally to develop attitudes and abilities to respond rapidly to change.

CBET in Kenya is aimed at: improving employability of TVET graduates, increasing self-employment of TVET graduates, providing competent TVET graduates for social economic development and contribute towards attainment of BIG 4 agenda and Vision 2030.

Group targeted by the CBET

According to TVETCDAAC (2017), CBET targets the following groups: People from the informal sector such as *jua kali*. The educated- people who have acquired academic certificates but have insufficient hands on skills. People from the formal sector: employed and working in various industries. The retirees and retrenched, people who have never been to school or undergone any kind of training. The last group is those youths who are out of school.

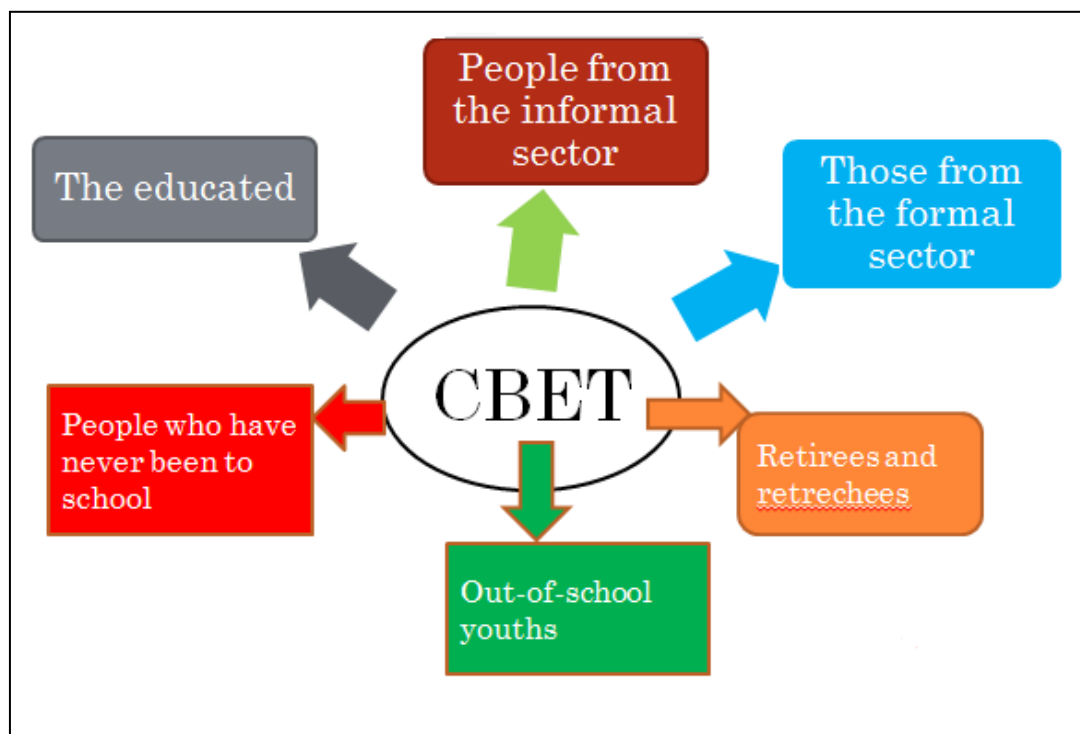


Figure 2: Target groups for CBET

Source: TVETCDAAC, 2018

The figure 2 shows a summary of group of people targeted by CBET, who are: the educated, people from the informal sector, those from the formal sector, retirees and retrenches, out of school youths and people who have never been to school.

Comparison between formal training and CBET

There exist a big difference between the formal training and CBET as summarized in the table below.

Table 2 Comparison between formal training with CBET**Source: MOE, 2018**

Formal Training	CBET
The curriculum is based on theory other than practical skills	The emphasis is put on the acquisition of skills, knowledge and attitude
Restrictive on access to the training, the training can only be accessed by those who meet the entry requirements	No restriction on entry, therefore anyone can access the training
Training is very rigid on time, not flexible	Training is not time-based, learners progress through modules at their own pace
Learning is trainer centered – the trainer knows it all	Learning is individualized and learner centered, trainer facilitates learning
Trainees are given summative knowledge based examinations at the end of the training period whether they are ready or not	Examinations are based on the standards set by the industry and business. The trainees are assessed continuously as they are recognized ready.
Trainees get feedback on their performance after some time	Feedback is immediately after the assessment
The trainees outcome is based on the Grades achieved in the examinations	Trainees outcome is based on the competencies achieved in various modules/units
Training can only take place in training institutions or training centres	Training takes place in workplaces, fields, sites, workshops, training institution and training centres.

Role of stakeholders in skill development

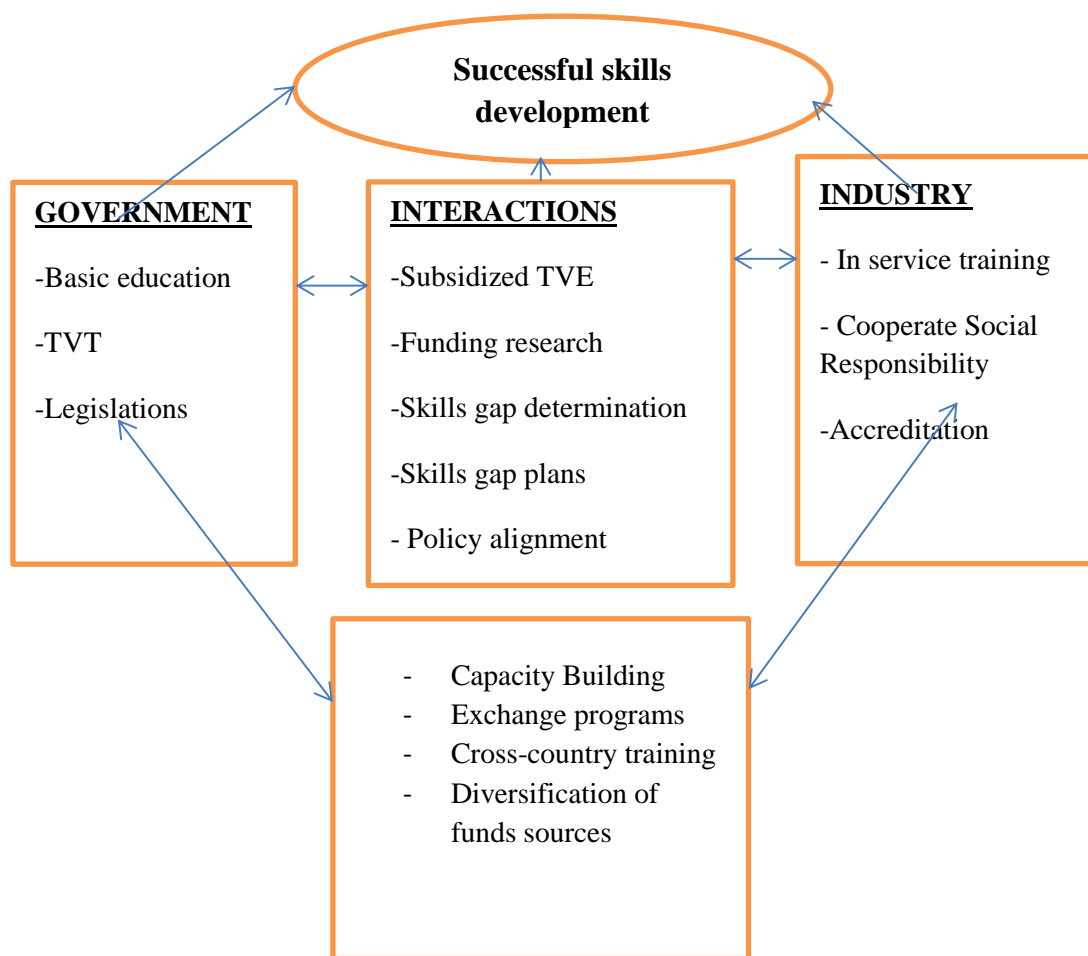


Figure 3 Roles of stakeholders in skills development.

Source: Swanzy et al 2011.

The figure 3 shows the role of various stakeholders in skill development. The government supports skill development through: formulation of policies and funding the institutions and industries. The industry supports skill development through in-service training, capacity building among others.

TVET in Canada

Canada is a country of ten provinces and three territories. Each province runs its education system. Provincial governments provide on average over 80% of direct public funds to support TVET institutions. The federal government also has a role in the TVET system as it funds in a number of ways including: transfer payments to provinces and territories and through direct financial support to institutions and to students. The federal government also runs a student loans programme. In Canada, the term Vocational Education and Training (VET) is not common as in other countries. Here, VET could be replaced with terms such as Career technical and professional (CTP). The Canadian postsecondary vocational education has two main strands: Apprenticeship and college programmes. Apprenticeship is normally informal in the sense that it does not require one to possess a secondary certificate. But in Canada, most individuals who enroll for apprenticeship are secondary graduates hence treated as at ISCED 4C level. In colleges, programmes offered are: certificate for one year, technical diploma for two years and three year diploma programmes. The research also has it that in Canada, the people aged between 25 to 65 years are well educated with one out of two having a tertiary qualification.

In summary, the VET in Canada is characterized by a number of strengths: experts from various fields who are working or employed in various industries are involved in training. The provision of skills is majorly through apprenticeship. The country has many TVET institutions with a wide range of professional courses. The TVET system is also set in a way that the needs of those with special needs are addressed. There is extensive research

work on TVET. Studies have been conducted on industrial linkages between colleges and industries/employers. The findings from such studies are used in improving the system. On the other hands, Canada is also faced with challenges: the apprenticeship model though strong it is only applied to limited occupations like in manufacturing and construction industries. The apprenticeship exam is majorly theoretical that is paper and pen exam. There is a difficult in credit transfers between colleges. OECD reviews of vocational education and training report (2015).

According to economic survey of 2012 (OECD 2012a) urges that due to changes in the economy and labour markets, the demand for workers with technical skills increased. This saw university graduates complimenting their degrees with diplomas from colleges to improve their employability.

TVET in Kenya

TVET plays a crucial role with regard to skill development in line with the labor market. There are about 3,197 TVET institutions in the country, 1,200 are the VTCs, 44 are line ministries, 1765 are private and 188 are under the ministry of education. Vocational education and training in the country is under both the national and the county government, GoK, 2011. The counties are in charge with the VTCs formerly youth polytechnics. The national government on the other is in charge of the TVCs under the ministry of education and other ministries. Through in Kenya, the government as from the year 2018 has begun the process of incorporating CBET curriculum into our education system. The program is expected to ensure provision of relevant and high

quality human resource for development. The program is being implemented for the next 5 years to a tune of Ksh.1.5 billion which is supported by the Canadian Government.

The CBET concept entails the involvement of industry in all aspects of training; development of occupational standards; training programs as well as assessment. The effective TVET system will play a vital role in achievement of the big four government agenda. Developing this new enhanced competency program will not only increase employment and improve economic environment but also increase effectiveness in implementing TVET reforms (Desai, 2018).

The competency based education in TVET is a five year project is being implemented by Colleges and Institutes Canada (CICan) in collaboration with the ministry of Education's Directorate of Vocational Education and Training and it will involve 10 Kenyan TVET institutions and 17 Canadian Colleges on three thematic partnerships, marketing and branding TVET (CAPA ,2018).

According to the Economic Survey (2018) the total number of educational institutions increased by 5.1 per cent to 90,587 in 2017 with the number of registered Technical Vocational and Education Training (TVET) institutions increasing substantially by 50.9 per cent to 1,962 in the same period. Total enrolment in TVET institutions increased by 35.8% to 275,139 in 2017

CBET courses in Kenya

The courses offered under CBET curriculum are specified in training tools referred to as occupational standards. Occupational standards (OS) are the descriptions of what an individual in a particular occupation must be able to do to be formally recognized as competent in the given occupation. OS provides a good practice framework outlining measures against which performance can be assessed. These standards are developed in collaboration with industry and approved by sector skills advisory committees (SSACs), to ensure that they are industry specific technically updated. The list of occupational standards as approved by TVETCDAAC is as shown in the Appendix i. Also in appendix ii is a list approved CBET programmes with respect to mechanical engineering areas.

2.4 Roles of TVET institutions in Kenya in CBET

In Kenya, TVET is accessible in two levels, Technical Vocational Colleges (TVCs) and Vocational Training Centers (VTCs). TVCs are run by the national government while VTCs are managed by the county governments. According to the CBET policy framework (2019), TVET institutions are tasked with the following roles with respect to CBET implementation. These institutions are to advertise CBET courses and conduct own individual recruitment of trainees for the various CBET courses they offer. The process of recruitment is also guided procedure that must be adhered to. This includes: need assessment must be done to ascertain the suitability of potential trainees. Recognition of prior learning (RPL). Trainees to be issued with a registration number that shall be maintained throughout the training period

2.5 Adequacy of trainers towards the implement the CBET course

Human resource is so crucial for implementing of any objectives in an organization. For the implementation of CBET courses, trainers who are the main players are very important. These trainers must be able to implement the curriculum and for this to happen, they must be well trained and competent. In Kenya, trainers are trained in the following institutions: Kenya Technical Trainers College, Universities such as University of Eldoret, Moi, Dadan Kimathi, Masinde Muliro, among others. The trainers are the key agents on the implementation of the curriculum. They offer training services in TVET institutions. In Kenya, before 2018, all teachers were managed by one body: Teachers Service Commission (TSC). TSC is mandated to register, deploy, discipline and remunerate teachers in Kenya. In 2018, all teachers who were in TVET institutions were transferred to the Ministry of Education- State Department of Vocational and Technical Training by Public Service Commission (PSC). This move led to a change in the name of teachers in TVET from Lecturers/Tutors to Trainers. This change of name was in compliance with the TVET Act of 2013. The act established TVET Authority with the mandate of registration and accreditation of TVET institutions and registration and licensing of trainers among others roles. Trainer must possess technical competence and work experience and with a minimum qualification of one level higher the course offered. According to TVET Act 2013, TVET Authority is the body tasked with a role of registration and licensing of all trainers. Trainers' competency is usually assessed and ascertained before is registered and silenced as a trainer. Directorate of Technical Education (DTE) under the ministry of education plays a key role in the capacity building of trainers and managers of TVET institutions. Therefore, DTE and TVETA pay a key

role in ensuring that trainer's competency are enhanced to meet the training needs, CBET policy framework, 2018.

Lang'at, 2021 noted that there is need for trainers to be exposed and trained to make use of emerging technologies, industry trends in the classroom through continuing professional development (CPD). For trainers to be globally competitive and kept with newer pedagogical and technological approaches, it is paramount that they renew and update skills by making full use of the opportunities offered through CPD.

Nevenkosky et al (2019) found that for the proper implementation of a new curriculum, the teacher who is very key poses a numbers of concerns: more information should be provided for proper understanding of the curriculum, peer collaborations to share on the experiences with new curriculum, professional development to build their capacity and access to the required curriculum materials. They recommended that, before a new curriculum is rolled out, more time should be allowed to pilot the program. This study explores the preparedness of trainer and instructors in terms of: their academic qualifications, experience, training in CBET curriculum and their understanding of CBET curriculum.

The majority of teachers had no clear understanding on the objective of CBET. Majority of teachers were also not able to plan for a lesson depiction competence based qualities. These led to ineffective implementation of the Competency Based Curriculum in Tanzania. This findings show that, for the curriculum to be implemented effectively, the

teachers must be thoroughly sensitized and given proper training on the new curriculum. In this study, the aspects of teacher training in CBET curriculum is examined to a certain their preparedness to implement the CBET curriculum (Komba and Mwandangi, 2015), Jonyo and Jonyo (2019) noted that the heads of the learning institution has a pivotal role in the implementation of the curriculum. The heads are the supervisors of the activities within the institution. It therefore follows that, for the curriculum to be effectively implemented, the head of institution must have the proper vision so as to properly utilize the resources. In this study, information on the experience and qualifications of the heads of institution is collected to investigate their attitude towards the implementation of the CBET curriculum.

Ogar and Awhen (2015), pointed out the importance of ICT skills in the implementation of a curriculum. In their research, they found out that the inability of teachers to apply ICT was a challenge to the effective implementation of the curriculum. In this study the trainers were assessed to a rate their ICT compliance and weather they can apply it in training.

According to Kizito et al (2019), found out that one of the factors affecting the implementation of a new curriculum is low knowledge on the curriculum. Teachers as the implementers should have an in-depth understanding on the curriculum and its contents. In this study, trainers are assessed on their understanding of competence based curriculum for its success.

Maclean and Lai (2014) in their studies on The future of technical and vocational training: Global challenges and possibilities found that some countries are not treating TVET trainers in a manner that is commensurate to their status. There was a very big gap in the in which trainers are treated compared to the academic teachers. The issues of concern were: remuneration, promotions and benefits which leaves them demotivated and frustrated. A trainer is very key in the implementation of the curriculum. In the study, the trainers were assessed to find out whether their challenges with regard to the implementation of the CBET curriculum. The issues of remuneration, promotions and the general welfare of trainers if not addressed lead to a demotivated trainer. This interns affects the effectiveness in the provision of quality training.

Mutua et al (2019) in their study on the trainers' qualifications in Competency Based Education and Training (CBET) implementation, found out that trainers had the necessary qualifications and competence to teach effectively due to great experience obtained in teaching. The study relooks into the adequacy and competency of TVET trainers. The experience and competency of trainers is very critical for the effective implementation of the CBET curriculum. The curriculum is so demanding that it requires a trainer well prepared to face it. Teaching experience and qualification is key to enhancing the teaching among trainers. To satisfy the curiosity, the researcher assessed the trainer qualifications in terms of the level of education and working experience.

2.6 Physical infrastructure necessary to support the implementation of CBET courses

Physical infrastructure forms an important element in the training activities in training institution. Physical infrastructure include: workshops, laboratories, classrooms, libraries and tools and equipment. In Kenya, TVETA and DTE plays a key role in quality assurance in respect to infrastructure. TVETA has a quality assurance role in TVETs, which ensures that any registered TVET has the required infrastructure before it can be registered. To the existing TVETs, TVETA usually conducts inspections to ensure that the facilities are suitable for the training programmes offered. DTE is responsible for capacity building which includes: training facilities and equipment. The equipping of TVETs lies majorly in the hands of DTE.

According to Ogar and Awhen (2015) lack of facilities is the main challenges in the implementation of curriculum. The facilities includes: classrooms, laboratories, workshops, library, and ICT facilities among others. The study has established the status of TVET institutions' physical infrastructure. Trainers, trainees and heads of institutions were asked to give their own assessment on their institutions preparedness to implement CBET curriculum.

2.7 Instructional resources necessary to support implementation of CBET courses

In Kenya, the curriculum and occupation standards (OS) or the syllabuses used for CBET programs are developed by TVETCDAAC and approved by TVETA. Those that have been developed and approved are as shown in the appendix ii.

Kizito et al (2019) noted that lack of relevant tools facilities led to ineffective implementation of curriculum. They listed: one, materials ICT tools, textbooks and audiovisual materials, two, lack of adequate time to teach.

2.8 Partnerships and Industrial collaborations in TVET institutions

A linkage between TVET institutions and the industrial players is very paramount in enhancing skills acquisition. It also makes trainees to appreciate the realities of things learnt at school. According to Ministry of Education (MoE, 2018), through a circular from the director of Technical and vocational education, all heads of TVET institutions were instructed to have collaboration with at least three private sector organizations including Micro Small and medium Enterprises (MSMEs) and *Jua Kali* by December 2018.

According to the Kenya Vision (2030), weak linkages between training institutions resulted to skill mismatch and underdevelopment in the country. Skill mismatch is where the labor force has skills which don't match with the requirements of the industries. The graduates from institutions of training lack skills that are needed by the industries. A gap exists between TVET institutions and the industry. The study assesses the strength of industrial partnerships and collaborations between TVET institutions and the industries.

Otunga et al, (2016) in their study on collaborative and linkages between TVET institutions and industry, found out that: the major form of collaboration was placement opportunities by the industries. Collaborative research and capacity building of staff was ranked the lowest form of collaboration. The linkages between TVET institutions and

industry was mainly to offer the attachment and internships place to TVET trainees. There is the need to expand the base of collaboration. In this study identifies the gap in the linkages between TVET institutions and industries and therefore assess the strength of the linkages. Industries offer on job experience to both trainees and trainers. Through industrial attachments, internships and staff training, industries enhance skill acquisition. Therefore industries play a key role in the implementation mechanical engineering CBET courses.

On promoting collaborative approaches and capacity building, UNESCO (2016) noted that lack of partnerships a major problem towards implementing TVET curriculum. To help in bridging this gap, UNESCO focuses on ways of creating institutions and partnerships across governments and between agents and institutions. This is to be done through extra budgetary initiatives.

According to Remington (2018) in his study found out that public – private partnerships in TVET was faced with challenge. This made the implementation of a dual system of training a challenge. He noted that the success stories of TVET institutions with a vibrant partnerships was rare. This was attributed to the financial involvements that was key in streamlining the linkages.

2.9 Financial resources to support learning activities of CBET courses

In Kenya, TVETs are financed by the government, student fees, donors and sponsors. The government subsidizes fee through capitation and loans to students. According to Higher Education Loans Board Act Cap' 213, HELB is a state body established in the

ministry of education. This body is mandated to give loans to students as well as management of the revolving fund. Students are given loans and they are obligated to pay back after completion of their studies. HELB also gives bursaries to the needy students. According to Higher Education Loans Board, 2021, for a student to benefit from the revolving fund, an application must be made with the following documents as the requirements: a copy of admission letter from the institution, a copy of National Identity Card, a KCSE results slip, copies of parents National Identity Card or death certificate (if deceased), copies of Bank card and a recent colored passport size photograph of the applicant. TVET are also funded by the bursaries from the constituency development funds (CDF) and county governments. The county government runs the Vocational Technical Centers (VTC), a devolved function enshrined in the constitution of Kenya, 2010. TVETs also get funded by the parents and donors.

According to Palmer, 2018, states for one to explicitly fathom TVET system, it's paramount to grasp country's TVET governance, agencies and courses offered. In financing TVET, it is important to reconcile public and private resources with the needs from many levels and programs offered. The attainment of the best resource utilization while maintaining a sustainable budget is important. He also noted that, it is crucial for TVET funding to distinguish between sources of funds, allocation and utilization. Every country has her own objectives and it is important that a mix of financing strategies must be considered to help realize the objectives within an enabling environment for TVET financing.

Generally speaking, TVET relies more on the government for funding. This traditional funding is always insufficient and unreliable therefore need for the institutions to set up strategies for additional sources of funding. Amaomah et al (2017) in exploring the role of business development units found out that funding can be diversified through establishing these units in TVET institutions. There are courses which are costly to run and the traditional sources of funds cannot support. With these business development units, institutions will be able to improve their source of fund hence able provide quality programs.

When it comes to financing TVET, the most reliable and sustainable source is a combination of government grants, students fee, private sector investments, contributions from companies and employees, income generated internally from services offered and externally in the form of donor grant, NGO contributions and cooperating partner loans, Mubanga et al, 2019.

2.10 Summary of the chapter

The chapter focused on review of relevant literature on the subject under study. The chapter detailed issues on: Definitions; objectives of CBET, target groups of CBET, evolution of CBET, comparison between CBET and conventional approaches in training, stakeholders in skill development, TVET in other countries such like: Australia and Canada and TVET in Kenya. The main objectives of CBET are: to promote lifelong learning, to encourage individuals achieve full potentials and to develop dynamic attitudes and ability. CBET targets the following groups: the educated, people from both

formal and informal sectors, youths out of school, people who have never been to school and people who have either retired or retrenched. The origins of CBET can be traced back from the United States of America during the 1950s and 1970s. The comparison between CBET and conventional approaches is basically that, CBET is competency based while conventional approach is knowledge based. In skill development, the government, industries and their collaborations is very paramount. Globally Canadian is one of the few countries with the greater proportion of the population being highly educated. In Kenya, competency based curriculum is to be implemented with the support from the Canadian government. TVET-CDAAC and TVET Authority are the main bodies that are coordinating the programs in TVET institutions.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter describes the research design used in assessing the preparedness of TVET institutions for the implementation of mechanical CBET courses in Kenya. Also discussed in this chapter: study area, target population, sampling techniques and sample size, instruments of data collection, reliability and validity of instruments, data collection and preparation for analysis.

3.2 Research Design

Research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 2004). The research design is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data. The study adopted an exploratory approach using descriptive survey design to investigate the preparedness of TVET institutions towards the implementation of mechanical engineering CBET courses. Mugenda and Mugenda (2003) argue that the purpose of the descriptive research design is to determine and report the way things are, and attempts to describe such things as possible behavior, values, attitudes and characteristics.

The researcher adopted the descriptive research design to have a comprehensive examination of aspects of training that are key in the implementation of the CBET in

mechanical engineering courses. The study examined: the trainers adequacy, physical infrastructure, instructional resources, industrial partnerships and collaboration and finances. Important factors as that influence policy decisions in education and training.

3.3 Study area

The study was carried out in three counties of Kakamega, Nandi and Uasin Gishu. Kakamega County is situated in Western region (formerly Western Province) of Kenya (GoK, 2010). The county covers an area of 3,033.8 square kilometers, with a population of 1,867,579 (KNBS, 2019). Kakamega County borders six other counties namely: Siaya and Busia Counties to the West, Vihiga County to the South, Bungoma and Trans Nzoia to the North and Nandi and Uasin Gishu Counties to the East. Kakamega County has 7 public TVET institutions (TTI/TVC/NP). Nandi County is in Rift Valley of Kenya covering an area of 2,884.4 square kilometers. Nandi county has a population of 885,711(KNBS, 2019) and borders the following counties: Uasin Gishu, Kakamega, Kisumu and Vihiga Counties. Nandi has 6 sub counties namely: Mosop, Emgwen, Aldai, Tinderet, Nandi Hills and Chesumei. Nandi County has 5 TVET institutions (TTI/TVC). Uasin Gishu County also is in Rift valley region of Kenya, with an area of 2,955.3 square kilometres and a population of 1,163,186. Uasin Gishu county boards 6 counties namely: Trans Nzoia to the north, Elgeyo Marakwet and Baringo to the east, Kericho to the South and Kakamega to the south west. Uasin Gishu County has 6 public TVET institutions (TVC/TTI/NP) (TVETA, 2020). The three counties represent: western and rift valley regions of the Kenya. These counties also provide a substantially representative number of institutions whose findings can be generalized to the rest of

TVET institutions in Kenya. TVET institutions in these counties were established under different circumstances, there are institutions which were established many years and while others established recently. This makes the area suitable for the study. Appendix xi shows Map of Kenya counties.

3.4 Target Population

Target population is the population to which the research wants to generalize the result of the study (Mugenda & Mugenda, 1999). According to Orodho (2009) target population are all members of a real or hypothetical set of people, events or objects to which the researcher wishes to generalize the results of the study. It is a group from which a sample is obtained (Sekaran & Bougie. In this study, the target population constitutes: the administrators, trainers and trainees from the 72 approved public TVET institutions and employers from the counties of Uasin Gishu, Nandi and Kakamega. TVETA (2021) the TVET institutions fall in the categories of: Technical Universities, National Polytechnics (NPs), Technical Trainers Colleges, Technical, Vocational Colleges (TVCs) and Vocational Training Centres (VTCs). These institutions have common characteristics in that: they are funded by the public: CBET is guided by the CBET Policy framework (MoE, 2018). Sample population of study is the subset of the target population that can be accessed for research due to geographical, cultural or temporal features (Kothari, 2004). In the three counties under the study, there are a total of 72 public TVET institutions – from which the accessible number of respondents is drawn: trainers, trainees, ILO and employers.

3.5 Sampling techniques

The sampling techniques are the procedures that the researcher adopts in obtaining the elements for the sample (Kothari, 2004). Kothari continues by stating that; the researcher must employ such sampling techniques which are reliable and appropriate. This study used both probability and Non-probability sampling. Mugenda Mugenda, 2003, the main objective of probability sampling is to select reasonable number of elements that are representative to the target population. Sampling techniques used were: simple random sampling, purposive sampling and stratified sampling. Simple random sampling was used to select trainers, employers and the general public. Purposive sampling was used to select ILO and heads of institutions. Non probability sampling is also important especially when the researcher is not interested in obtaining a representative sample. This research also employs purposive sampling to select ILOs since they are in charge of industrial attachments in the TVET institutions.

3.6 Sample Size

A sample is a portion of a particular population. According to Kothari (2008), a sample is a collection of items from the universe representing it. The sample was obtained from the accessible population. The study area had a total (target population) of 72 public TVET institutions from which 33 were selected using simple and stratified sampling. The 72 institutions had approximately 2,500 trainees undertaking mechanical engineering courses from which 414 were selected using simple random sampling. 14 ILO and 33 heads of institutions were purposively sampled. 180 employers were selected using simple random sampling. The breakdown of all the participants in the study is as given in

table 3. Gay, 1983 suggests that for a descriptive study, 10% of the accessible population is enough for a sample size. The study surpassed gay's achieved the threshold.

Table 3 Sample size of the participants in the study

County	No of sampled TVET Institutions	Participants				
		Principals	Trainers	Trainees	ILO	Employers
Uasin Gishu	1 NP	1	10	50	1	80
	5 TVCs	5	20	100	5	
	4VTCs	4	16	24	4	
Nandi	3 TVCs	3	18	60	3	40
	4 VTCs	4	16	12	4	
Kakamega	1 NP	1	10	50	1	60
	5 TVCs	5	30	100	5	
	10VTCs	10	30	18	10	
TOTAL	33	33	150	414	33	180

3.7 Research Instruments

Development of research tool is very important as it's the means through which the researcher collects the crucial information (Mugenda & Mugenda, 2003). In deciding the method of data collection, the research should keep in mind the type of data. Primary data and secondary data: primary data are those data collected for the first time while secondary data are those already collected by someone else (Kothari, 2008). Data can

also be qualitative or quantitative. According to Kabir (2016) quantitative data is numerical while qualitative data are non – numerical and descriptive in nature. In this research, the research questions required answers that generated both quantitative and qualitative data. The study relied on the primary data sources. Secondary data is less valid and therefore not relied on for the purpose of this study. In this study, data was collected using questionnaires.

The questionnaires were prepared to be completed by: trainers, trainees, ILOs, principals and employers of TVET graduates.

3.7.1 Questionnaires for Principals

The principals' questionnaires were used to collect data about: trainers' adequacy, institution's physical infrastructure, availability of instructional materials, strengths of partnerships and industrial collaborations and adequacy of financial resources. The questions contained both opened and close ended questions organized in sections a shown in the appendix vi.

3.7.2 Questionnaires for Trainers and ILOs

The trainers' questionnaires were used to collect data about: trainers' adequacy, institution's physical infrastructure, availability of instructional materials. The section on the strength of partnerships and industrial collaborations was to be completed by the ILOs. The questions contained both opened and close ended questions organized in sections a shown in the appendix vii.

3.7.3 Questionnaires for Trainees

The trainees' questionnaires were used to collect data about: trainers' adequacy, institution's physical infrastructure, availability of instructional materials, strengths of partnerships and collaborations. The questions contained both opened and close ended questions organized in sections a shown in the appendix viii.

3.7.4 Questionnaires for Employers

The employers of TVET graduates were to complete their questionnaires. Employers' questionnaires were used to collect data about: strengths of partnerships and collaborations with TVET institutions. The questions contained both opened and close ended questions organized in sections a shown in the appendix ix.

3.8 Validity and Reliability of Research Instruments

For any research to make sense, the data collected using the developed tools must also make sense. The quality of research is anchored in the ability of the researcher to apply such techniques that yields accurate results. This was achieved by ensuring that the data collected using such instruments that were valid and reliable.

3.8.1 Validity of the Research Instruments

Validity has to with the ability of the research instrument to yield data that is meaningful which allows the researcher to draw inferences from the sample to the population (Cresswell, 2005). According to Mugenda and Mugenda (2003) validity is the degree to which the results from the research instruments are objective to the phenomenon being

studied. There are four types of validity: Criterion validity, face validity, content validity and construct validity. Face validity deals with the appearance of the research instrument, the readability of the text and the clarity in the language used (Taherdoost, 2016). Questionnaire used in this research achieved face validity as the items were presented neatly, the text was legible and language was simple and fathomable by the respondents. Content validity is defined as the degree to which items in the research instrument represents the content of a particular concept (Straub, Boudreau et al. 2004). The research instruments achieved content validity since: the instruments were critiqued by three experts from the University of Eldoret and curriculum development experts from KICD. These research tools were developed after intensive literature review. Mugenda, 2003 states that construct validity is the degree to which the data obtained from the tool reflects a theoretical concept. Construct validity was achieved during the development of research tools through the use of theoretically derived hypotheses.

3.8.2 Reliability of the Research Instruments

Reliability means that the data obtained from the research tools are consistent and stable. Reliability also has to do with repeatability. Reliability responds to a question as to whether the research tool can be trusted. A reliable tool will yield consistent and accurate result. Mugenda & Mugenda (2003) reliability is inversely proportional to the random errors. Implying that, reliability is well achieved when random errors are minimized. These errors may arise from situations such as: inaccurate coding, ambiguous instructions, and respondents' fatigue. Therefore the research tools in this study were developed with high accuracy and void of ambiguity.

There are two aspects of reliability: stability and equivalency. Stability is determined by comparing the results of repeated measurements. Equivalency on the other hand, determines how much errors get introduced by different researchers or sampled items of the study. This was achieved by comparing the observations of two researchers of the same event.

Internal consistency was estimated at Cronbach's Alpha of 0.7, which is the lowest value for reliability. The researcher used Cronbach's Alpha since the factors measure different extends within the same data instrument. Each questionnaire required the respondent provide data about different issues. Issues concerning: Trainers adequacy, physical infrastructure, instructional resources, industrial partnerships and collaboration and finance in TVET institutions. Piloting was using 3 principals, 3 ILOs, 10 trainers, 20 trainees and 10 employers to assess the validity of the research tools. Pilot was done in TVET institutions and industries in Busia County. Therefore Cronbach's Alpha was most preferred. From the pilot it was found to be as calculated below.

Using the formula,

$$Kr_{20} = \frac{(K)(S^2 - \sum s^2)}{(S^2)(K - 1)}$$

Where, Kr_{20} = reliability coefficient of internal consistency

K = Number of items to be measure the concept

S^2 = Variance of all scores

s^2 = Variance of individual items

Reliability is the consistency in the results obtained over repeated trials (Mugenda, 2003).

In the study, the tools were subjected to Cronbach's alpha test. Internal consistency was

measured using Cronbach's alpha where the value was 0.730 for employers' scores, 0.725 for principals' scores, and 0.759 for the scores of ILOs, 0.770 for trainees' scores and 0.902 for the scores of trainers. The coefficients are shown in the table 4, 5, 6 and 7. The appendix xvii shows the values of Cronbach's alpha if items deleted which have acceptable internal consistencies above 0.7. This indicated high reliability in the scores.

Table 4: Cronbach's Alpha for employers' questionnaire scores

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N Number of Items
.730	.743	27

Table 5: Cronbach's Alpha for Trainers' questionnaire scores

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N Number of Items
.902	.910	30

Table 6: Cronbach's Alpha for trainees' questionnaire scores

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N Number of Items
.770	.759	27

Table 7: Cronbach's Alpha for principals' questionnaire scores

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N Number of Items
.725	.703	38

3.9 Administration of Research Instruments

Data collection is the process of gathering and measuring information in a well systematic manner that leads the research to answering research questions (Kabir, 2016). According to Mugenda (2003) three ways through which questionnaires can be administered are: self-administration, researcher administration and through the use of internet. The researcher adopted self-administration and in person. The respondents were issued with the questionnaire, some were given some time to complete then return at a later date. The questionnaires that were completed instantly were picked by the researcher .the use of the two methods of administration enabled the researcher to attain a substantial response rate of 77.65% which enabled data analysis for the results.

3.10 Data Analysis Procedures

The research instruments used in the study produced qualitative data. According to Kothari, (2004) data processing involves editing, coding classification and tabulation of the data gathered from the research instruments. Editing is the process of careful examination of the raw data to eliminate errors, this ensure that the data is accurate and consistence. Coding on the other is the process of assigning numbers, alphabets, symbols, or combination, so that the responses can be put into limited categories for easy analysis. Coding is a technique where raw data are assigned numbers representing measurable

variables to facilitate analysis (Mugenda, 2003). Classification is the process of reducing a large amount of raw data into groups. Tabulation is the process of systematically summarizing raw data into rows and columns for presentation and analysis.

Qualitative data analysis involved: manual coding of data, searching for commonalities and differences and interpreting data within the specific context. The data was categorized and patterns identified. These data was summarized using descriptive statistics. Quotations and narrations were use during presentation.

Quantitative data analysis included: descriptive statistics which involved: summarizing and presenting of data using frequencies, percentages and means. The output of data included: graphs, charts and tables. The analysis was aided by the use of Statistical Packages for Social Sciences (SPSS) software. Data was analyzed using descriptive statistics in the form of frequencies, percentages, means and correlations.

Data preparation involved: This involved: compilation, editing, coding, classification and tabulation. Each questionnaire was examined for incompleteness and inaccuracies. The questionnaire were then serialized from 0001 to 0629. The test items were then coded for easy entering into the SPSS program. This was followed by grouping of the questionnaire into various groups: trainees, trainers, ILOs, principals and employers. And finally the date was tabulated to facilitate presentation, description and interpretation of the results.

3.11 Ethical Issues of the study

Ethical issues concerning research subjects were: confidentiality and privacy, anonymity, physical and psychological harm voluntary and informed consent, dissemination of findings and professionalism. According to Mugenda & Mugenda (2003), the research should ensure that the information provided by the respondents is kept confidential, the identity of the respondents should not be revealed and the participation of the respondent in the study should be voluntary. This research ensured ethical concerns were adhered to throughout. The main purpose of the study was explicitly stated to the respondents in the introduction. The researcher adhered to ethical issues in the study. Before administering of the questionnaires to the Heads of TVET institutions, consent was obtained from the respective county directors of TVET. Before trainers, ILOs and trainees were given the questionnaires, consent was obtained from the respective Heads of institutions. Respective county police commissioners were also key in providing consent to move about in the process of data collection. In each questionnaire, the researcher ensured that there was a statement assuring respondents of confidentiality in the data provided. In each questionnaire, respondents were not required to provide their identity through providing names. The participation of the respondents was also voluntary; there was no coercion of the participants. The researcher obtained the necessary permit and approvals from NACCOST, County Commissioners and County governors. These authorizations are shown in appendix XI, XII and XIII.

3.12 Summary of the chapter

In summary, the study employed a descriptive research design. This research adopted a descriptive design. The study was conducted in three counties: Kakamega, Nandi and Uasin Gishu Counties. The study targeted the 33 registered public TVET institutions in the Kenya. Sampling techniques used in the study are: Simple random sampling, purposive sampling. The sample size for the study consisted of 810 participants from public TVET institutions and industries in the three counties. The research instruments used in the collection of data were questionnaires. The data was collected and prepared for analysis. Finally, the researcher adhered to ethical considerations such as confidentiality, anonymity and voluntary participation.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the presentation, interpretation and discussion of the findings. It focuses on the five research objectives which were: To examine the adequacy of trainers required to implement mechanical engineering CBET courses in TVET institutions, in Kakamega, Nandi and Uasin Gishu counties, Kenya; To assess the state of physical infrastructure for the implementation of mechanical engineering CBET courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya; To identify the existing instructional resources related to mechanical engineering CBET courses in Kakamega, Nandi and Uasin Gishu counties, Kenya; To investigate the strengths of industrial partnerships and collaborations in the implementation of mechanical engineering CBET courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya; To find out the adequacy of financial resources needed to support training activities in mechanical engineering CBET courses in Kakamega, Nandi and Uasin Gishu counties, Kenya. The chapter provides the highlights the key findings related to each research objective. The findings shed light on the strengths, weakness and areas of improvements to enhance the preparedness of TVET institutions for the implementation of mechanical engineering CBET courses in the selected counties. The data was analyzed descriptively using: frequencies, percentages, means and presented using tables, graphs and charts.

4.2 Response Rate of the Participants

Out of the eight hundred and ten (810) sampled participants, six hundred and twenty nine (629) questionnaires were completed and returned; this include; trainees, trainers, ILOs, principals and employers. The rate of response was 77.65%. Mugenda & Mugenda (2003) states that when the response rate is 50 percent, it is adequate; when 60 percent is good and when above 70 percent, it is very good. The response rate was therefore sufficient for generalizing the outcome of the study, as it is assumed that the respondents were representative sample for the entire population. A high response rate assures the results are sufficiently accurate (Backstrom & Hursh, 1963; Babbie, 1990; Aday, 1996; & Parker, 1997)

Table 8 Response rate of the participants

Response	Frequency	Percentage (%)
Initial population	810	100
Filled and returned questionnaires	629	77.65
Unfilled questionnaires	181	22.35

4.3 Demographics of respondents

For the responses to be analyzed, it was paramount to fathom the entire sample population. This was achieved using descriptive statistics. Such analysis utilized frequencies and percentages Mugenda (2003). The study had a total of 629 participants, which constituted: 278 trainees, 150 trainers, 30 ILOs, 33 principals and 138 employers of graduates from TVET institutions. The distribution of participants in terms of: gender, level of education, occupation and working experience was examined.

4.3.1 Gender distribution of respondents

The participants were asked to state their gender (male or female) and the results was summarized as shown in the table 9 below.

Table 9 **Distribution of trainees, Trainers, ILOs and employers**

	Trainees		Trainers		ILOs		Principals		Employers	
	f	%	F	%	f	%	f	%	f	%
Male	200	71.9	99	66	20	66.7	19	57.6	110	79.7
Female	78	28.1	51	34	10	33.3	14	42.4	28	20.3
Total	278	100	150	100	30	100	33	100	138	100

From table 9, the data shows that out of a total of 278 trainees, 200(71.9%) were male while 78 (28.1%) were female. This suggests that there was a higher representation of male trainees compared to female trainees in the study. Out of a total of 150 trainers, 99(66%) were male while 51 (34%) were female. This suggests that there was a higher representation of male trainers compared to female trainers in the study. Out of a total of 30 ILOs, 20(66.7%) were male while 10 (33.3%) were female. This suggests that there was a higher representation of male ILOs compared to female trainers in the study. There were a total of 33 principals. Out of which, 19 (58%) were male, and 14 (34%) were female. This indicates that there was a higher representation of male principals compared to female in the study. The data also shows that there were a total of 138 employers. Out of which, 110 employers (79.7%) have male representatives, and 28 employers (20.3%)

have female representatives. This suggests that there was a higher representation of male employers compared to female employers in the study. Overall, based on the given data, there was gender imbalance in the representation of the participants in the study. Male respondents were highly represented. Figure 3 shows the summary of gender distribution of all the participants combined. Figure 3 below shows the overall gender percentages of all participants in the study

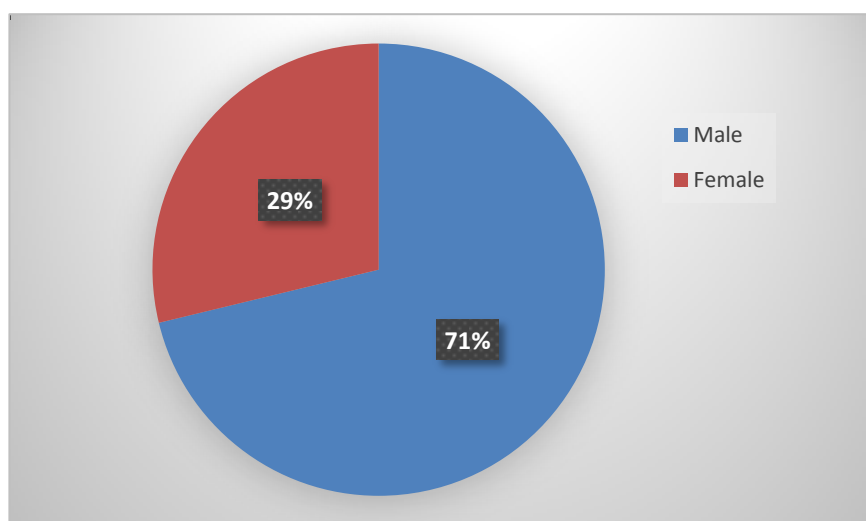


Figure 3: Gender distribution of all participants

The pie chart in figure 3 shows that; 29 percent of the participants were female while 71 percent were male. This shows that more male participated in the study than female. There was gender discrepancy in occupations related to mechanical engineering field is dominated by male. Therefore in assessing the prepared of TVET institutions to implement mechanical CBET courses. The gap in the gender distribution should also be addressed to ensure that the courses attracts female trainees.

4.3.2 Participants' Level of education

The participants were asked to state their highest level of education. The levels were categorized as: Artisan, craft, diploma, bachelor degree, masters and PhD. Their responses were analyzed and the summarized as shown in table 10 below.

Table 10: Participants' level of education

	Artisan		Craft Certificate		Diploma		Bachelor's Degree		Master s		PHD	
	f	%	F	%	f	%	f	%	f	%	f	%
Trainers	0	0	5	3.3	63	42.0	81	54.0	1	0.7	0	0
ILOs	0	0	0	0	2	6.7	28	93.3	0	0	0	0
Principals	-	-	0	0	17	51.5	15	45.5	1	3.0	0	0
Trainees	53	19	151	54.3	74	26.6	-	-	-	-	-	-
Employers	42	30.4	23	16.7	30	21.7	41	29.7	2	1.4	0	0

From the above table, among the trainers, 5(3.3%) had craft, 63 (42%) had diploma, 81 (54%) had bachelor's degree, one (0.7%) had masters and none had PhD. This shows that majority of trainers had bachelors as their highest level of education. Among the ILOs, 2 (6.7%) had diploma, 28 (93.3%) were in Bachelors, and there was none with masters and PhD as highest level of education. The results shows that, majority of the principals had diploma as their highest level of education. Among the principals, 17 (51.5%) had diploma, 15 (45.5%) were in Bachelors, 1 (3%) had masters and none had PhD. The results shows that, majority of the principals had diploma as their highest level of education. Among the trainees, 51 (19%) were undertaking artisan courses, 151 (54.3%)

were in Craft courses and 74 (26.6%) had enrolled for diploma courses. The results shows that majority of the trainees had enrolled in diploma courses. Among the employers, 42 (30.4%) had artisan, 23 (16.7%) had craft, 30 (21.7%) had diploma, 41 (29.7%) had bachelor's, two (1.4%) had masters and none had PhD. This shows that majority of trainers had artisan and bachelor's as their highest level of education.

Table 11 below shows the summary of the level of education of trainers per category of the TVET institutions. The institutions were categorized as: VTCs, TVCs and NPs

Table 11: Trainers level of education per the category of TVET institutions

	Level of education									
	Craft		Diploma		Bachelor		Master		Total	
	f	%	f	%	f	%	f	%		
VTC	5	10.4	39	81.3	4	8.3	0	0	48	
TVC	0	0	18	22.0	63	76.8	1	1.2	82	
NP	0	0	6	30.0	14	70.0	0	0	20	

The results show that: in VTC, 5 (10.4%) had craft, 39 (81.3%) had diploma, 4 (8.3%) had bachelor's and we had none with masters and PhD. The majority of trainers had diploma as their highest level of education in VTCs. In TVCs, none had craft, 18 (22%) had 63 (76.8%) had bachelor's one had master and none had PhD. This shows that the majority of trainer in TVCs had bachelors. In NPs, none had craft, 6 (30%) had 14 (70%), none had masters and PhD.

This information provides insights into the distribution of educational qualifications among the three groups (NP, TVCs, and VTCs). Majority of trainers in VTCs had diploma and those in TVCs and NPs had Bachelors qualification. Trainers in NPs and VTCs have higher qualifications compared to those in TVCs. This shows that NPs and TVCs are highly prepared in terms of academic qualifications to implement the CBET curriculum compared to VTCs.

4.3.3 Working experience of the respondents.

The participants were asked to state their working experience. The experience was categorized as: 1 to 3 years, 4 to 5 years and above 6 years. The results were as summarized in table 12 below:

Table 12: Working experience of respondents

		Working experience						Total
		0-3		4-5		Above 6		
		Years		Years		Years		
		f	%	f	%	f	%	
Trainers teaching experience	VTCs	9	18.8	25	52.1	14	29.2	48
	TVCs	22	26.8	29	35.4	31	37.8	82
	NPs	4	20.0	8	40.0	8	40.0	20
	Total	35	23.3	62	41.3	53	35.4	150
ILOs		6	20	12	40	12	40	30
Principals		7	21.2	15	45.5	11	33.3	33
Employers		30	21.7	54	39.1	54	39.1	138

The results from the table 12 above show that: -

Among trainers, majority in all the categories of TVET institutions had teaching experience of over four years. ILOs, majority had teaching working experience of above four years. For principals, majority had working experience of above four years. And for the employers, majority of those interviewed had working experience of over four years.

4.4 Descriptive Statistics

Frequencies, percentages, means and correlations were used to assess the preparedness of TVET institutions to implement mechanical engineering CBET courses. The preparedness for the implementation was weighed on the following aspects: The adequacy of trainers, Availability of the physical infrastructure, Availability of instructional resources, strength of partnerships and industrial collaborations between TVET institutions and industries, Adequacy of financial resources to support training activities.

4.5 Adequacy of trainers and preparedness to implement CBET

The write up below is about the findings on the first objective of this study: To examine the adequacy of trainers required to implement mechanical engineering CBET courses in TVET institutions, in Kakamega, Nandi and Uasin Gishu counties, Kenya.

4.5.1 Trainers' training in Competency Based Assessment (CBA)

Competency Based Assessment (CBA) is crucial in the assessment of trainees under CBET curriculum. For effective assessment of mechanical engineering CBET courses, trainer must be properly trained on CBA. The CBA training is provided by TVET-CDACC, a body that is mandated to develop, assess and certify trainees under CBET

curriculum in TVET institutions in Kenya. To find out whether trainers had undergone a training on CBA, the question was directed to the trainers and principals.

4.5.1.1 CBA training in all TVET institutions

The trainers were asked to state whether they had undergone a training on CBA or not.

The principals were asked to whether their trainers had undergone the training or not. The results were summarized as shown in table 13 and presented using the pie chart as shown in figure 4:

Table 13: Trainers' training on CBA

	Yes		No		Total
	f	%	f	%	
Trainers' responses	98	65.4	52	34.6	150
Principals' responses	25	69.7	8	30.3	33
Overall %	67.2		32.8		

The table above shows that:

According to the responses from the trainer, majority (98%) of them had been trained on CBA. From the principals' responses, we also saw that the majority of trainers had been trained on CBA.

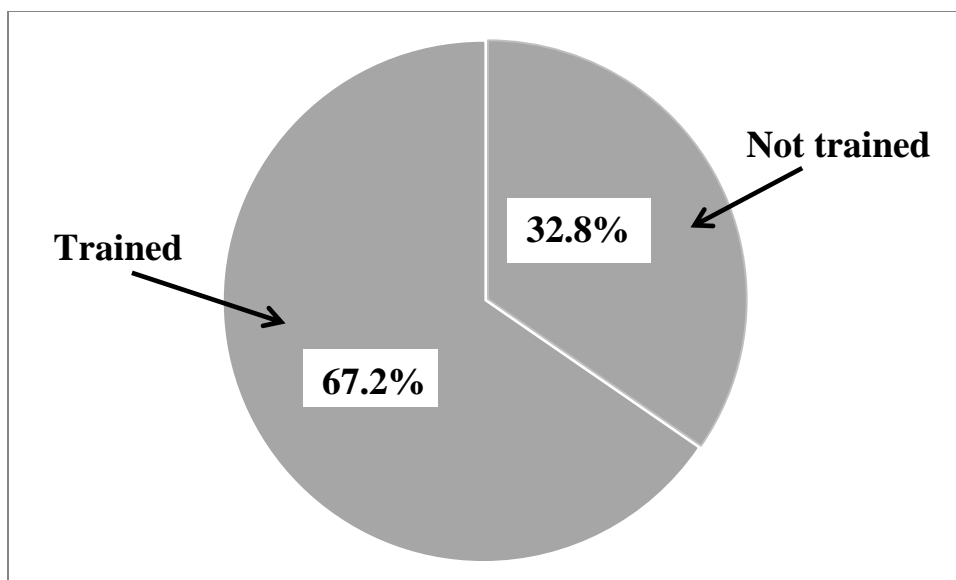


Figure 4: Trainers trained on CBA

The results show that the majority (67.2%) of trainers have been trained on CBA.

4.5.1.2 CBA training per level of institutions

To understand the level of training among different categories of TVET institutions, the trainers' responses were analyzed per level of each category. TVET institutions were categorized into three categories: VTCs, TVCs and NPs. The result was as shown in table 14.

Table 14: CBA training of trainers per level of TVET institutions

Categories	YES		NO	
	f	%	F	%
VTCs	25	73.5	9	26.5
TVCs	74	84.1	14	15.9
NPs	26	92.8	2	7.2

From table 14, the results show that: NPs and TVCs have the biggest number (92.8%) and 84.1% respectively of trainers having been trained. the VTC have the majority (74.6%) of trainers not trained in CBA.

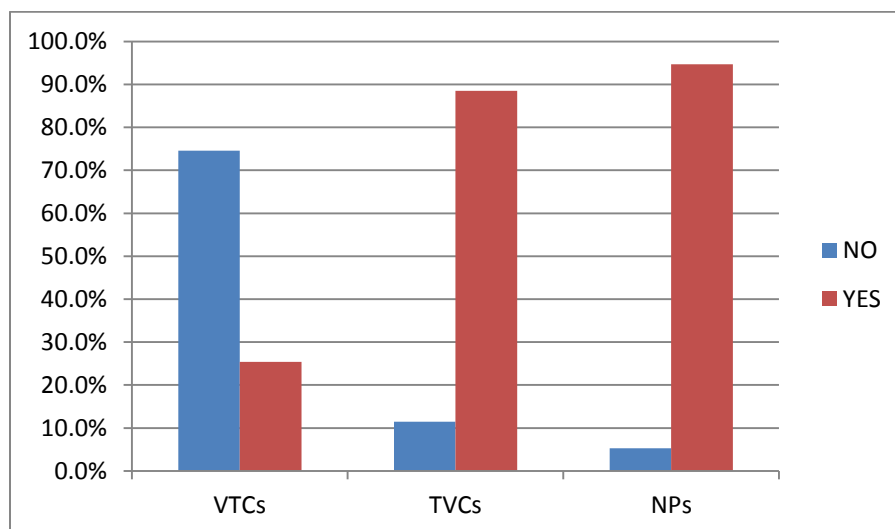


Figure 5: Trainers trained on CBA per the category of TVET institutions

The results show that majority of trainers in VTCs have not undergone the training while in TVCs and NPs have undergone the training. This implies that TVCs and NPs have majority of its trainers trained on CBA hence have a greater understanding on how CBET curriculum is to be implemented.

4.5.2 Trainers' adequacy towards the implementation of CBET in mechanical engineering courses

To shed light on the number of trainers and their competency, trainers, trainees and principals were asked to rate the following aspects of trainers in their institutions. The statements were given requiring them to rate them on a scale of 1 to 5, 1 being the lowest and 5 being the highest. The statements were: institutions have competent trainers, institutions have adequate number of trainers, trainers employ trainee

centered approaches in teaching, trainers are highly motivated to teach, trainers have been effectively trained on CBA and trainers are well prepared to tackle CBET courses. The results were as follows:-

Table 15 Trainees' responses on trainers' adequacy

Statements	SD	D	N	A	SA	Mean	Std Dev.
Trainers are competent	0	21	66	108	83	3.91	.913
Trainers are adequate	0	21	120	80	57	2.62	.894
Trainers use trainee centered approach	24	107	80	59	8	2.71	.989
Trainers are motivated to work	5	53	168	32	20	3.03	.817
Average Score						3.07	

The results show that: - for Trainers' Competence: The ratings given by trainees for trainers' competence is 3.91, indicating a relatively high perception of trainers' competence. Trainee Std Dev.: The standard deviation of trainees' ratings for trainers' competence is 0.913, suggesting that there is some variability in trainees' perceptions.

Trainers' Adequacy: The mean rating given by the trainees was 2.62, indicating a relatively lower perception of trainers' adequacy. Trainee Std Dev.: The standard deviation of trainees' ratings for trainers' adequacy is 0.894, suggesting that there is some variability in trainees' perceptions.

Trainee-Centered Approach: The mean rating given by trainees was 2.71, indicating a relatively lower perception of trainers' use of such an approach. Trainee Std Dev.: The

standard deviation of trainees' ratings for trainers' use of a trainee-centered approach is 0.989, suggesting that there is some variability in trainees' perceptions.

Average Score: The average score across all statements for both for trainees was trainees 3.01, shows than on average trainees were neutral to slightly agreeing that trainers are adequate and competent in TVET institutions.

Table 16 Trainers responses on their adequacy.

	SD	D	N	A	SA	Mean	Std Dev.
Trainers are competent	6	3	30	87	24	3.80	.875
Trainers are adequate	11	64	60	13	2	2.54	.808
Trainers use trainee centered approach	7	41	53	40	9	3.02	.986
Trainers are motivated to work	7	60	60	21	2	2.67	.823
Trainers are undergone effective trainings on CBET	6	47	31	45	21	3.19	1.143
Trainers are ready to implement CBET	13	46	54	31	6	2.81	0.995
Average Score						3.01	

The results from table 15 show that: - for Trainers' Competence: The ratings given by trainers was 3.80, indicating a relatively high perception of trainers' competence. The standard deviation of trainers' ratings for their competence was 0.875, suggesting that there is some variability in trainers' perceptions. Trainers' Adequacy: The mean rating given by the trainers was 2.54, indicating a relatively lower perception of trainers' adequacy. The standard deviation was 0.808, suggesting that there is some variability in trainers' perceptions. Trainee-Centered Approach: The mean rating given by trainers was

3.01, indicating a relatively high perception of trainers' use of such an approach. The standard deviation was 0.986, suggesting that there is some variability in trainers' perceptions. Motivation to Work: The mean rating given by trainers was 2.67, indicating a relatively lower perception of trainers' motivation. The standard deviation was 0.823, suggesting that there is some variability in trainers' perceptions. Effective Trainings on CBA: The mean rating given by trainers was 3.19, indicating a moderate perception of the effectiveness of their own trainings. Trainer Std Dev: The standard deviation of trainers' ratings was 1.143, suggesting that there is high variability in trainers' perceptions of their training on CBA. Readiness to Implement CBET: Trainer Mean: The mean rating given by trainers for their own readiness to implement CBET is 2.81, indicating a relatively lower perception of their readiness. The standard deviation was 0.995, suggesting that there is some variability in trainers' perceptions of their readiness. Average Score: The average score across all statements for trainers is 3.01, indicating that on average trainers are slightly neutral to agreeing that TVET institutions have adequate trainers and that these trainers are competent for CBET implementation.

The findings are in contradiction to the finding of a study by (Komba and Mwandanji, 2015), which found that the majority of teachers had no clear understanding on the objective of CBET. In this study, it was found that the majority of trainers have already undergone CBA training. This implies that, these trainers have clear understanding of the requirements and guidelines of the competency based curriculum.

Table 17 Principals' responses on staffing and competency of trainers

	SD	D	N	A	SA	Mean	Std Dev.
Trainers are competent	3	1	8	19	2	3.48	1.004
Trainers are adequate	5	15	12	1	0	2.27	.761
Trainers use trainee centered approach	3	6	11	10	3	3.12	1.111
Trainers are motivated to work	2	12	15	3	0	2.64	.783
Trainers are undergone effective trainings on CBA	5	11	2	8	7	3.03	1.447
Trainers are ready to implement CBET	6	14	11	1	1	2.17	.731
Average Score						2.79	

The results from table 17 show that: - on trainers' competence: The ratings given by principals was 3.48, indicating a relatively high perception of trainers' competence. The standard deviation of trainers' ratings for their competence was 1.004, suggesting that there is high variability in principals' perceptions.

On trainers' adequacy, the mean rating given by the principals was 2.27, indicating a relatively lower perception of trainers' adequacy. The standard deviation was 0.761, suggesting that there is some variability in principals' perceptions.

On the use of trainee-centered approach, the mean rating given by principals was 3.12, indicating a relatively high perception of trainers' use of such an approach. The standard deviation was 1.111, suggesting that there was high variability in principals' perceptions.

On trainers' motivation to Work, the mean rating given by principals was 2.64, indicating a relatively lower perception of trainers' motivation. The standard deviation was 0.783, suggesting that there is some variability in principals' perceptions.

On the effectiveness of the CBA training, the mean rating given by trainers was 3.03, indicating a moderate perception of the effectiveness of their own trainings. Trainer Std Dev: The standard deviation of trainers' ratings was 1.447, suggesting that there is high variability in trainers' perceptions of their training on CBA.

Readiness to Implement CBET: principals Mean: The mean rating given was 2.17, indicating a relatively lower perception of their readiness. The standard deviation was 0.731, suggesting that there is some variability in principals' perceptions of their readiness.

The average score across all statements for trainers is 2.79, indicating that on average principals are slightly neutral to agreeing that their institutions have adequate trainers and that these trainers are competent for CBET implementation.

4.5.3 Trainers' attendance to practical lessons

Trainees were asked to rate their trainers on how they attend to practical lesson in workshops and laboratories. The rating was on a scale of 1 to 5 one being lowest and 5 highest. The results were summarized as shown in the table 18. The results were analyzed per category of TVET institutions.

Table 18: Trainees responses on trainers' attendance to practical lessons per category of TVET institution

		VTC		TVC		NP	
		f	%	f	%	f	%
Trainers' practical lesson attendance	Very low	0	0.0	19	10.5	5	6.5
	low	1	5.0	72	39.8	34	44.2
	Medium	5	25.0	54	29.8	21	27.3
	High	12	60.0	36	18.9	11	14.3
	Very high	2	10.0	0	2.4	6	7.8
Total		20	100	181	100	77	100

In VTC: 60.0% of respondents perceive trainers' attendance to practical lessons as high. 25.0% of respondents perceive it as medium. 10.0% of respondents perceive it as very high. 5.0% of respondents perceive it as low. Very low category is not applicable (0.0%).

TVC: 39.8% of respondents perceive trainers' attendance to practical lessons as low. 29.8% of respondents perceive it as medium. 18.9% of respondents perceive it as high. 2.4% of respondents perceive it as very high. 9.1% of respondents perceive it as very low.

NP: 44.2% of respondents perceive trainers' attendance to practical lessons as low. 27.3% of respondents perceive it as medium. 14.3% of respondents perceive it as high. 7.8% of respondents perceive it as very high. 6.5% of respondents perceive it as very low.

This information provides insights into the perceptions of different groups (VTC, TVC, and NP) regarding the attendance to practical lessons. The practical lessons are very key in CBET curriculum courses.

The TVET institutions are not satisfactorily adequately staffed with trainers. Trainers play a crucial role in delivering high-quality education and training to learners. Their competence directly influences the effectiveness of the learning experience and the acquisition of relevant skills. The moderate level of adequacy suggests that trainers generally meet the minimum requirements and expectations in terms of their competencies to implement mechanical CBET courses. However, it is important to note that there is still scope for trainers to enhance their skills and capabilities further. The moderate rating implies that there may be areas where trainers could benefit from additional training, professional development opportunities, or continuous improvement efforts. This could include staying updated with the latest industry practices, incorporating innovative teaching methods, and continuously refining their pedagogical approaches.

These findings are in contradiction with the finding by Wambua and Waweru (2019) which found inadequate of teachers one of the factors affecting the successful implementation of competence based curriculum.

4.6 Physical infrastructure to support mechanical engineering CBET courses

This section presents the findings on the second objective of this study which was: To assess the current state of physical infrastructure for the implementation of Mechanical CBET courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya.

Infrastructure was assessed using the following key aspects: adequacy of classrooms and workshops, tools and equipment, library facilities and ICT resources. The statements

were: - there are adequate classrooms and workshops; there are adequate tools and equipment; there are adequate library facilities; there are adequate ICT resources. Participants were to rate them on a scale of 1 to 5, 1 being strongly disagree (SD), 2 disagree (D), 3 neutral (N), 4 agree (A) and 5 strongly agree (SA). The summary is as shown in table 19

4.6.1 Trainees' responses on the availability of physical infrastructure

Table 19: Trainees responses on availability of physical infrastructure

	SD	D	N	A	SA	Mean	Std Dev
There are adequate classrooms and workshops	26	166	61	25	0	2.31	.762
There are adequate tools and equipment	44	96	133	5	0	3.36	.764
There are adequate library facilities	25	82	146	25	0	3.62	.774
There are adequate ICT resources	3	32	151	28	0	3.61	.859
Average Score						3.23	

The data from table 19 shows that:-

On adequacy of Classrooms & Workshops: The mean score for trainees is 2.31 indicating a low perception. Std Dev of .762 shows some variability in responses.

On the adequacy of tools and equipment, the mean is 3.36 and Std Dev of .764. This shows that they was moderate perception. The Std Dev shows that there were some variability in responses.

On adequacy of library facilities: The mean score for trainees is 3.62 indicating a moderate perception. Std Dev of .774 shows some variability in responses.

On adequacy of ICT resources: The mean score for trainees is 3.61 indicating a moderate perception. Std Dev of .859 shows some variability in responses

Average Score: The average score across all statements for physical infrastructure is 3.23, indicating that on average trainees are slightly neutral to agreeing that their institutions have adequate physical infrastructure to support CBET curriculum.

4.6.2 Trainers' responses on the availability of physical infrastructure

Table 20: Trainers responses on availability of physical infrastructure

	SD	D	N	A	SA	Mean	Std Dev
There are adequate classrooms and workshops	11	51	52	33	3	2.77	.942
There are adequate tools and equipment	5	33	55	53	4	3.12	.897
There are adequate library facilities	4	35	64	36	11	3.10	.932
There are adequate ICT resources	12	41	53	32	12	2.94	1.063
Average Score						2.98	

The data from table 20 shows that:-

On adequacy of Classrooms & Workshops: The mean score for trainees is 2.77 indicating a moderate perception. Std Dev of .942 shows some variability in responses.

On the adequacy of tools and equipment, the mean is 3.12 indicating that there was moderate perception. The Std Dev of .897 shows that there were some variability in responses.

On adequacy of library facilities: The mean score for trainees is 3.10 indicating a moderate perception. Std Dev of .932 shows some variability in responses.

On adequacy of ICT resources: The mean score for trainees is 2.94 indicating a moderate perception. Std Dev of 1.063 shows high variability in responses.

Average Score: The average score across all statements for physical infrastructure is 2.98, indicating that on average trainers are slightly neutral to agreeing that their institutions have adequate physical infrastructure to support CBET curriculum.

4.6.3 Principals' responses on the availability of physical infrastructure

Table 21: Principals' responses on availability of physical infrastructure

	SD	D	N	A	SA	Mean	Std Dev
There are adequate classrooms and workshops	2	10	14	7	0	2.79	.857
There are adequate tools and equipment	9	11	13	33	2	3.12	.820
There are adequate library facilities	10	16	5	2	33	2.97	.847
There are adequate ICT resources	2	12	12	5	2	2.79	.992
Average Score						2.92	

The data from table 21 shows that:-

On adequacy of Classrooms & Workshops: The mean score for trainees is 2.79 indicating a moderate perception. Std Dev of .857 shows some variability in responses.

On the adequacy of tools and equipment, the mean is 3.12 indicating that there was moderate perception. The Std Dev of .820 shows that there were some variability in responses.

On adequacy of library facilities: The mean score for trainees is 2.97 indicating a moderate perception. Std Dev of .847 shows some variability in responses.

On adequacy of ICT resources: The mean score for trainees is 2.79 indicating a moderate perception. Std Dev of .992 shows some variability in responses.

Average Score: The average score across all statements for physical infrastructure is 2.92, indicating that on average principals are slightly neutral to agreeing that their institutions have adequate physical infrastructure to support CBET curriculum.

4.7 Existing instructional resources towards supporting CBET in mechanical engineering courses

The write up below is about the findings on the third objective of this study: To identify the existing instructional resources related to mechanical CBET courses in Kakamega, Nandi and Uasin Gishu counties, Kenya.

Trainee, trainers and principals were asked to rate their institutions based on the following statements related to the instructional resources: - there are adequate occupation standards (OS), teaching aids, learning guides and reference materials. From the statements, participants were to rate institutions instructional resources adequacy on a scale of 1 to 5, 1 being strongly disagree (SD), 2 disagree (D), 3 neutral (N), 4 agree (A) and 5 strongly agree (SA). The summary is as shown in tables below

4.7.1 Trainees' responses on instructional resources

Table 22: Trainees' responses on instructional resources

	SD	D	N	A	SA	Mean	Std Dev
There are adequate OS	10	120	148	0	0	2.53	.500
There are adequate teaching aids	129	59	83	7	0	2.88	.924
There are adequate CBET learning guides	35	166	77	0	0	3.15	.618
There are adequate reference materials	20	39	74	135	10	3.26	.863
Average Score						2.96	

The data from table 22 shows that:-

On adequacy of OS: The mean score for trainees is 2.53 indicating a moderate perception. Std Dev of .500 shows very low variability in responses.

On the adequacy of teaching aids, the mean is 2.88 indicating that there was moderate perception. The Std Dev of .924 shows that there were some variability in responses.

On adequacy of learning guides: The mean score for trainees is 3.15 indicating a moderate perception. Std Dev of .618 shows some variability in responses.

On adequacy of reference materials: The mean score for trainees is 3.56 indicating a moderate perception. Std Dev of .863 shows some variability in responses

Average Score: The average score across all statements for instructional resources is 2.96, indicating that on average trainees are neutral to slightly agreeing that their institutions have adequate instructional resources to support CBET curriculum

4.7.2 Trainers' responses on instructional resources

Table 23: Trainers' responses on Instructional Resources

	SD	D	N	A	SA	Mean	Std Dev
There are adequate OS	5	100	38	4	3	2.33	.682
There are adequate teaching aids	7	36	68	35	4	2.95	.877
There are adequate CBET learning guides	8	58	74	7	3	2.59	.752
There are adequate reference materials	5	22	49	65	9	3.34	.918
	Average Score					2.80	

The data from table 23 shows that:-

On adequacy of OS: The mean score for trainees is 2.33 indicating a low perception. Std Dev of .682 shows some variability in responses.

On the adequacy of teaching aids, the mean is 2.95 indicating that there was moderate perception. The Std Dev of .877 shows that there were some variability in responses.

On adequacy of learning guides: The mean score for trainees is 2.59 indicating a moderate perception. Std Dev of .752 shows some variability in responses.

On adequacy of reference materials: The mean score for trainees is 3.34 indicating a moderate perception. Std Dev of .918 shows some variability in responses

Average Score: The average score across all statements for instructional resources is 2.80, indicating that on average trainers are neutral to slightly agreeing that their institutions have adequate instructional resources to support CBET curriculum.

4.7.3 Principals' responses on Instructional Resources

Table 24: Principals' responses on Instructional Resources

	SD	D	N	A	SA	Mean	Std Dev
There are adequate OS	0	24	8	1	0	2.30	.529
There are adequate teaching aids	1	5	16	11	0	3.12	.781
There are adequate CBET learning guides	1	9	21	2	0	2.73	.626
There are adequate reference materials	0	6	13	14	0	3.24	.751
Average Score						2.85	

The data from table 24 shows that:-

On adequacy of OS: The mean score for trainees is 2.30 indicating a low perception. Std Dev of .529 shows some variability in responses.

On the adequacy of teaching aids, the mean is 3.12 indicating that there was moderate perception. The Std Dev of .781 shows that there were some variability in responses.

On adequacy of learning guides: The mean score for trainees is 2.73 indicating a moderate perception. Std Dev of .626 shows some variability in responses.

On adequacy of reference materials: The mean score for trainees is 3.24 indicating a moderate perception. Std Dev of .751 shows some variability in responses.

Average Score: The average score across all statements for instructional resources is 2.85, indicating that on average principals are neutral to slightly agreeing that their institutions have adequate instructional resources to support CBET curriculum.

These findings contradict the study by Wareru and Wambua (2019) which found inadequacy of instructional resources like syllabuses to be affecting the effective implementation for the CBC curriculum on the availability of teaching aids.

The instructional resources such as teaching aids, teaching guides, reference books are very key in training. Given that these resources are not sufficiently available in the TVET institutions, it becomes an inhibitor towards the implementation of mechanical CBET courses. These TVET institutions can therefore be said to inadequately prepare for the implementation of mechanical CBET courses.

The findings of the study in contradiction to the study conducted by Kizito et al (2019) which established that lack of relevant tools and facilities led to ineffective implementation of curriculum. The tools included: one, materials ICT tools, textbooks and audiovisual materials, two, lack of adequate time to teach. This study found that the adequacy of instructional materials were moderate.

4.8 Strength of partnerships and industrial collaborations to support CBET courses

The write up below is about the findings on the fourth objective which was to investigate the strength of industrial partnerships and collaborations in the implementation of mechanical CBET courses in TVET institutions in Kakamega, Nandi and Uasin Gishu counties, Kenya.

Industrial partnerships and collaboration was examined using the following items: The strength of industrial partnerships, easy of trainees getting attached, trainee motivation while on attachment, and contribution of partnership towards capacity building of trainers, and recall of trainee after graduating for jobs. The participants (trainees, ILOs, principals and employers) were asked to rate the statements on a scale of 1 to 5, 1 being strongly disagree (SD), 2 disagree (D), 3 neutral (N), 4 agree (A) and 5 strongly agree (SA).

The responses were as summarized in table 25, 26, 27 and 28 for trainees, ILOs, principals and employers.

4.8.1 Trainees' Responses on partnerships and industrial collaborations

4.8.1.1 How trainees sourced for attachment places

Trainees were asked to state how they obtained their places of attachment. They were to state whether it was through: their institutions, companies' sponsorships, trainees' self-application/sourcing.

The results were as summarized in table 25.

Table 25: Trainees' responses on how they obtained attachment places

Way of obtaining attachment	f	%
Through their institutions	85	30.6
Companys' sponsorships	30	10.8
Trainees' self-application/sourcing	163	58.6
Total	278	100

Majority of the trainees 163 (58.6%) obtained attachment places by their own means, and 85 (30.6%) through their institutions. 30 (10.8%) of the trainees said that they obtained through direct sponsorship by the companies. This implies that majority of trainees face challenges in obtaining attachment places.

The findings are in agreement with the findings from a study conducted by (Otunga et al, 2016) which found that the main way through which TVET institutions collaborated with industries was attachment placement opportunities. The industries offered places for attachment to trainees the trainees from TVET institutions.

4.8.1.2 Challenges faced by trainees during attachment

The trainees were asked to state challenges they've face while on industrial attachment.

The table 26 gives a summary of their responses.

Table 26: Trainees responses on the challenges faced during industrial attachments

Challenges	Number of responses	Percentage %	Total
Financial challenges	153	75	204
Harsh treatments	51	25	

This was an open ended question where trainees were asked to state the challenges they face or experience while on attachment. Out of the 204 responses, 153 (75%) pointed out financial challenges especially for expenses such as commuting and upkeep. A number of trainees 54 (25%) noted that they face harsh treatment by their supervisors. Quoting the response of one, said “some supervisors don’t even want us to touch things, they don’t

want us to know things especially in hard areas”. From the results it can be noted that trainees face challenges during their attachment.

4.8.1.3 Trainees responses on the strength of partnerships and collaborations between their institutions and industries.

The trainee were asked respond to the statements on the strength of partnerships and industrial collaborations. This statements were to be rated on a scale of 1 to 5, 1 being the lowest and 5 the highest. The statements were: easy with which trainees obtain attachment places. Trainees’ motivation levels while on attachment, the support of industries toward trainees skills acquisition, capability of recalling trainees after completion of studies/attachment.

Their responses are as summarized in the table 27:

Table 27: Trainees’ responses on their institutions’ strength of partnerships and industrial collaboration

Statements	SD	D	N	A	SA	Mean	Std Dev
It is easy to obtain attachment places	82	57	44	14	6	2.11	.629
Trainees are highly motivated while on attachment	47	63	57	21	15	2.48	.751
Trainees have been recalled after attachment	54	81	31	25	12	2.31	.616
Industries strongly support training for trainees	35	43	56	43	26	2.91	.651
Average Score						2.45	

The data shows that:-

On easy of obtaining attachment places: The mean score for trainees is 2.11 indicating low perception. Std Dev of .629 shows some variability in responses.

On trainees motivation while on attachment, the mean is 2.48 indicating that there was low perception. The Std Dev of .751 shows that there were some variability in responses.

On trainees recall after attachment: The mean score for trainees is 2.31 indicating low perception. Std Dev of .616 shows some variability in responses.

On industries training support: The mean score for trainees is 2.91 indicating a moderate perception. Std Dev of .651 shows some variability in responses

The average scores of 2.45 indicates that trainees agrees that there is low level of strength of partnerships and industrial collaborations among TVET institutions.

4.8.2 ILO responses on partnerships and collaborations

4.8.2.1 Responses on as to whether institutions have partnered with

The ILOs were asked to state whether their institutions have partnered with industries and their responses were as shown in table 28:-

Table 28 Responses of ILO on partnerships with industries.

	Yes		No	
	f	%	f	%
My institution has partnerships with industries	6	20	24	80

The results show that majority 24 (80%) of TVET institutions have not partnered with industries. Out of the 24 institutions, 22 ILOs noted that they've partnered with less than

3 companies and 2 noted that they've partnered with between 3 and 6 companies. This also indicates that there is low partnerships and collaboration between industries and TVET institutions.

4.8.2.2 ILO responses on the strengths of partnerships between TVET institutions and industries

The ILOs were asked to rate the strength of the partnerships between their institutions and industries on a scale of 1 to 5, 1 being the lowest and 5 the highest. The statements were: easy with which trainees obtain attachment places. Trainees' motivation levels while on attachment, the support of industries toward trainees skills acquisition and capacity building of trainers, capability of recalling trainees after completion of studies/attachment.

Their responses are as summarized in the table 28:

Table 29 Responses from the ILOs on strength of partnerships

	SD	D	N	A	SA	Mean	Std Dev
It is easy for trainees to obtain attachment	0	14	12	4	0	2.67	.711
Trainees are highly motivated while on attachment	0	4	20	6	0	3.07	.583
The company strongly support training for trainees and trainers capacity building	0	6	18	6	0	3.00	.643
Trainees have been recalled after attachment	0	8	14	8	0	3.00	.743
Average Score						2.94	

The data from table 29 shows that:-

On obtaining attachment places: The mean score for trainees is 2.67 indicating moderate perception. Std Dev of .711 shows some variability in responses.

On trainees motivation while on attachment, the mean is 3.07 indicating that there was moderate perception. The Std Dev of .583 shows that there were very low variability in responses.

On trainees recall after attachment: The mean score for trainees is 3.00 indicating moderate perception. Std Dev of .643 shows some variability in responses.

On industries training support: The mean score for trainees is 3.00 indicating moderate perception. Std Dev of .743 shows some variability in responses

The average scores of 2.94 this shows that average ILOs are neutral to agreeing that there are strong partnerships and industrial collaborations between their institutions and industries.

4.8.2.3 ILOs' responses on challenges faced on partnerships and collaborations

It was an open ended question where ILOs were to state challenges their institutions face with respect to partnerships and industrial collaborations. Their responses analyzed and the results summarized as shown in table 30 below.

Table 30: ILO responses on the challenges their institutions face with regard to partnerships with industries

Challenges	Number of responses	Percentage %	Total
There is a challenge in sourcing for industrial attachments	23	76.7	
Big number of trainees with few industries	17	56.7	30
Stiff competition with other TVET institutions	12	40.0	

The results from table 30 show that: majority 23 (76.7%) of ILO noted that it's difficult to source for places for their trainees. 17 (56.7%) of the ILOs noted that due to the big number of trainees and with few industries, it's a challenge when it comes on attachments. 12 (40%) stated that there is stiff competition from other TVET institutions. Some of the reasons given were like “some companies only prefers trainee from certain institutions” , “some have very few slots for attaches, so when you call them you find they are already full with attaches’ we also had some trainers noting that some employers/workers especially from informal sector demands payments for their services to attaches.

4.8.3 Employers’ responses on partnerships and collaborations

The views of employers of TVET graduates were gathered. These were views concerning the partnerships and collaborations with TVET institutions.

4.8.3.1 Employers' responses on whether they have partnerships or not.

Employers were asked to state whether they have partnerships with TVET institutions or not. Their responses were as shown in table 31.

Table 31: Employers' responses on whether they have partnerships with TVET institutions

Question	Yes		No		Total
	f	%	f	%	
Do you have partnerships with TVET institutions?	73	53	65	47	138

Out of the 138 responses, 73 (53%) said yes while 65 (47%) said no. the pie chart below shows this results.

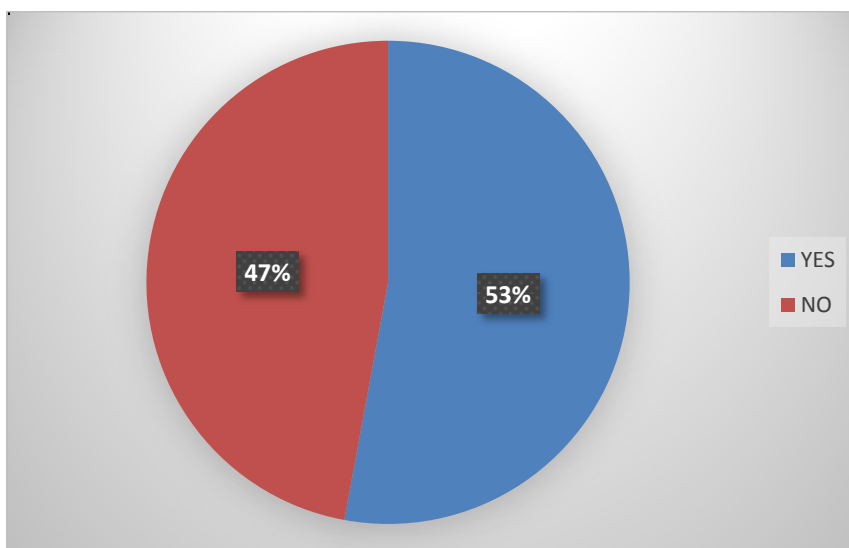


Figure 6: Employers' responses on partnerships with TVET institutions

This results in figure 6 show that the majority (53%) of industries have partnered with TVET institutions. We also have a number of industries (43%) which have not partnered

with TVET institutions. This results indicates that there is the partnerships with TVET institutions is still a challenge among industries.

4.8.3.2 Employers' responses on strength of partnerships with TVET institutions

They employers were asked to rate the statements which were testing the strength of partnerships that exists between them and TVET institutions. The statements were: It is easy for trainees to obtain attachment here; Trainees are highly motivated while on attachment; The Company strongly support training for trainees and trainers capacity building; Trainees have been recalled after attachment. The scale of 1 to 5 was used, where 1 was the lowest and 5 highest score. Their responses are as shown in table 32 below.

Table 32: Employers' responses on strength of industrial partnerships with TVET institutions

	SD	D	N	A	SA	Mean	Std Dev
It is easy for trainees to obtain attachment here	14	56	41	27	6	2.80	.718
Trainees are highly motivated while on attachment	15	82	28	13	3	2.28	.783
The company strongly support training for trainees and trainers capacity building	15	27	69	14	13	2.94	.800
Trainees have been recalled after attachment	10	82	28	14	4	2.41	.789
	Average Score					2.61	

The data from table 32 shows that:-

On easy of obtaining attachment places: The mean score for trainees is 2.80 indicating moderate perception. Std Dev of .718 shows some variability in responses.

On trainees motivation while on attachment, the mean is 2.28 indicating that there was low perception. The Std Dev of .783 shows that there were some variability in responses.

On trainees recall after attachment: The mean score for trainees is 2.94 indicating moderate perception. Std Dev of .800 shows some variability in responses.

On industries training support: The mean score for trainees is 2.41 indicating moderate perception. Std Dev of .789 shows some variability in responses

The average scores of 2.61 indicates that on average employers were neutral to agreeing that there exist strong partnerships and industrial collaborations among TVET institutions.

4.8.3.3 Challenges faced with regard to partnerships with TVET institutions

The employer were asked to state challenges they face with regard to partnerships and collaborations with TVET institutions. From their responses were as summarized in table 33.

Table 33: Employers' responses on the challenges faced by employers on partnerships with TVET institutions

Challenges	Number of responses	Percentage %	Total
TVET institutions don't have the necessary infrastructure to produce competent graduates	86	62	138
Lack of communication with TVET institution to easy planning	83	60	

Majority 86 (62%) of them noted that TVET institutions don't have the necessary infrastructure to produce graduates who comfortably fit in the job. Some stated that they employ people who are not fully 'backed' and therefore forcing them to retrain them for some time before they can full fit in. quoting one employer "I sympathize with some of the trainees in this institutions and worst in universities, they can't do anything out here". Majority of the employers were well aware of the need to change our way of training. They also recognized there role in training. Most of the employer 83 (60%) mentioned lack of connection with TVET institutions, they operate in isolation. A quote from one employer "like here we have never received a call or any formal communication from the institutions but we receive trainees who come seeking for attachment places on their own. I think we need to have a conversation".

The results are in concurrence with the findings from UNESCO, 2016 and Remington, 2018. The two studies revealed that there were challenges with regard to the partnerships between TVET found that the adoption of public private partnership was a challenge in TVET institutions. The successful examples of institutions with a vibrant partnership is rare due to the financial commitment that may be required.

It is with this findings that the study finds that the TVET institution have a weak partnerships and collaborations with industries. This component of industrial collaborations is very key to enhancing skills among trainees and trainers. This therefore implies that the institutions need to improve on partnerships so that to be able to implement the mechanical CBET courses.

4.9 Adequacy of financial resources to support training activities

The write up below is about the findings on the first objective of this study: To find out the adequacy of financial resources needed to support training activities in mechanical engineering CBET courses in Kakamega, Nandi and Uasin Gishu counties, Kenya.

Financial resources was looked at using the following aspects: level of enrolment of trainees in institutions, Funds by the Government through capitation, Helb/CDF/Bursaries, parents and guardians, donations and grants, income generating activities (PU). From the statements, participants were to rate on a scale of 1 to 5, 1 being strongly disagree (SD), 2 disagree (D), 3 neutral (N), 4 agree (A) and 5 strongly agree (SA).

4.9.1 Principals' responses on the level of trainees' enrolment

The principals were asked to state the level of trainees' enrolment in their institutions. They were to rate their enrolment based of: trainees below 100, between 100 and 250, between 250 and 500, between 500 and 1000 and finally above 1000 enrolment level. The result were as shown in table 34.

Table 34: Principals responses on the level of trainees' enrolment in institutions

	VTC		TVC		NP	
	f	%	f	%	f	%
Very low (below 100)	10	55.6	2	15.4	0	0.0
Low (100-250)	8	44.4	6	46.2	0	0.0
Medium (250-500)	0	0.0	3	23.1	0	0.0
High (500-1000)	0	0.0	2	15.4	0	0.0
Very high (above 1000)	0	0.0	0	0.0	2	100.0
Total	18	100	13	100	2	100

VTC: 55.6% of the principals said the enrolment level was very low and 44.4 said that it was low. This shows that the enrolment is generally very low in VTCs.

Among TVCs, principals' responses were that: 15.4% very low, 46.2% low, 23.1% medium, 15.4 high and none said mentioned high enrolment. This shows that the overall enrolment level in TVCs was low.

Among NPs, all the principals noted that the enrolment was very high. This shows that NPs have very high enrolment levels. At a very low level. 14.58% of trainees are enrolled at a low level. 0.00% of trainees are enrolled at a medium level. 10.42% of trainees are enrolled at a high level. 0.00% of trainees are enrolled at a very high level.

This information provides insights into the distribution of trainees' enrolment levels among different groups (VTC, TVC, and NP).

4.9.2 Principals responses on fee payment by the trainees

The principals' were asked to state the methods through which trainees pay their fees. They were to select from the four choices given: self-sponsorships, government capitation, HELB and bursaries, scholarships.

Their responses were summarized as shown in the table below.

Table 35 Responses from the principals on fee payment methods

	f	%
Self-sponsorships	6	18.2
Government capitation	23	69.7
Helb and bursaries	24	72.7
Scholarships	3	9.1

From table 35 above, results shows that government capitation and helb/bursaries are the most popular means through which trainees' fee is paid. Scholarships and self-sponsorships are the lowest at 9.1% and 18.2% respectively. This implies that the majority of trainees don't pay school fee by themselves, they rely on the money the institutions get through government capitation and helb loans and bursaries to settle their fee.

4.9.3 Principals responses on the effectiveness of institutions towards raising funds

The study was to establish ways through which TVET institutions raise their funds. The principals were asked respond to statements on the effectiveness of raising funds. The statements were: Funds receive from government capitation; Funds received from Helb and Bursaries; Moneys from fee payments through self-sponsorship; Funds from

donations/grants; Moneys from income generating activities (PU). They were to rate the statements on a scale of 1 to 5, 1 being lowest and 5 the highest.

The results were as shown in the table below.

Table 36 Responses from the principals on the sources of funds

	SD	D	N	A	SA	Mean	Std Dev
Funds receive from government capitation	8	10	8	3	4	2.55	.674
Funds received from Helb and Bursaries	6	2	9	6	10	3.46	.781
Moneys from fee payments through self-sponsorship	18	7	6	2	0	1.76	.756
Funds from donations/grants	12	9	5	3	4	2.33	.625
Moneys from income generating activities (PU)	15	10	5	1	2	1.94	.536
Average Score						2.41	

The data from table 36 shows that:-

On funds received through government capitation: The mean score for trainees is 2.55 indicating low level of effectiveness. Std Dev of .674 shows some variability in responses.

On funds as received from Helb and bursaries, the mean is 3.46 indicating that there was high level of effectiveness. The Std Dev of .781 shows that there were some variability in responses.

On funds received through self-sponsorship: The mean score for trainees is 1.76 indicating very low effectiveness. Std Dev of .756 shows some variability in responses.

On funds as received from donations: The mean score for trainees is 2.33 indicating low effectiveness. Std Dev of .625 shows some variability in responses

On funds as received from income generating activities: The mean score for trainees is 1.94 indicating low effectiveness. Std Dev of .536 shows very small variability in responses.

The average scores of 2.41 indicates low perception on the effectiveness means thorough which funds are obtained by the TVET institutions. This indicates that these institution don't have a reliable and effective ways of sourcing for funds to support training. The financial situations in these institutions cannot be predicted.

4.9.4 Challenges institutions face towards raising funds

On establishing the challenges TVET institutions face towards raising funds to support the training activities. The principal asked to give their views. Their response were as summarized in the table below.

Table 37: Principals' responses on their challenges in raising funds

Challenges	Number of responses	Percentage %	Total
Delays in disbursement of funds by the government	30	91	
Parents don't pay fee trainees, depend on Helb loans and bursaries	23	70	33

From table 37, the results shows that the majority 30 (91%) of the principals stated that their main source of funding is the government through capitation, which usually delays. This delay makes it difficult to fund training activities and pay salaries. 23 (70%) of the principals said that the funds from capitation is not adequate due to low enrolment levels. Majority of them also stated that parents and trainees come to school knowing that it is free, the government pays everything. Quoting one principal “I meet parents who believe that education is free, the government pays everything”.

4.10 Summary

In this chapter, data was analyzed, presented and interpreted. The response rate from the completed questionnaire was calculated and found to 75 percent. The reliability of scores from the questionnaires was calculated and found to be 0.75. The data was presented in tables and bar graphs. Normality and tests for outliers were used to model the data. Descriptive statistics was used, which were: frequencies, percentages and means. The findings on the variables under study were as follows: - Majority (80%) of trainers have teaching experience above four years. This percentage is higher in NP and VTC compered to TVCs. Majority of trainers have bachelor’s degree in NP and TVCs while in VTCs the majority have diploma certificate as their highest educational qualification. Majority (67%) of trainers have undergone CBA training. Trainers are competent in their area of specialization. Overall the trainers are moderately adequate. Moderate adequacy of classes and workshops, tools and equipment, library facilities and ICT resources. Moderate adequacy of teaching aids, occupational standards, learning guides and reference materials. There exists weak strength of partnerships between TVET

institutions and industries. Low levels of financial capabilities of institutions to support CBET implementation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter focuses on: summary of the finding, conclusions and recommendations. The findings were summarized based on the five specific research objectives. These objectives were basis of the study which was to assess the preparedness of TVET institution for the implementing of CBET in mechanical engineering courses. From the findings, conclusions and recommendations were made to the relevant stakeholders and researchers.

5.2 Summary of the findings

The study revealed the following findings: the findings are summarized as per the specific research objectives.

5.2.1 Trainers' adequacy for the implementation of CBET in Mechanical courses in TVET institutions

The overall assessment of trainers' adequacy reveals a moderate level of competency in providing practical lessons and effectiveness in training. This indicates that trainers possess a satisfactory level of skills and knowledge in their respective areas of mechanical engineering. Trainers satisfactory employ the appropriate teaching approaches (trainee centered), and are satisfactorily motivated to teach. It also shows that there is room for improvement. TVET institutions have a challenge of staffing of trainers.

5.2.2 State of physical infrastructure for the implementation of CBET in Mechanical courses in TVET institutions

The findings indicate a moderate level of adequacy in various aspects related to the physical infrastructure. Specifically, the mean scores for availability of classes, workshops, tools and equipment, library facilities, and ICT resources are 2.31, 3.36, 3.62, and 3.61, respectively out of 5. In terms of classes and workshops, the mean score of 2.31 suggests that there is room for improvement in terms of providing adequate physical infrastructure. The infrastructure that will enable the implementation of mechanical CBET course in TVET institutions. While the facilities may be deemed adequate to some extent, there might be limitations on areas that require attention to learning experience. This could include considerations such as classroom size, layout, availability of necessary equipment, and the overall suitability of the physical infrastructure for practical training. Regarding tools and equipment, the mean score of 3.36 indicates a moderate level of adequacy. This suggests that while there are sufficient tools and equipment available, there may be scope for improvement to meet the specific requirements of the training programs. Regular maintenance, updates, and ensuring the availability of necessary tools and equipment for hands-on training can further enhance the learning experience for trainees. The mean score of 3.62 for library facilities indicates a moderate level of adequacy. This suggested that there were resources available for trainees to access, although there may be opportunities for expanding the collection, ensuring the availability of relevant materials, and creating a conducive learning environment within the library. The mean score of 3.61 for ICT resources indicates a moderate level of adequacy of ICT resources. This suggests that there are ICT resources available, such as

computers and internet access, but there may be areas for improvement in terms of their availability, functionality, and integration into the training programs to support effective teaching and learning. These findings points out that the state of physical infrastructure is not very sufficient to support the implementation of mechanical CBET courses.

5.2.3 Existing instructional resources related to CBET in mechanical courses

The findings reveal that the instructional resources are moderately available in TVET institutions. Specifically, the mean scores for teaching aids, occupational standards, learning guides, and reference materials are 2.88, 2.53, 3.15, and 3.34, respectively. The mean score of 2.88 for teaching aids suggests a moderate level of availability to support the implementation of mechanical CBET courses. This indicates that while there are some teaching aids available, there is room for improvement in terms of their variety, quality, and accessibility. Providing a diverse range of teaching aids, including multimedia resources, visual aids, and interactive tools, can enhance the effectiveness of instructional delivery and cater to different learning styles. Regarding occupational standards, the mean score of 2.53 indicates a moderate level of adequacy. This suggests that there is some degree of alignment between the training provided and the occupational standards set for the respective industries. However, there may be areas where further emphasis on meeting and exceeding these standards can be beneficial. Regular updates and alignment of the curriculum with the latest industry practices and standards can ensure that trainees are adequately prepared for the workforce. The mean score of 3.15 for learning guides suggests a moderate level of adequacy. This indicates that there are resources available to guide trainees in their learning process. However,

there may be opportunities to further improve the comprehensiveness, clarity, and accessibility of learning guides. Developing well-structured and comprehensive learning materials that provide step-by-step instructions, examples, and exercises can support trainees in their skill development journey. Regarding reference materials, the mean score of 3.26 indicates a moderate level of adequacy. This suggests that there are resources available for trainees to access additional information and deepen their understanding of the subjects. However, there may be scope for expanding the range of reference materials and ensuring their relevance and currency. Regular updates to the reference materials and establishing partnerships with industry experts, organizations, and academic institutions can contribute to a more comprehensive and up-to-date collection.

5.2.4 The strength of partnerships and industrial collaborations of TVET

institutions with industries in the implementation of CBET in mechanical courses

The findings indicated that there were weak strength of partnerships and industrial collaboration among TVET institutions in the three counties of Kakamega, Nandi and Uasin Gishu. This suggests that there is limited collaboration and engagement between the two entities in supporting and promoting TVET programs and initiatives. A strong partnership between TVET institutions and industries is crucial for several reasons. First, it helps ensure the relevance and alignment of the training programs with the needs and requirements of the industry. By actively involving industry representatives in curriculum development, program design, and regular feedback processes, TVET institutions can stay updated on the latest industry trends, technologies, and skill requirements. This, in turn, enhances the employability of graduates and increases their chances of successful

integration into the workforce. Second, strong partnerships facilitate practical training opportunities for students. Industries can provide work-based learning experiences, internships, apprenticeships, and on-the-job training, allowing students to apply their theoretical knowledge in real-world settings. These practical experiences enable students to develop industry-specific skills, gain exposure to workplace dynamics, and enhance their overall employability. Additionally, partnerships with industries can lead to collaboration on research and development projects, innovation initiatives, and joint ventures. This fosters knowledge exchange, promotes innovation, and strengthens the competitiveness of both TVET institutions and industries in the evolving economic landscape.

5.2.5 Adequacy of financial resources to support the implementation of CBET in mechanical engineering courses

The findings reveal that TVET institutions have poor financial capabilities to support the implementation of CBET in mechanical engineering courses. These institutions have insufficient financial resources to effectively carry out the training activities and provide the required infrastructure and support for mechanical CBET programs. Insufficient financial capabilities can pose significant challenges to the implementation of CBET courses. Adequate funding is essential to ensure the availability of quality learning environments, updated teaching materials and resources, modern equipment and technology, and ongoing professional development for instructors. Without proper financial support, institutions may struggle to meet these requirements, compromising the overall effectiveness and quality of CBET programs. The financial capabilities of

institutions are closely linked to their ability to provide adequate classroom and workshop facilities, tools and equipment, library resources, and ICT infrastructure. These resources are essential for delivering practical training, supporting research and learning activities, and facilitating access to relevant information and technology. When institutions lack the necessary financial means, these resources may be outdated, limited in quantity, or insufficient to meet the needs of CBET learners. The consequences of poor financial capabilities include: it may impede the institutions' capacity to attract and retain qualified trainers who can deliver high-quality mechanical CBET instruction. Insufficient funding may result in low salaries, limited professional development opportunities, and inadequate support for instructional materials, which can negatively impact the motivation and retention of skilled instructors. Secondly, the lack of financial capabilities can limit the institutions' ability to invest in infrastructure development and maintenance. Outdated or inadequate facilities can hinder the delivery of practical training, limit hands-on learning opportunities, and create safety concerns for learners in the mechanical courses. Insufficient resources for library facilities and ICT infrastructure can restrict access to information, research materials, and online learning platforms, hindering learners' ability to acquire up-to-date knowledge and skills.

5.3 Conclusions

Based on the evidence presented, the research has shown that there are issues of concern, issues that need to be addresses for effective implementation of CBET curriculum. TVET institutions from the selected counties are not adequately prepared to implement mechanical engineering CBET courses. From the examined factors such as: adequacy of trainers, physical infrastructure, instructional resources, partnerships and industrial

collaborations. It was evident that TVET institutions have weak partnerships and industrial collaborations. The financial resources are also not adequate. The study therefore concludes that TVET institutions are not sufficiently prepared to implement mechanical engineering CBET courses. This calls for stakeholders to put more efforts towards: funding, equipping, staffing and providing more resources to the TVET institutions for effective implementation of the curriculum.

5.4 Recommendations

- i. The ministry of education through the boards of governors and councils should support Continuous Professional Development programs: Offering regular training and development programs for trainers to enhance their subject matter expertise, teaching methodologies, and instructional techniques. This can help trainers stay abreast of the latest advancements in their fields and adopt more learner-centered approaches.
- ii. TVET institutions should be supported by the stakeholders in mentorship and collaboration: Facilitating mentorship programs where experienced trainers can guide and support newer trainers. Encouraging collaboration and knowledge-sharing among trainers can foster a culture of continuous learning and improvement.
- iii. TVET institutions should be adequately funded to support the activities related to CBET in mechanical engineering courses.
- iv. There should be proactive efforts by all stakeholders to establish and nurture relationships with industry stakeholders. This can involve organizing regular

industry engagement events, forums, and workshops to facilitate dialogue, identify common goals, and explore opportunities for collaboration.

- v. TVET institutions to explore cost-sharing models, such as public-private partnerships, where industry partners contribute resources, expertise, or financial support in exchange for access to skilled graduates or customized training programs. This can help alleviate some of the financial burden on TVET institutions while fostering closer ties with the industry.

5.5 Areas for further research

In this study, weak partnerships and industrial collaboration and weak financial capabilities were the main challenges affecting the effective implementation of mechanical CBET courses. However, the study recommends further investigation into ways through which TVET institutions can be sustainable in terms of finances and partnerships and industrial collaboration.

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APPENDICES

Appendix I: Approved occupational standards and curricula (Mechanical Eng.)

Source: TVETCDACC, 2019

S/NO	COURSE TITLE	KNQF LEVEL
1.	Oil Pipeline Mechanical Maintenance	5
2.	Welding	4
3.	Mechanical Technology and Maintenance	4
4.	Mechanical Technology and Maintenance	5
5.	Mechanical Technology and Maintenance	6
6.	Mechanical Heavy and Light Machinery Operation	4
7.	Mechanical Heavy and Light Machinery Operation	5
8.	Motorcycle Mechanics	3
9.	Automotive Engineering	6
10.	Mechanical Engineering	3
11.	Automotive Technician	6
12.	Mechatronic Technology	6
13.	Mechatronic Technician	5
14.	Refrigeration and Air Conditioning	5
15.	Welding and Fabrication	6
16.	Lathe Machine Operations	4
17.	Manual Metal Arc Welding	4
18.	Simple Automation Control Inspection	4

Appendix II: Approved CBET programs (Mechanical Eng.)

Source: TVETA 2020

NO	CURRICULUM	KNQF LEVEL
1	Automotive engineering	5
2	Automotive technician	6
3	Construction Plant	6
4	Mechanical plant engineering	6
5	Mechanical production Technician	6
6	mechatronics	5 & 6
7	Refrigeration and air conditioning	5
8	Welding and fabrication	6

Appendix IV: Questionnaire: - For Heads of Institutions

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH DATA

I am a post graduate student from the University of Eldoret pursuing Masters of Education degree in Technology Education (Mechanical and Automotive Technology). I am carrying out a research on the Preparedness of Technical Vocational Education and Training and (TVET) institutions for the implementation of Competency Based Education and Training (CBET) program in Kenya. *CBET is a training strategy that focuses on what the learner should be able to do by the end of his /her course.* The data collected from you or given by you will be treated with utmost confidentiality and will only be used for the academic purposes. To enable me conduct this research effectively and successfully, I humbly request you to complete the attached questionnaire form.

Thank you in advance.

Yours Faithfully,



VITALIS O. AYIEKO

REG NO: SEDU/TED/M/002/18

Part A: Background Information

Please specify your answer by putting a (√) on the answer that suits you.

1. Gender? Male () Female ()
2. Your level of education?
Artisan () Craft () Diploma () Bachelor () Masters () PHD ()
3. The status of your institution?
National Polytechnic () TTI/TVC () VTC/County/Youth Polytechnic ()
4. How long have you been working as the head of this institution?
1-3 years () 4 – 5 years () 6 years and above ()

Part B: Trainers' adequacy towards the preparedness for CBET implementation

5. Has your trainers been trained on CBA by TVET CDACC? Yes () No ()
6. How would you rate trainers in your institution based on the given statements. On a scale of 1-5(1 lowest and 5 highest). 1 is Strongly Disagree (SD), 2 is Disagree (D), 3 is Neutral (N), 4 is Agree (A) and 5 is Strongly Agree (SA).

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has very competent trainers					
Institution has adequate number of trainers					
Trainers employ trainee centered approaches in training					
Trainers are highly motivated to provide training					
Trainers have been effectively trained on CBET					
Trainers are well prepared to tackle CBET courses					

Part C: Institutional physical infrastructure to support CBET implementation

7. What is the students' enrollment in the institution?
Below 100 () 100 – 250 () 250 – 500 () 500 – 1000 () Above 1000 ()
8. How would you rate your institutions preparedness for CBET in terms of the following? Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has high level of enrolment					
Institution has adequate classroom and workshops					
Tools and equipment are adequate					
Institution is equipped with library facility					
Adequate ICT resources					

9. Does your institution have the necessary resources to make CBET programs?

Yes () No ()

10. What challenges does your institution face related to physical infrastructure?

.....

.....

.....

Part D: Existing instructional recourse for CBET courses

11. Indicate the adequacy of the following instructional resources in your institution.

Rate them, Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2

Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
There is adequate Occupation Standards (OS) for CBET courses					
There are sufficient Teaching aids for CBET courses					
There are adequate learning guides for CBET courses					
There are adequate reference materials					

PART E: Strength of partnerships and industrial collaborations for CBET implementation

This study is interested in your views based on your records with regard to the industrial attachments and linkages between your institution and private sector partners (industry).

12. Has your institution partnered with the industries with regard to attachments and training?

Yes () No ()

13. If your answer is Yes in 12 above

- i. In respect to engineering departments, how is the status of collaborations with various industries in the categories listed. On a scale of 1-5, 5 being highest and 1 lowest

Categories of Industries	5	4	3	2	1
Manufacturing					
Jua Kali					
Service					
Agriculture					
Others					

- ii. How many industries have you partnered with?

Less than 3 () Between 3 – 6 () More than 6 ()

14. How would you rate your institution industrial partnerships/attachments using the given statements? Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
It is easy for trainees to get attachments in various firms					
Trainees are highly motivated during attachment					
Industries strongly support capacity building for trainers					
Trainees have been recalled or absorbed back to work after attachments					

15. How would you assess the strength of these linkages? Tick (√). On a scale of 1 -5, where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (5)	D (4)	N (3)	A (2)	SA (1)
The institution has a strong industrial linkages					
The attachments are strongly supported by industries					

iii. What challenges have you faced as the head with regard to partnerships and collaborations with industries?

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.....

.....

Part E: Financial resources to support CBET implementation

16. What is the most popular methods of fee payment?

- Self-sponsorship ()
- Government capitation ()
- HELB and bursaries ()
- Scholarships ()
- Others specify ().....

17. From your experience, how would you rate the effectiveness through which your institution raise funds using the below statements? Rate on a scale of 1-5(lowest and highest), 1 is Strongly Disagree(SD), 2 is Disagree (D), 3 is Neutral (N), 4 is Agree (A) and 5 is Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Government capitation is very effective means					
Funds from HELB and bursaries is very effective					
Funds from scholarships/donations and grants is most effective					
Funds from parents/self/guardians is very effective					
Through income generation activities (PU)					

18. What challenges or difficulties do you experience towards raising funds to run the institution?

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.....

.....

--The End--

Thank you for participating in the study

Appendix V: Questionnaire: - For Trainers/Instructors & ILOs**Letter of introduction****9TH July 2021**

Dear Trainer/Instructor/ILO,

RE: REQUEST FOR RESEARCH DATA

I am a post graduate student from the University of Eldoret pursuing Masters of Education degree in Technology Education (Mechanical and Automotive Technology). I am carrying out a research on the Preparedness of Technical Vocational Education and Training (TVET) institutions for the implementation of Competency Based Education and Training (CBET) curriculum in mechanical and automotive engineering courses in Kenya. *CBET is a training strategy that focuses on what the learner should be able to do by the end of his /her course.* The data collected from you or given by you will be treated with utmost confidentiality and will only be used for the academic purposes. To enable me conduct this research effectively and successfully, I humbly request you to complete the attached questionnaire form.

Thank you in advance.

Yours Faithfully,



VITALIS O. AYIEKO

REG NO: SEDU/TED/M/002/18

Section one: To be completed by Trainers and ILOs

Part A: Background Information

Please specify your answer by putting a (√) on the answers provided.

1. Gender? Male () Female ()
2. Your level of education?
Artisan () Craft () Diploma () Bachelor () Masters () PHD ()
3. The status of your institution?
National Polytechnic () TTI/TVC () VTC/County/Youth Polytechnic ()
4. How long have you been working as the head of institution?
1-3 years () 4 – 5 years () 6 years and above ()

Part B: Trainers' adequacy towards the preparedness for CBET implementation

5. Have you been trained on CBA (Competency Based Assessment)? Yes () No ()
6. Apart from teaching have you worked in private sector (industry)? Yes () No ()
7. If YES in (7) above, state the period of time you worked or practiced in the industry.
0- 1 months () 2 – 3 months () 4 – 5 months () More than 6 months ()
8. How would you rate trainers in your institution based on the given statements. On a scale of 1-5(1 lowest and 5 highest). 1 is Strongly Disagree (SD), 2 is Disagree (D), 3 is Neutral (N), 4 is Agree (A) and 5 is Strongly Agree (SA).

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has very competent trainers					
Institution has adequate number of trainers					
Trainers employ trainee centered approaches in training					
Trainers are highly motivated to provide training					
Trainers have been effectively trained on CBA					
Trainers are well prepared to tackle CBET courses					

Part C: Institutional physical infrastructure to support CBET implementation

9. What is the students' enrollment in your department?

Below 100 () 100 – 250 () 250 – 500 () 450 – 1000 () Above 1000 ()

10. How would you rate your institutions preparedness for CBET in terms of the following? Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has high level of enrolment					
Institution has adequate classroom and workshops					
Tools and equipment are adequate					
Institution is equipped with library facility					
Adequate ICT resources					

11. Does your institution have the necessary resources to make CBET programs?

Yes () No ()

Part D: Existing instructional recourse for CBET courses

12. Indicate the adequacy of the following instructional resources in your institution.

Rate them, Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
There is adequate Occupation Standards (OS) for CBET courses					
There are sufficient Teaching aids for CBET courses					
There are adequate learning guides for CBET courses					
There are adequate reference materials					

13. Has your institution started CBET courses in your department?

Yes () No ()

14. If your answer Yes in 15 (above), how will you rate your learners adaptability to CBET courses

Very Good () Good () Somehow Good () Poor () Very Poor ()

PART E: Strengths of partnerships and industrial collaborations for CBET implementation (for ILOs)

This study is interested in your views based on your records with regard to the industrial attachments and linkages between your institution and private sector partners (industry).

15. Has your institution partnered with the industries with regard to attachments and training?

Yes () No ()

16. If your answer is Yes in 24 above

i. How many companies have you partnered with?

Less than 3 () Between 3 – 6 () More than 6 ()

ii. What challenges have you faced as the champion for industrial collaborations?

.....
.....

17. How would you rate your institution industrial partnerships/attachments using the given statements? Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
It is easy for trainees to get attachments in various firms					
Trainees are highly motivated during attachment					
Industries strongly support capacity building for trainers and training of trainees					
Trainees have been recalled or absorbed back to work after attachments					

-The End-

Thank you for participating in the study

Appendix VI: Questionnaire - For Trainees**Letter of introduction**

Dear Trainee/Student,

9TH July 2021

RE: REQUEST FOR RESEARCH DATA

I am a post graduate student from the University of Eldoret pursuing Masters of Education degree in Technology Education (Mechanical and Automotive Technology). I am carrying out a research on the Preparedness of Technical Vocational Education and Training (TVET) institutions for the implementation of Competency Based Education and Training (CBET) curriculum in mechanical and automotive engineering courses in Kenya. *CBET is a training strategy that focuses on what the learner should be able to do by the end of his /her course.* The data collected from you or given by you will be treated with utmost confidentiality and will only be used for the academic purposes. To enable me conduct this research effectively and successfully, I humbly request you to complete the attached questionnaire form.

Thank you in advance.

Yours Faithfully,



VITALIS O. AYIEKO

REG NO: SEDU/TED/M/002/18

Part A: Background Information

Please specify your answer by putting a (√) on the answers provided.

1. Your gender? Male () Female ()
2. The status of your institution?
National Polytechnic () TTI/TVC () VTC/County/Youth Polytechnic ()
3. Your area of study?
Production () Automotive () Welding & Fab () Plant () Agriculture ()
4. Your course level?
Trade Test () Artisan () Craft () Diploma ()

Part B: Trainers' adequacy towards the preparedness for CBET implementation

Please specify your answer by putting a (√) where appropriate.

5. How would you rate trainers in your institution based on the given statements. On a scale of 1-5(1 lowest and 5 highest). 1 is Strongly Disagree (SD), 2 is Disagree (D), 3 is Neutral (N), 4 is Agree (A) and 5 is Strongly Agree (SA).

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has very competent trainers					
Institution has adequate number of trainers					
Trainers employ trainee centered approaches in training/teaching					
Trainers are highly motivated to provide training					

6. How frequent does your trainers attend practical lessons in workshops/Laboratory?
Very frequent () Frequent () Fairly frequent () Rarely () Not at all ()

Part C: State of physical infrastructure to support CBET implementation

7. How would you rate your institutions preparedness for CBET in terms of the following? Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Institution has adequate classroom and workshops					
Tools and equipment are adequate					
Institution is equipped with library facility					
Adequate ICT resources					

Part D: Existing instructional recourse for CBET courses

8. Indicate the adequacy of the following instructional resources in your institution. Rate them, Tick (√). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
There is adequate Occupation Standards (OS) for CBET courses					
There are sufficient Teaching aids for CBET courses					
There are adequate learning guides for CBET courses					
There are adequate reference materials					

Part E: Strength of partnerships and Industrial collaborations (for those already gone for attachment)

9. How did you obtain a place for your attachment?

Through the college ()

Through company's sponsorships ()

Self-application application/sourcing ()

Others specify ()

.....

10. What challenge(s) did you experience while on attachment?

.....

11. As a trainee how would you rate the following statements related to partnerships and industrial collaborations? Tick (✓). On a scale of 1 -5 , where 1 is Strongly Disagree (SD), 2 Disagree (D), 3 Neutral (N), 4 is Agree (A) and 5 Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
It is easy for trainees to get attachments in various firms					
Trainees are highly motivated during attachment					
Industries strongly support capacity building for trainers					
Trainees have been recalled or absorbed back to work after attachments					

Part F: Financial resources to support CBET implementation

12. How do you pay your fee?

Self-sponsor/Parents/Guardian ()

HELB and Bursaries ()

Scholarships ()

Others specify ()

.....

13. From your experience, how would you rate the effectiveness through which your raise fee using the below statements? Rate on a scale of 1-5(lowest and highest), 1 is Strongly Disagree(SD), 2 is Disagree (D), 3 is Neutral (N), 4 is Agree (A) and 5 is Strongly Agree (SA)

	SD (1)	D (2)	N (3)	A (4)	SA (5)
Government capitation is very effective means					
Funds from HELB/Bursaries/CDF is very effective					
Funds from scholarships/donations and grants is most effective					
Funds from parents/self/guardians is very effective					

14. What challenges or difficulties do you experience towards paying your school fess?

.....

.....

The End

Thank you for participating in the study

Appendix VII: Questionnaire - For Employers of TVET graduates

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH DATA

I am a post graduate student from the University of Eldoret pursuing Masters of Education degree in Technology Education (Mechanical and Automotive Technology). I am carrying out a research on the Preparedness of Technical Vocational Education and Training and (TVET) institutions for the implementation of Competency Based Education and Training (CBET) program in Kenya. *CBET is a training strategy that focuses on what the learner should be able to do by the end of his /her course.* The data collected from you or given by you will be treated with utmost confidentiality and will only be used for the academic purposes. To enable me conduct this research effectively and successfully, I humbly request you to complete the attached questionnaire form.

Thank you in advance.

Yours Faithfully,



VITALIS O. AYIEKO

REG NO: SEDU/TED/M/002/18

Part A: Background Information

Please specify your answer by putting a (√) on the answer that suits you.

Please specify your answer by putting a (√) where appropriate

1. Gender? Male () Female ()
2. The sector of the company?
 Manufacturing () Processing () Agriculture () Jua Kali () Service ()
 Others specify ()
3. Your level of education?
 Artisan () craft () Diploma () Bachelor () Masters () PhD ()
4. How long has the company been in operation since its establishment?
 Less than a year () 1 – 3 years () More than 3 years ()
5. Your role in the company?
 Owner () Manager () Supervisor () Technician () Others ()

6. How long have you been working to you have in the company?
 Less than 3 Years () 4 – 5 Years () More than 6 Years ()

PART B: Partnership and industrial collaborations

This study is interested in your views based on your records with regard to the industrial attachments and linkages between your company and TVET institutions (industry).

7. Does your company have partnerships with TVET institutions?
 Yes () No ()
8. If YES in 7 above, how many TVET institutions have you partnered with?
 Less than 10 () 11 to 20 () above 20 ()
9. Rate your company's status on industrial linkages on the following statements. On a scale of 1 -5, where 1 is Strongly Disagree, 2 Disagree, 3 Neutral, 4 Agree and 5 strongly Agree. Tick (√).

	5	4	3	2	1
It is easy for the trainees to get attachments places here					
Trainees are well motivated while on attachment here					
The company highly supports trainers' capacity building and training of trainees					
The company always recalls trainees for jobs					

10. What challenges have you faced as the employer with regard to collaborations with TVET institutions?

.....

.....

--The End--

Thank you for participating in the study

Appendix VIII: Introductory Letter to NACOSTI



P O Box 1125-30100,
ELDORET, Kenya
Tel: 0774 249552
Fax No. +254-(0)53-206311 Ext 2232

Our Ref: UOE/B/TED/PGR/065

DATE: 11th May, 2021

The Executive Secretary,
National Council for Science Technology & Innovation
P.O.BOX 30623-00100,
NAIROBI.

Dear Sir/Madam,

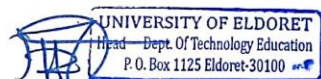
SUBJECT: RESEARCH PERMIT FOR ONYANGO VITALIS AYIEKO -
SEDU/TED/M/002/18

This is to confirm that the above named student is pursuing Master of Education in
Technology Education: Mechanical Technology Option.

He is currently preparing for his field research work on thesis entitled: *"Preparedness of TVET Institutions in the Implementation of Competency Based Education and Training Curriculum in Mechanical and Automotive Engineering Courses in Kenya - A case of Kakamega, Nandi and Uasin Gishu Counties"*. He has successfully presented the proposal and has been approved by the university.

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

Yours faithfully,





DR. HOSEAH KIPLAGAT
HOD, TECHNOLOGY EDUCATION

Copy to: Dean, School of Education




Appendix IX: Research License


REPUBLIC OF KENYA
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 589793 **Date of Issue: 26/04/2021**

RESEARCH LICENSE



This is to Certify that Mr. VITALIS AYTEKO ONYANGO of University of Eldoret, has been licensed to conduct research in ...
Kakamega, Nandi, Uasin Gishu on the topic: PREPAREDNESS OF IVET INSTITUTIONS IN THE IMPLEMENTATION OF
COMPETENCY BASED EDUCATION AND TRAINING CURRICULUM IN MECHANICAL AND AUTOMOTIVE
ENGINEERING COURSES IN KENYA -A CASE OF KAKAMEGA, NANDI AND UASIN GISHU COUNTIES for the period
starting: 26/04/2021

License No: NACOSTI/PDR/18918
Applicant Identification Number: 589793
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 applications.

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The Licensee any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies
5. The License does not give authority to transfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one year of completion of research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
 off Waiyaki Way, Upper Kabete,
 P. O. Box 30623, 00100 Nairobi, KENYA
 Land line: 020 4007000, 020 2341349, 020 3310571, 020 8001077
 Mobile: 0713 782 377, 0713 404 245
 E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
 Website: www.nacosti.go.ke


Appendix X: Research Authorizations

THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Tel: 053 5252621, 5252003, Kapsabet
 Fax No. 053 – 5252503
 E-mail:
 nandicountycommissioner@gmail.com
 When replying, please quote

County Commissioner's Office,
 Nandi County
 P.O. Box 30,
 KAPSABET.

Ref: No. NC.EDU/4/3/VOL.1/(68)



9th June, 2021

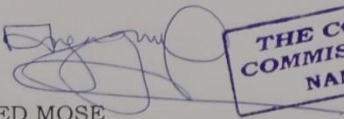
Vitalis Ayieko Onyango
 University of Eldoret,
 P.O. Box 1125 - 30100
ELDORET.

RE: RESEARCH AUTHORIZATION

This is in reference to Research License No. NACOSTI/P/21/10919 dated 26th May, 2021 from the Director General, National Commission for Science, Technology and Innovation on the above subject matter.

You are hereby authorized to conduct a research on **“Preparedness of TVET Institutions in the Implementation of Competency Based Education and Training Curriculum in Mechanical and Automotive Engineering Courses in Kenya – a case study of Nandi”** for the period ending **26th May, 2022.**

Wishing you all the best.


**THE COUNTY COMMISSIONER
 NANDI.**

OBED MOSE
 For: COUNTY COMMISSIONER,
NANDI.

REPUBLIC OF KENYA



THE PRESIDENCY
MINISTRY OF INTERIOR AND CO-ORDINATION OF NATIONAL
GOVERNMENT

Telephone: 056 -31131

Email: cckakamega12@yahoo.com

When replying please quote:

Ref: ED 12/1/VOL.V/151

County Commissioner
Kakamega County
P O BOX 43 - 50100
KAKAMEGA

Date: 4th June, 2021

Mr. Vitalis Ayieko Onyango

P.O Box 2227 – 50100

KAKAMEGA

RE: RESEARCH AUTHORIZATION

Following your authorization vide letter **Ref: No. NACOSTI/P/21/10919** dated 26th May, 2021 by NACOSTI to undertake research on “*Preparedness of TVET Institutions in the Implementation of Competency Based Education and Training Curriculum in Mechanical and Automotive Engineering Courses in Kenya*” for the period ending 26th May, 2022. I am pleased to inform you that you have been authorized to carry out the research on the same in this county.

COUNTY COMMISSIONER
KAKAMEGA COUNTY

EREDI C.M

FOR: COUNTY COMMISSIONER

KAKAMEGA COUNTY

VITALIS AYIEKO ONYANGO

P.O BOX 2227-50100

KAKAMENGA-KENYA

TEL:- 0718067290

4TH June 2021

COUNTY COMMISSIONER,

UASIN GICHU COUNTY

ELDORET

Dear Sir/Madam,

RE: REQUEST FOR RESEARCH AUTHORIZATION

I write to request for the authorization to conduct research from the TVET institutions within the county. The research Topic: *“Preparedness of TVET institutions in the implementation of Competency Based Education and Training (CBET) Curriculum in Mechanical and Automotive Engineering Courses in Kenya: A case of Kakamega, Nandi and Uasin Gishu counties*

I am a student pursuing Master of Education in Technology Education: Mechanical Technology Technology Option at the University of Eldoret. I've successfully presented the research proposal and has been approved by the university.

Your assistance will be of great help towards my research

Thank you.

Yours Faithfully,



VITALIS AYIEKO ONYANGO

SEDU/TED/M/002/18

Approved, No objection.
07-06-21
COUNTY COMMISSIONER
UASIN GISHU COUNTY



REPUBLIC OF KENYA

MINISTRY OF EDUCATION
STATE DEPARTMENT OF VOCATIONAL & TECHNICAL TRAINING
 Office of the County Director, TVET - Kakamega

Telephone: 056 -30828
 Fax: 056 – 30325
 E-mail:cdtvvetwr@gmail.com
 When replying please quote our ref. no.

County Director
 Technical, Vocational Education
 and Training Office
 P O Box 2441 – 50100
KAKAMEGA

Ref. No. TVET/WR/TT/GEN/1/3(55)

Date: 28th June, 2021

The Principal

1. Sigalagala National Polytechnic
2. Butere TVC
3. Bushiangala TTI
4. Mumias West TVC
5. Wanga TVC
6. Shamberere TTI

**RE: INTRODUCTION LETTER FOR VITALIS AYIEKO ONYANGO, A STUDENT
 OF UNIVERSITY OF ELDORET**

The person mentioned in the subject is a master's student of University of Eldoret. He is authorized and licenced to carry out research in your college for purpose of and in fulfilment of the requirement for the award of a master of education in Technology Education degree.

This letter, is to request for your assistance to enable him carry out the research.

JOSEPH B. SUNGUTI
COUNTY DIRECTOR, TVET
KAKAMEGA & VIHIGA COUNTIES

COUNTY DIRECTOR TECHNICAL, VOCATIONAL
 EDUCATION & TRAINING
 KAKAMEGA COUNTY
 P. O. Box 2441-50100,
 KAKAMEGA

Copy to: The Ag. Director DTE
 State Department for VTT
 Ministry of Education
 P.O Box 9583-00200
NAIROBI

Vitalis Ayieko Onyango
 P.O Box 2227-50100
KAKAMEGA



REPUBLIC OF KENYA

MINISTRY OF EDUCATION

STATE DEPARTMENT OF VOCATIONAL AND TECHNICAL TRAINING

COUNTY DIRECTOR OF TVET

Telephone: 053-2063342 or 2031421/2
 Mobile 0710456081
 Email: tvetug16@gmail.com
 When replying please quote:
 Ref: No. MOEST/TVET/EM/27/12

Office of The County Director of TVET,
 Uasin Gishu County,
 P.O. Box 1465-30100,
 ELDORET.

Date: 7th June ,2021

VUTALIS AYEKO ONYANGO
 P.O BOX 594-30100
 KAKAMEGA - KENYA
 TEL 0718067290

RE: RESEARCH AUTHORIZATION

This office has received a request from your Institution to authorize you to carry out research on ***"preparedness of TVET institutions in the implementation of Competency Based Education and Training (CBET) Curriculum in Mechanical and Automotive Engineering Courses in Kenya: A case of Kakamega, Nandi, and Uasin Gishu."***

We wish to inform you that the request has been granted until **7th June, 2022**. The authorities concerned are therefore requested to give you maximum support.

We take this opportunity to wish you well during this data collection.

For: COUNTY DIRECTOR OF TVET
 UASIN GISHU COUNTY
 P. O. Box 9843,
 ELDORET,
 Gichuru Mutulili
 COUNTY DIRECTOR OF TVET.

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF KAKAMEGA



OFFICE OF THE GOVERNOR
COUNTY SECRETARY AND HEAD OF PUBLIC SERVICE

Telephone: 056-31850/31852/31853
Website: www.kakamega.go.ke
E-mail: countysecretary@kakamega.go.ke

County Government of Kakamega
P.O. Box 36-50100
KAKAMEGA

When replying please Quote

Date: 7th June, 2021

REF NO. CGK/OCS/GEN CRR/06(03)

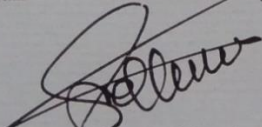
Mr. Vitalis Ayieko Onyango
P.O Box 2227-50100
Kakamega -Kenya

RE: AUTHORITY TO COLLECT RESEARCH DATA

The above subject matter refers,

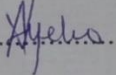
This is to inform you that you have been granted permission to collect data on "*Preparedness of TVET Institutions in the Implementation on Competency Based Education and Training Curriculum in Mechanical and Automotive Engineering Courses in Kenya*" A case of Kakamega, Nandi and UASIN Gishu Counties for a Masters degree in Education, Mechanical Technology from the University of Eldoret.

You are therefore required to adhere to Ethical standards and the County Government regulations on confidentiality.


Jacinta Aluoch Odhiambo (Mrs.)
County Secretary and Head of Public Service

Copy to: H.E the Governor

I hereby commit to share the findings with the County Government of Kakamega through the undersigned.

Sign:  VITALIS O. AYIEKO Date: 09-06-2021

REPUBLIC OF KENYA
COUNTY GOVERNMENT OF UASIN GISHU

Tel. NOs:direct line:053-2016215
053-2016000
053-2016125



When Replying, Please Address to:
County Secretary
Uasin-Gishu County
P.O. Box 40 – 30100
Eldoret, Kenya.

Fax: +254-053-2062884
Website:www.uasi.gishu.go.ke
Email:info@uasingishu.go.ke

REF: UGC/ADM.1/31/GEN/2021/VOL.II

8 June, 2021

Mr. Vitalis Ayieko Onyango,
P.O. Box 2227-50100,
KAKAMEGA.

AUTHORITY TO CARRY OUT RESEARCH

Your letter on the above subject is in reference.

Authority is hereby granted to you to carry out your research at the Vocational Training Centres within Uasin Gishu County Government, with a view to focusing on the preparedness of TVET institutions in the implementation of Competency Based Education and Training (CBET) Curriculum in Mechanical and Automotive Engineering courses in Kenya. However, you are advised to seek the information through our County Department of Education and request you to share your findings with the undersigned, for the findings may be useful in addressing the Competency Based Education and Training issues in the County.

By copy of this letter, the Director, Education is hereby requested to assist you accordingly.

Edwin Bett
COUNTY SECRETARY/
HEAD OF COUNTY PUBLIC SERVICE

Copy: Director, Education.

Appendix XI: Approved TVET institutions in selected counties

COUNTY	INSTITUTION
Kakamega	The Sigalagala National Polytechnic Bukura Agricultural Centre Bushianga la Technical Training Institute Butere Technical and Vocational College Mumias West Technical and Vocational college Wanga Technical and Vocational College Shamberere Technical Training Institute 27 Public Vocational Training Centres
Uasin Gishu	The Eldoret National Polytechnic Kipkabus Technical Training Institute Koshin Technical Training Institute Moiben Technical Training Institute Rift Valley Technical Training Institute Ziwa Technical Training Institute 16 Public Vocational Training Centres
Nandi	Aldai Technical Training Institute Emsos Technical Training Institute Kaiboi Technical Training Institute Ol'lessos Technical Training Institute Tinderet Technical and Vocational College 11 Public Vocational Training Centres

Source: TVETA, 2019

Appendix XII: Map of Kakamega, Nandi and Uasin Gishu Counties

SOURCE: GoK, 2023




Appendix XIII: Cronbach's Alpha table

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlatio n	Squared Multiple Correlation	Cronbac h's Alpha if Item Deleted
level of cbet awareness	91.70	89.164	.237	.	.752
Trained on CBA	91.90	86.886	.458	.	.738
Trainers competency	91.19	87.981	.425	.	.741
Adequate number of trainers	92.38	89.353	.362	.	.744
Use of leaner centered approaches	92.06	88.769	.310	.	.747
Trainers motivatio towards work	92.17	88.314	.419	.	.741
Extend of manpower adequacy	92.52	89.873	.412	.	.744
Hight trainee enrolment	91.51	90.097	.140	.	.761
Institutions has infrastructural adequacy	92.36	89.816	.323	.	.746
Classroom and Workshops are adequate	92.41	90.999	.260	.	.749
Tools and equipment are adequate	91.70	89.845	.343	.	.746
Library	91.42	91.094	.225	.	.751
ICT resources	91.59	88.927	.322	.	.746
Institutions instractional material are adequate	92.49	87.875	.421	.	.741

Occupation standards availability	92.30	93.791	.119	.	.755
Teaching Aids	92.10	93.767	.072	.	.759
Teachersguides	91.91	93.575	.142	.	.754
Reference Materials	91.51	89.370	.360	.	.745
High extent of industrial partnerships	92.16	91.436	.203	.	.752
Easy of getting attachments	92.30	91.031	.255	.	.750
Trainees motivation on attachment	92.44	92.770	.150	.	.754
Trainers capacity building surpport	92.03	91.247	.262	.	.749
Recal of attachees to work	92.40	91.143	.249	.	.750
Funds are adequacy for cbet	92.50	94.268	.052	.	.759
Government Capitation	91.12	94.114	.058	.	.759
Helb/Bursaries/CDF	90.79	93.880	.040	.	.762
Parents/Guardians/self	92.42	92.637	.141	.	.755
Scholarships	92.77	94.051	.092	.	.756


Appendix XIV: Similarity Report



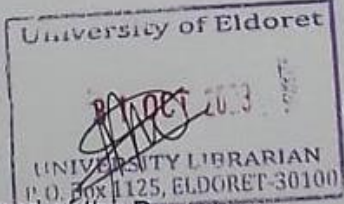
University of Eldoret

Certificate of Plagiarism Check for Thesis

Author Name	ONYANGO VITALIS AYIEKO SEDU/TED/M/002/18
Course of Study	Type here...
Name of Guide	Type here...
Department	Type here...
Acceptable Maximum Limit	Type here...
Submitted By	titustoo@uoeld.ac.ke
Paper Title	ASSESSMENT OF THE PREPAREDNESS OF TVET INSTITUTIONS FOR THE IMPLEMENTATION OF COMPETENCY-BASED EDUCATION AND TRAINING IN MECHANICAL ENGINEERING COURSES IN SELECTED COUNTIES, KENYA
Similarity	9%
Paper ID	1057062
Submission Date	2023-10-30 08:18:32



Signature of Student



Head of the Department

Signature of Guide

University Librarian

Director of Post Graduate Studies

* This report has been generated by DrillBit Anti-Plagiarism Software