

**THE EVALUATION OF THE IMPLEMENTATION OF REAL-LIFE PROJECT-
BASED LEARNING FOR COMPETENCE DEVELOPMENT OF TVET
TRAINEES IN UGANDA**

**BY
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DECLARATION

Declaration by the Student

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DEDICATION

This Ph.D. thesis is dedicated to my wife Rosette and our children Dilan, Martha, Miriam, Mary and Darius, who through their inspiration gave me the needed time and reinforcement throughout the research process. Special dedication goes to my parents, Mr. and Mrs. Aloiz. Baingana for the encouragement and prayerful role they did during my Ph.D Programmme.

ABSTRACT

Real-life project-based learning is a practical approach to learning; a multifaceted method of training where trainees come up with real-world tangible products while working individually or in small collaborative groups. The purpose of this study was to evaluate the implementation of the real-life project-based learning for competence development of technical and vocational education and training (TVET) trainees in Uganda. The research was guided by the following objectives to; find out the status of the implementation process of the real-life project-based learning, determine the capabilities of TVET trainers' regarding the implementation of real-life project-based learning, establish the role of TVET Managers in the implementation of real-life project-based learning and identify the challenges of implementing real-life project-based learning; for competence development of TVET trainees in Uganda. The study was anchored in the constructivist and experiential Learning theories. The study adopted the descriptive survey design with a mixed methods approach. The sample size of 488 study participants included TVET trainers, trainees, heads of departments and institutions and the Ministry of Education and Sports officials. Purposive sampling and simple random sampling techniques were employed. Data collection was carried out using questionnaires, interview schedules, observation checklists and a focus group discussion guide. The quantitative data was analysed using Statistical Package for the Social Sciences (SPSS) version 16.0 while thematic analysis was used for qualitative data. The results were presented in table form using frequency distribution and percentages. The study revealed that the TVET trainers did not follow the implementation processes and most of them lacked the abilities required to implement real-life project-based learning approach. TVET Managers did not perform their roles as expected. Furthermore, the main challenge was inadequate materials to implement real-life project-based learning across all TVET institutions. Arising from the findings of the study, it was concluded that the quality of the TVET trainees was below the expectation and their products were of poor quality. It was recommended that government should fast-track the implementation of the new TVET reforms including the back to industry program for the TVET trainers and the provision of adequate materials for real-life project-based learning. Additionally, the assessment bodies should involve industry practitioners but not only trainers to conduct the competence based assessment of trainees.

Key words; Implementation, Real-life project-based learning, Competence development, TVET trainees

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LIST OF ACRONYMS AND ABBREVIATIONS

AU	African Union
BTVET	Business Technical and Vocational Education and Training
CBET	Competency-Based Education and Training
CBA	Competence-Based Assessment
CBE	Competence-Based Education (CBE)
CEDEFOP	European Centre for the Development of Vocational Training
CVI	Content Validity Index
ELT	Experiential Learning Theory
FGD	Focus group discussion
FGDG	Focus group discussion guide
GoU	Government of Uganda
ICTs	Information and Communication Technologies
ILO	International Labour Organization
MoES	Ministry of Education and Sports
MoFPED	Ministry of Finance, Planning and Economic Development
NACOSTI	National Council for Science, Technology and Innovation
NCDC	National Curriculum Development Centre
NCHE	National Council for Higher Education
NDP	National Development Plan
PhD	Doctor of Philosophy
PoE	Portfolio of Evidence
RLPBL	Real-Life Project-Based Learning

SD	Skills Development
SDF	Skills Development Fund
SPSS	Statistical Package for the Social Sciences
TVET	Technical and Vocational Education and Training
TVETA	Technical and Vocational Education and Training Authority
UBTEB	Uganda Business and Technical Examinations Board
UNCST	Uganda National Council for Science and Technology
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEVOC	International Centre for Technical and Vocational Education and Training
UTC	Uganda Technical College
VET	Vocational Education and Training
VTI	Vocational Training Institute

DEFINITION OF OPERATIONAL TERMS

Challenges: Refers to barriers faced by training institutions during the implementation of real-life project-based learning.

Competence Development: Competence development refers to an overall description of the various methods that can be used to improve the learners' ability to be competitive on the internal and international labour market.

Competence: This refers to the basic ability of a trainee to perform actions in his/her specialization. It is the quality or a state of being competent such as having sufficient knowledge, judgement, skill or strength for a particular duty. This means that they are able to perform actions of an average person.

Competency Based Assessment (CBA): Refers to the gathering and judging of evidence in order to decide whether a person has achieved a standard (level) of competence.

Implementation Process: Refers to the application of approved activities such as initiation, planning, execution, monitoring & control and closure of the real-life project.

Real-life Project-Based Learning: Real-life project-based learning refers to hands-on practical training approach where learners individually or in small groups produce a tangible product. It's a method designed for implementing competence-based curriculum intended to increase the competitive levels of trainees in knowledge, attitude and life skills for gainful employment, enterprise and economy.

Trainers Capabilities: Refers to the trainers' abilities and know-how to ease the acquisition of relevant skills, knowledge and attitude competencies through instruction and teaching or practice.

TVET Managers: Refers to head of training institutions, Ministry of Education & Sports officials, Examining body and National curriculum development officials.

TVET trainees: Refers to individuals receiving training or completing a traineeship and working toward acquiring the awareness, knowledge, skill, attitude, and competencies necessary to successfully complete the task that has been assigned to them. It also refers to students enrolled in technical and vocational education and training. The person has to demonstrate the skills they learned before being accepted into the workforce.

TVET Trainer: Is an experienced individual who imparts and facilitates learning of knowledge, skills and attitude proficiency with specialized training and practice.

TVET: Technical and vocational education and training, or TVET, is an abbreviation for that which equips both young people and adults with the skills necessary for gainful employment, higher levels of production, and better quality of life.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

The background of the study, the problem statement, the purpose of the evaluation of real-life project-based learning, the objectives, and the research questions are all outlined in this chapter. The relevance, the scope, the limitations, and the assumptions of this study are also covered in this chapter. Additionally, the chapter provides examples of the conceptual framework, theoretical framework, and research philosophy.

1.2 Background of the Study

In this study, Competence-Based Education and Training curriculum (CBET) formed the basis for the implementation of real-life project-based learning for competence development of TVET trainees in Uganda. The evaluation considered the implementation process and capabilities of TVET trainers, the roles of TVET managers and the challenges of implementing real-life project-based learning while realizing competence-based curriculum in selected training institutions in Uganda. In this study, the components of real-life project-based learning are defined as the independent variables and competence development of TVET trainees as the dependent variable.

In 2016, Uganda through National Curriculum Development Centre (NCDC) introduced CBET curriculum for Business, Technical and Vocational Education and Training (BTJET) sub-sector. The new curriculum introduced Competence-Based Assessment (CBA) being implemented by Uganda Business and Technical Examinations Board (UBTEB). Assessment of students' development is based on abilities that have been

shown in competence-based education (CBE) (Barman, 2014). Real-life project-based learning is one of the approaches used to implement CBET. It is intended to enhance TVET trainee's capabilities for decent employment and entrepreneurship.

Real-life project-based learning is an active learning by doing and it is also known as a multifaceted approach to training in which trainees come up with real-world tangible products assessed by experts while working individually or in small collaborative groups. Real-life projects involve problem identification, solution identification, project planning and designing, project implementation and presentation.

Different nations are emphasizing the significance of TVET in supplying pertinent knowledge and skills to improve productivity, competitiveness, access to employment opportunities, and elevate the standard of life. This is why TVET has been acknowledged as playing a crucial role in all Ugandan educational development efforts to address the nation's socioeconomic challenge through knowledgeable and skilled personnel (Getachew, 2016).

The growing challenge of youth unemployment and underemployment is one of the main socio-economic development concerns of most African governments including Uganda. Without job-related abilities, youth and adults cannot benefit from the employment opportunities that offer a decent income (African Union, 2018).

In Germany, Ganter de Otero (2019) researched about the current trends mapping study that aimed at increasing the knowledge on innovations in TVET among the international community. The study recommended that TVET institutions should implement learner centered pedagogies and methods such as project-based learning with the aim of

enhancing student engagement and activities that help them to solve real-life problems in the local communities (UNESCO-UNEVOC, 2019).

In USA, Kwietniewski (2018) did a literature review about project-based learning at the State University of New York College at Buffalo. She observed that real-world application of projects in training allowed learners to improve their competencies and supplemented their preparation for lives after school. They also learned how to collaborate, make connections and manage themselves (UNESCO-UNEVOC, 2014). The techniques developed by Perkins (2009), which proved to be solidly founded in the literature and approachable, were proposed by Lucas (2014) in his background note in his research to determine which learning and teaching strategies performed best in TVET. He adapted the version of seven learning methods that work well in the vocational context. Accordingly, project-based learning approach was among the best seven approaches for TVET. The adapted seven methods include;

1. *Play the whole game – use extended projects and authentic contexts*
2. *Make the game worth playing – work hard at engaging learners giving them choices wherever possible*
3. *Work on the hard parts – discover the most effective ways of practicing*
4. *Play out of town – try things out in many different contexts*
5. *Uncover the hidden game – make the processes of learning as visible as possible*

6. *Learn from the team and the other teams – develop robust ways of working in groups and seek out relevant communities of practice*
7. *Learn from the game of learning – be in the driving seat as a learner, developing your own tried and tested tactics and strategies. (Lucas, 2014)*

Real-life project-based learning (RLPBL) is a multidimensional method of training in which students investigate real-world issues while cooperating in little groups. As they go through both team-based and solo work, it is an active and engaging strategy that encourages students to have a better grasp of the subject they are learning. They also gain self-assurance and self-direction (Weber, 2016).

It is well established that project-based learning is a crucial instrument for attaining training goals and ensuring quality in technical and vocational education. It uses a dynamic activity method to teach trainees new information, attitudes, and skills that help them resolve practical problems. (Liu, 2019).

Universally, project-based learning is defined as learners' individual or and teamwork tasks for extended period of time to produce a tangible product. The central goal of project-based learning is to help trainees to take responsibility for their learning, to advance their positive risk-taking actions, to motivate them to build confidence and cooperate with others. (Korkmaz & Kaptan, 2002).

With real-life project-based learning approach, the aim is to gain trainees' practical competencies and corresponding improvement in their academic progress (Mehmet & Mikail, 2015).

Real-world project-based learning is thus suitable to the curricula of primary, secondary, and higher education. It provides an alternative to the common, trainer-centered teaching approaches that so many students despise. The use of a real-world project-based learning approach may be able to re-engage students who may otherwise have lost interest in the learning environment in the classroom (Beres, 2021).

Real-world project-based learning has the benefit of being more productive than conventional teaching techniques. According to Mehmet and Mikail (2015), meta-analysis conducted in Turkey to identify the effects of project-based learning approach to the academic achievements of the learners in science classes it was found that project-based learning was more effective than the traditional teaching methods.

The core significant potential and important objective of real-life project-based learning approach is the advancement of innovative and productive thinking. Projects are designed and implemented by the learners themselves with guidance from trainers, this strengthens ownership of the project, integrating cognitive and metacognitive domains at individual level and their contextual desires at the institutional level (Sharipova & Wesseler, 2018).

However, project-based learning has its drawbacks. According to Lui (2019), in the study about the barriers to project-based learning in technical and vocational education and training, it was found that the lack of knowledge, skills, and enterprise experience of trainers in managing projects is a significant problem.

Furthermore, Project design, lack of integration from multiple levels and being disconnected from reality, absence of established rubric for assessing student skills and trainers' role adaptation not being conscious of having a different role in RLPBL setting affect project-based learning negatively.

The BTVET Act, 2008, the most significant legislative instrument governing policy development and reforms for the TVET education sub sector, was passed by the Ugandan Government through the Ministry of Education and Sports in response to this issue. This act states that the purpose of BTVET is to provide a greater number of people with affordable access to relevant and high-quality knowledge, values, and skills for the purpose of academic advancement and employment in the labor market, as well as to increase people's productivity and employability (GoU, 2008).

Through a strategy plan dubbed "Skilling Uganda" 2012–2022, which represents a paradigm change for skills development in Uganda, the Ugandan TVET sub-sector made a paradigm shift in the same endeavour. The strategic plan's goal is to.

to transform BTVET system from an educational sub-sector into a comprehensive system of skills development for employment, enhanced productivity and growth. The main purpose will be to create employable skills and competencies relevant in the labour market instead of educational certificates. It will embrace all Ugandans in need of skills, not only primary and secondary school leavers (MoES, 2012).

Instead of focusing on academic credentials, the major goal is to teach young people essential competences and employable abilities. It includes all Ugandans in need of skills, not only those who have finished elementary and secondary education (MoES, 2012). Based on the foreseen reforms, National Curriculum Development Centre (NCDC) reviewed the curricula for Uganda community polytechnics and schools, Technical, Vocational and Farm Institutes and Uganda Technical Colleges. Competency-based education and training (CBET), a form of training where the focus is placed on the development of competences, was implemented in Uganda in 2016 in an effort to generate competent workers that can fulfill current and future labor demands. The most important approach in this revised curriculum is the emphasis of real-life project-based learning because it's meant to enhance skills for employability, enhanced productivity, and entrepreneurship in order to tackle youth unemployment, already significantly high in Uganda (Government of Uganda [GoU], 2016).

In the Ugandan TVET context, Project-based learning (PBL) is commonly known as Real-life project. It is a reform initiative to transform the TVET sub sector and deliver TVET competence-based programs to varied needs of human development. This is completely consistent with Sustainable Development Goals 4 and 8 of the UN 2030 Agenda for Sustainable Development, which view TVET as a mechanism to significantly increase the number of youth and adults with skills relevant for the labor market, including technical and vocational skills for employment, competitiveness, decent jobs, and entrepreneurship. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) has a clear definition of TVET as:

“Those aspects of the educational process involving, in addition to general education, the study of technologies and sciences, in order to attain knowledge, practical skills, and attitudes for employment in various sectors of economic and social life” (UNESCO-UNEVOC, 2021).

It is a crucial component of general education that equips students to participate effectively in the workforce, pursue lifelong learning, act responsibly as citizens, and advance sustainable development (Maclean, 2013). While general education prepares students for academic pursuits, TVET prepares students for employment by giving them marketable skills (Simiyu, 2009). Generally speaking, TVET has been defined as the form of education that equips both young people and adults with the knowledge, skills, and competences necessary for meaningful employment, higher levels of production, and better quality of life (ILO, 2008).

In implementing TVET, the CBET curriculum was developed of which Real-life Project-Based Learning (RLPBL) approach takes a center stage. It is examined by a competence-based assessment body- Uganda Business Technical Examinations Board (UBTEB) as such an examination paper known as “Real-Life Projects” (RLP) was introduced 2016. The researcher reviewed the Real-life project-based learning implementation for competence development of TVET trainees in Uganda.

1.3 Real-life Project-based learning in Uganda

The BTVET Act, 2008, which was adopted by the Ugandan government's Ministry of Education and Sports, is the most important legal document driving policy development

and reforms for the TVET subsector (GoU, 2008). "Skilling Uganda" is the name of a strategy plan created by the TVET subsector (GoU, 2008). It represents a paradigm change in Uganda's approach to skill development. In 2016, after reviewing TVET courses, the National Curriculum Development Center implemented competence-based education and training (CBET). The most noticeable development in this curriculum was the addition of real-world projects that the Uganda Business Technical Examination Board (UBTEB) has been testing since 2017.

According to National Curriculum Development Centre (NCDC, 2020), Real-Life Project work execution and assessment involves a combination of subjects' knowledge, process, skills and transferable abilities. Trainees must apply classroom knowledge and skills proactively in a real-life context for an extended period. Each trainee is required to do a project outside the classroom time. At the end of every year, a trainee should have a visible real-life project on the ground to be authenticated by UBTEB.

Project-based vocational skills' training is comprehensive and focuses on productivity. The training reflects a situation of real world of work with projects and assignments simulating the workplace atmosphere. The trainees are assessed on a day-to-day basis; their weekly progress is also monitored by trainers and their learning level is individually evaluated at the end of the training.

A project constitutes a number of tasks and is assigned to trainees by TVET trainers based on the curriculum of the study or needs of the community at the beginning of the training period or course (UBTEB, 2014). The trainees are assigned tasks or projects within or outside the training institution which may be conducted individually.

Project-Based Learning (PBL) is seen similarly to andragogic approach, active style of learning, form of inquiry-based learning, and technique, according to literature study on the subject. RLPBL is described by Stephanie Bell as "a student-driven, trainer-facilitated approach to learning because learners pursue knowledge by posing queries that have piqued their innate curiosity, and it results in the creation of an artifact (model, design, device, computer program, etc.) by way of carrying out a variety of tasks (Bell, 2010). Contrarily, RLPBL is seen as a specific kind of activity-based learning where the learning context is given by genuine issues and difficulties within real-world activities (Bell, 2010).

1.4 Statement of the Problem

The increasing number of poorly trained, unskilled, unemployed and under-employed TVET graduates every day becomes a threat not only to the TVET sub sector but also to the stability of countries in their development process. It is estimated that almost 100 million young men and women in Africa are unemployed or in low-paid jobs (UNESCO-UNEVOC, 2013).

Consequently, the quality of the workforce remains low and often inadequate. Uganda is not different, GoU (2021) highlights that human capital development remains a major concern with skills gap in key Sectors of Agriculture, Manufacturing, Construction, Oil and Gas and Tourism. Additionally, the GoU (2016) estimated that the labor force growth rate for Uganda was 4.7 percent per annum.

Furthermore, the study about the employers' perception of the employability of TVET graduates in Uganda established that the graduates possessed the basic skills like ICT

skills and interpersonal skills required for work (Kintu *et. al.*, 2019). However, it was also established that most employers negatively perceived some incapacities about TVET graduates (Kintu *et.al.*, 2019). These incapacities included, product finishing, decision making and reasoning, self-esteem, sociability, integrity and honesty. Others were materials selection, estimation of quantities, facilities management, understanding of systems, monitoring and improving of systems designs and application of technologies (Kintu *et.al.*, 2019). Likewise, Belgian Development Agency, BTC, (2018) established that there was lack of quality and standards in the conduct of real-life projects.

1.5 Purpose of the Study

The purpose of the study was to find out the status of the implementation of the real-life project based learning for competence development of TVET trainees in Uganda.

1.6 Objectives of the Study

1.6.1 Main Objective

To evaluate the implementation of the real-life project-based learning for competence development of trainees in selected TVET Institutions in Uganda.

1.6.2 Specific Objectives

This study was guided by the following specific objectives:

- i. To find out the status of the implementation process of the real-life project-based learning for competence development of TVET trainees in Uganda.
- ii. To determine the abilities of TVET trainers' regarding the implementation of real-life project-based learning for competence development in Uganda

- iii. To establish the role of TVET Managers in the implementation of real-life project-based learning for competence development of TVET trainees in Uganda
- iv. To identify the challenges of implementing real-life project-based learning for competence development of TVET trainees in Uganda

1.7. Research Questions

1.7.1 Main research question

How is real-life project-based learning for competence development of TVET trainees in Uganda being implemented?

1.7.2. Specific Research questions

This study answered the following questions.

- i. what is the status of the implementation process of the real-life project-based learning for competence development of TVET trainees in Uganda?
- ii. What are TVET trainers' abilities needed in real-life project-based learning for the competence development of TVET trainees in Uganda?
- iii. What is the role of TVET Managers in project-based learning on competence development of trainees in TVET Institutions in Uganda?
- iv. What are the challenges of implementing real-life project-based learning for competence development of trainees in TVET Institutions in Uganda?

1.8 Significance of the Study

The study will motivate development partners and other stakeholders the desire to focus its effort towards TVET to emerge into a comprehensive skills development system for employment, enhanced productivity and economic growth. It will inform policy makers, curriculum specialist and TVET managers the status under which effective real-life project-based learning occurred to produce skilled workforce that meet current and future labour demands.

Additionally, the implication of Real-life project-based learning is a recognized approach in TVET and higher education that meet the emerging needs for skilling and upskilling. Large number of young people lack skills to turn them into a productive and competitive workforce for both the domestic and global labor markets (NDP 111, 2020). Specifically, TVET is an significant part of the education & training system with the aim of developing skilled workers for a country's economy (Choi, 2021).

1.9. Theoretical Framework

This study was hinged on the constructivist and experiential learning theories.

1.9.1. Constructive Learning theory

Constructive learning theory explains how people acquire knowledge and skills. This theory advocates that humans build up knowledge and meaning from their experiences (Bada, 2015). The major assumption of constructivism is that knowledge is constructed, it is dependent on the learner's prior knowledge of the subject matter. Some of the prominent philosophers associated with constructivism are (Vrasidas, 2000; Bada, 2015; Liu, 2005).

Furthermore, Constructivism regards learning as an active process in which learners construct new knowledge based upon their prior knowledge. Constructivism is learner-centered, assuming that learners learn better if they construct knowledge for themselves, rather than being told by a trainer (Vrasidas, 2000). Constructivism is grounded in several philosophical traditions with three orientations: individual constructivism, social constructivism (Shabani, Khatib, & Ebadi, 2010) and radical constructivism (von Glasersfeld, 1995). These approaches are not mutually exclusive. They are closely related to each other. Therefore, individual constructivism concentrates on personalities and their learning while social constructivism focuses on groups and their learning within socio-cultural contexts. Consequently, radical constructivism considers that there is no knowledge independent of that constructed by learners because knowledge is based upon constructions that are not tied to any external reality (Hadjerrouit, 2005).

However, this study was woven to social constructivism because as viewed by Morgan, (2017) a classroom is a social entity for trainees to learn and solve problems together as a community. Learners are viewed as unique individuals; they can be found busy at work constructing their own knowledge through personal learning, rather than trainer-imposed knowledge and trainer-directed activities. John Dewey (1938) held the same opinion in his social learning theory and educational beliefs in action. Dewey thought that schools and learning environment should be a representative of real-life situations, allowing trainees to participate in learning activities interchangeably and flexibly in a variety of social settings (Morgan, 2017).

1.9.2. The Experiential learning theory

Experiential learning in TVET is that style of training which emphasizes learning through direct experience, active participation and reflection of trainees. Experiential learning theory defines learning as “the process whereby knowledge is created through transformation of experience. Knowledge is results from the combination of grasping and transforming experience”(Kolb 1984, p.41). It suggests that trainees acquire knowledge, skills, and attitudes by engaging in hands-on tasks, problem solving and real-life projects. This approach promotes a deeper understanding of concepts and enhances practical skills by connecting theoretical learning to practical application. According to McCarthy (2016) collaborating training, or learning by doing has resulted in positive outcomes. Most experts agree that when trainees take an active role in the learning process the trainee’s learning is enhanced (McCarthy, M. 2016). Kolb’s Experiential Learning Theory (ELT) has its roots in the experiential works of Dewey, Lewin, and Piaget. Distinct from cognitive learning theories, which tend to emphasize cognition over affect, and behavioral learning theories, which do not permit any role for cognizance and subjective experience in the learning process, experience plays an essential role in ELT’s process. ELT is anticipated to be a universal adaptive process on learning that merges experience, perception, cognition, and behavior (McCarthy, M. 2016).

1.9.3 Educational Implications of experiential learning theory

According to Kolb's (1984) learning stages, experiential learning outlines four-stage cycle which include concrete experience, reflective observation, abstract conceptualization and active experimentation. These can be used by trainers to critically

evaluate the learning provision typically available to trainees, and to develop more appropriate learning opportunities.

The trainers should confirm that activities are designed and carried out in ways that offer each learner the chance to engage in the manner that suits them best. Preferably, activities and materials are developed in ways that appeal to their abilities from each stage of the experiential learning cycle and take the trainees through the whole process in sequence (McLeod, 2013).

1.10. Conceptual Framework

Preferably, activities and materials are developed in ways that appeal on abilities from each stage of the experiential learning cycle and take the trainees through the whole graphically or diagrammatically process in sequence (Lawson, 2013).

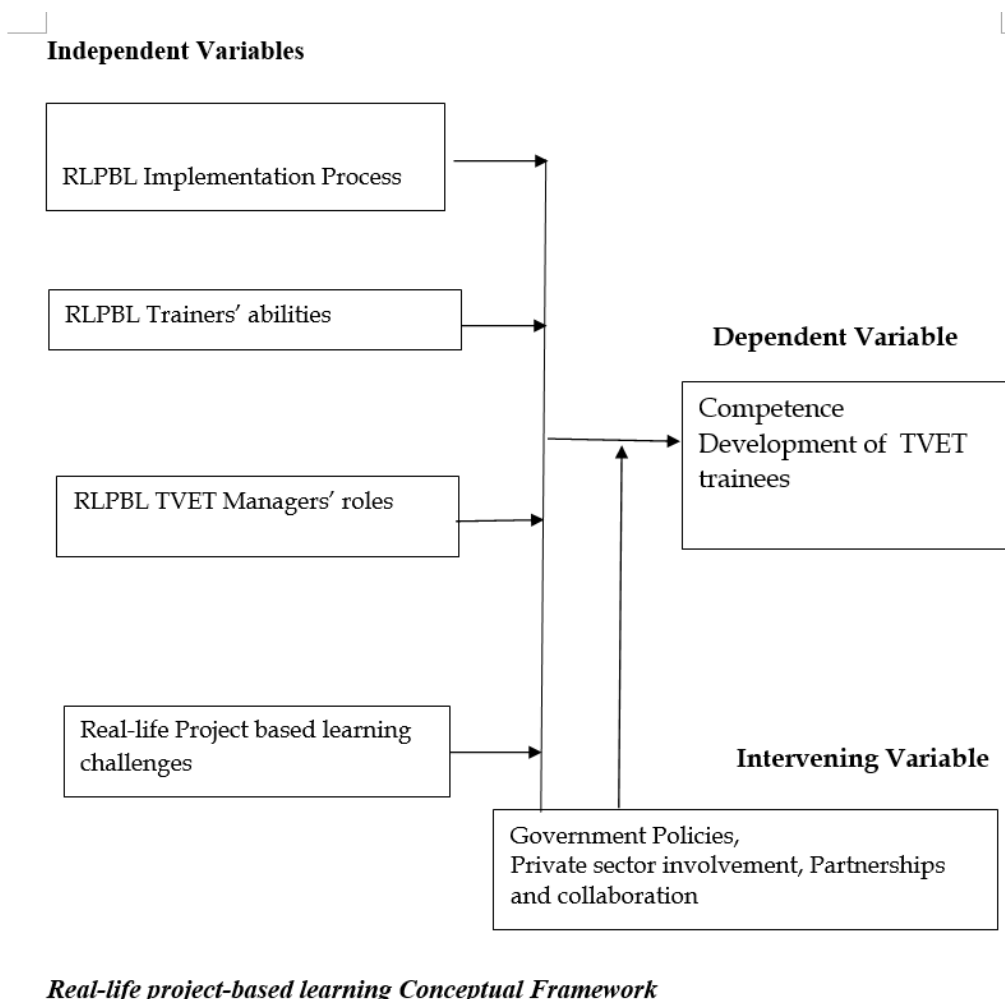


Figure 1.1 Real-life project-based learning Conceptual Framework

(Source: Author, 2022)

As it's indicated in figure 1.1, real-life project-based learning implementation process, RLPBL Trainer abilities, RLPBL Managers roles and RLPBL challenges in the TVET training institutions in Uganda are independent variables. Government Policies, private sector involvement, partnerships and collaboration are intervening variables whereas the competence development of TVET trainees is the independent variable.

The status of the implementation process such initiation, planning, execution, product

presentation and closure help both trainers and trainees to achieve high quality products and the desired learning achievement. RLPBL trainer's abilities such as Routine expertise (being skillful), Resourcefulness (stopping to think and to deal with the non-routine), Functional literacies (communication, and the functional skills of literacy, numeracy, and ICT), Craftsmanship (vocational sensibility; aspiration to do a good job; pride in a job well done), Business-like attitudes (commercial or entrepreneurial – financial or social – sense), Wider skills (for employability and lifelong learning).

These capabilities of a RLPBL Trainer are critical in competence development of TVET trainees. Management support is needed to motivate RLPBL trainer to do his/her job well. Management is charged with developing a framework to strengthen the link between TVET institution and the industry for support such as internship, materials for projects this intervening for competence development needed in the world of work. And the identification of barriers will help trainers to find solutions in time. Some of the challenges may include Time to implement, Meeting all of the quality requirements, implementing the project within the school's schedule, fitting all of the standards, and designing the project. The relationship between the independent and the intervening variables is that the effective use of the indicated variables will lead to quality TVET graduate thus competent employable workforce needed in the world of work.

On the other hand, the intervening variables such as such as development partners with elements such as (Materials, Machines and motivated Manpower-trainers), Monitoring for standards and quality assurance, industrial linkages, trainee factors-attitude, adversely affect the competence development and hence unemployment, under employment and poverty amongst TVET graduates.

1.11 Justification of the Study

Like many other African countries, Uganda has engaged in various curriculum reforms in the post-independence period after 1962. The new curriculum for TVET, called ‘Competence-based curriculum’ has been freshly developed and implemented nationwide beginning from February 2016. There are high quality training expectations related with the new curriculum.

Nevertheless, the status of the implementation of real-life projects which was the main improvement of the new curriculum has not been done. Hereafter, many aspects of real-life projects are not yet well understood. Subsequently, there is a narrow evidence base that policy makers can draw on (Dyer, 1999). Therefore, Dyer (1999) argued that there is an urgent need for research that focuses on real-life project implementation process in order to increase on the knowledge base on the actual processes of change, the likely difficulties and issues that can appear, and approaches to solutions.

This study aimed to respond to Dyer’s call for more research on the implementation process by looking at the experience of implementing real-life project-based learning in Uganda. A related world-of-work competence population is considered imperative for sustainable development and economic growth in Uganda. In this context, the project-based learning is believed to immensely contribute to competence-based curriculum processes by improving education and training quality, and more specifically by increasing the competitive levels of trainees in knowledge, attitude and life skills for gainful employment, enterprise and economy.

The implementation of the real-life projects is critical. It is done practically by producing quality products, the written and oral way of presentation, summarizing the processes

used to produce innovative products and presenting them for assessment cannot be underestimated. Similar to many other learning initiatives, project-based learning has many laudable goals and objectives. Yet, it is still to be seen whether the new learning initiative were adequately implemented by TVET Trainers and whether the sound intentioned policies incorporated into the curriculum are translated into world of work competencies. This study explored these competence development issues from the perspectives of project-based learning approach. It will be based on a fieldwork study in Technical colleges and Technical Vocational Institutes that are implementing the CBET curriculum in Uganda.

1.12 Scope of the Study

The study was carried out in selected technical colleges & vocational training institutions situated within the four major regions of Uganda clustered as follows; Northern-Kiryandongo, Oyam and Kitgum districts, Central- Nakasongora, Kampala city, and Wakiso districts, Western-Ntugamo and Bushenyi and Eastern- Soroto city, Iganga and Mbale Districts of Uganda in order to give a clear representation of the population.

The variables of the study covered the real-life project-based leaning activities present in the curriculum, the mode of delivery and assessment, quality and process of the projects as being implemented in the TVET institutions to yield skilled workforce for both the domestic and global labor markets as a key factor behind productivity and development, innovative capacity and competitiveness. The study was conducted between January 2021 and June 2022.

1.13 Limitations of the Study

The research faced some challenges during the data collection as highlighted on below with the ways through which we overcame them.

- i. Potential bias from respondents. The researchers collected the responses from the participants as true but cannot rule out any bias and misinterpretation of the questions.
- ii. Data quality and lack of baseline data. Absence of historical data on similar real-life projects hindered trend analysis. Inaccurate or incomplete real-life project data, which could affect the validity and reliability of the study, the researcher relied on the data provided by the trainers who were engaged in the training of real-life projects.
- iii. Ethical considerations. Ensuring the ethical treatment of participants and obtaining informed consent presented some challenges. Some respondents took long to fill the questionnaire and the researcher went to institutions severally to make sure he collects their responses.
- iv. Long-Term Impact. Difficulty in tracking the long-term effects of real-life projects on TVET graduates and their livelihood was not considered as it was beyond the scope of this study.

1.14 Assumptions of the Study

The study was based on the following assumptions.

- i. TVET institutions offer real-life projects as a mode of implementing competence-based curriculum and are assessed by a national body.

- ii. TVET managers provide timely training materials, tools and competent workforce who impart the indispensable skills to trainees.
- iii. The national assessment body uses standard competency-based assessment principles and use relevant assessment guidelines to gather and judging of evidence in order to decide whether the trainee achieved the standard of competence or is not yet competent.
- iv. TVET trainers are motivated with the right perception to focus on having trainees be effectively skilled using real-life project-based learning approach.

1.14 Summary

This chapter provided a framework onto which other chapters are developed and guided by the objective of the study; the review of real-life project based learning for competence development of TVET trainees in Uganda. The section sorted out the current material and concentrated on the background, conceptualization of the study objectives, the purpose and the scope with a view to solve the study problem. These include lack of quality and standards in the conduct of real-life projects, continuous assessment and inadequate involvement of the private sector hence the quality of the workforce remains low and often inadequate.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the literature associated with the real-life project-based learning for competence development of TVET trainees. Particularly, it focused on real-life project-based learning implementation processes, the capabilities of TVET trainers, the role of TVET Managers and project-based learning barriers on competence development of TVET trainees. Preceding to these, this chapter presents literature on the TVET system in Uganda and the concept of real-life project-based learning approach.

2.2 TVET System in Uganda

Uganda is promoting technical and vocational education and training (TVET) as a major path to realize fair economic transformation, social and environmentally sustainable development and employability skills. However, the success of this strategy depends on TVET training institutions' ability to empower individuals, enterprises and community to become competitive both at national and international labour market (UNESCO-UNIVOC, 2016).

In Uganda, Technical, Vocational Education and Training (TVET), was identified as a Directorate under the Ministry of Education and Sports. The directorate houses the department of TVET Operations and Management, Healthy Education and Training and TVET Trainer. The directorate is in charge of both private and public TVET up to diploma level. The principle legal instruments guiding the policy formulation and reforms for this education sub sector is the TVET Policy 2019 and BTVET act of 2008. According to this act the objectives of BTVET are:

” To provide relevant and quality knowledge, values and skills for purposes of academic progression and employment in the labour market to the larger number of persons in an affordable way, to enhance the productivity capabilities of the individual for employment and self-employment and to monitor gaps between supply and demand for skills” (GoU, 2008)

The BTVET system includes a directorate of education standards, curriculum development, and semi-independent evaluation organizations. In Uganda, there are 142 state TVET facilities, over 1000 private training service providers, an undetermined number of apprenticeship programs, and enterprise-based training facilities.

According to Okware & Ngaka (2019), TVET, or BTVET as it is known in Uganda, is a method of instruction and training in which the focus is on the students and the tasks that need to be completed. Additionally, they assert that it is a kind of education that aims to create competences in the processes linked to technology (tools, equipment, and materials) usage as well as abilities that cover every facet of a particular profession in order to prepare students for working life.

It is a type of education and training that is typically non-academic and focuses on "manual dexterity" or practical action. Vocational and Technical Education (VTE) is a type of instruction and training that aims to educate young people for employment in certain trades, crafts, vocations, and careers. Because it enables for learning to be given at a learner's leisure, often through a modular curriculum, and accommodates persons at all levels of occupational credentials, it is intended to be a flexible, democratic, and inclusive kind of training (MoES, 2012). In order to prepare trainees for work and employment,

TVET is a kind of education and training that aims to instill knowledge, skills, and attitudes (competencies), as well as trainees' independence of identity, resiliency, character, and work ethic. Productivity, competitiveness, social inclusion, and economic change follow from this (UNESCO-UNEVOC, 2013; MoES, 2019).

As Uganda strives to realize Vision 2040—"A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 Years"—and create the national development plan, there is a greater need for skills than ever before (GoU, 2021). The goal was "To Increase Average Household Incomes and Improve the Quality of Life of Ugandans" as Karmel (2007) reveals that global demand for skills is mostly evident in the economically globalized regions, including North America, Europe and East Asia.

2.3 Concept of Real-life Project-Based Learning

According to Khasawneh, this research is based on the pragmatic school of thought (2014). The education and writings of John Dewey, the most well-known American philosopher and educator, provide insight into the consequences of contemporary education and training, not just in the United States but also internationally.

His approach to education and training—commonly referred to as Pragmatism—placed a strong emphasis on experiential learning as an alternative to rigorous lecture and memorizing of facts. Dewey's contribution to philosophy, pragmatism, promised to help individuals make decisions when faced with difficult circumstances. The phrase is said to be derived from the Greek word *pragma* meaning activity, from which the terms practice and practical arise, according to American psychologist and foremost pragmatist William James. It was released in 1907 during a new phase of industrial civilization, when

America overtook Europe as the world's foremost industrial power. Following a review of the literature, it was discovered that William James, a renowned practical psychologist, developed pragmatism in response to the moral bankruptcy of his time. James offered his pragmatic truth-formula as a prescription for the populace so that they could simultaneously hold onto their religious convictions in the face of materialistic science and practically adapt to life in a new industrial society (Nash, 1947).

The reality or essence of any information or a claim, according to pragmatism, is in its observable practical effects rather than anything theoretical (Sharma et al., 2018). Real-life project-based learning (RLPBL), which emphasizes learning by doing as an alternative to memorizing of information, attitude, and skills and as a firm method to training, is similar to how it is for pragmaticists. (2014) Khasawneh.

The Pragmatists and the project-based learning approach place a strong emphasis on practical problem solving, experimentation, and projects that typically require students to work in groups. According to a survey of the literature, RLPBL has its roots in the progressive educational movement, which encouraged greater student engagement and participation. However, there is proof that the idea of learning via projects was created in the 1700s and 1800s (Knoll, 1997). Pragmatists hold that via experimental research, students should apply their knowledge to real-world situations. This strategy prepares students for citizenship and future careers. It has the ability to drastically alter the Ugandan education and training system.

In all disciplines, RLPBL practice revolves around the real-world task (Kolmos, 2007; Thomas, 2000; Bell, 2010). This establishes a link between the classroom and outside

social, political, and environmental realities, maintaining students' attention and drive (Bell, 2010).

Real-world problems that need to be solved are the focus of RLPBL learning, and this is crucial since it motivates both the learning process and the research (Blumenfeld et al., 1991; Stauffacher et al., 2006). Project-Based Learning (PBL) has seen an increase in trials and adoption internationally over the past ten years in a variety of educational institutions (Kolmos, 2009). RLPBL is especially common in engineering in Tertiary Education (TE); for instance, most engineering institutes in Denmark, Canada, and Uganda use RLPBL to some level (Malciene, 2016).

However, an examination of the literature shows that the technique is used in a variety of fields, including media and business studies, geography, environmental science, education, information technology, and sustainability, in various national settings. RLPBL is difficult to define since, as Harmer (2014) notes, the word has a wide range of applications and may signify many things in various contexts and disciplinary settings.

Additionally, it is strongly associated with and occasionally used synonymously with Problem Based Learning (PBL), or it may be referred to by other umbrella terms like the Inquiry-based approach or the Trans-Disciplinary case study (Stauffacher & Walter, 2006). However, it is evident from the literature that the majority of the essential components of RLPBL are also part of the idea of an approach where students search for answers to complex problems by posing and refining queries, arguing positions, formulating hypotheses, planning experiments, gathering and analyzing data, coming to conclusions, sharing their thoughts and discoveries with others, posing new queries, and

producing artifacts (Blumenfeld et al., 1991). It's important to note that project-based learning is a type of training that calls for trainers and students to work together to solve real-world issues that are motivated by a central topic. Frequently, technology is used for research and the presentation of (Bell, 2010).

A survey of the literature reveals that the progressive educational movement, which favored greater student involvement and engagement, is where the roots of RLPBL reside (Peterson, 2012). It is acknowledged that John Dewey's theory served as an inspiration for William Heard Kilpatrick when he created the Project Method. It was said by (Knoll, 1997).

The project is one of the standard teaching methods. It is generally considered a means by which learners can (a) develop independence and responsibility, and (b) practice social and democratic modes of behavior RLPBL is a teaching method in which learners gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. (Knoll, 1997)

On the other hand, “PBL is considered to be a particular type of inquiry-based learning where the context of learning is provided through authentic questions and problems within real-world practices” (Vazquez-vargas, 2018). Real-life projects yield to physical outcomes as a result of learners’ hands on products in bid to solve a real-life problem.

In Uganda, a student or a group of students enrolled in BTVET institutions are obliged to create, present, and write a report on a year-long project in preparation for an examination by UBTEB (Vazquez-vargas, Aveliraz, & Luis, 2018). It is hoped that

students would acquire skills that will enable them to transfer into the workforce more smoothly. According to the literature, the key benefits of RLPBL include assertions of higher competency outcomes, the development of broader abilities, an increase in student motivation and enjoyment, greater outreach and involvement outside of the classroom, and benefits for trainers. Education of future professionals is also a key to the future of our economies, our environments, and our society, according to the 2004 "Bonn Declaration."

However, the conduct of these real-life projects requires a different orientation and overhaul in view to enhance standards and the quality of competencies to be achieved by TVET graduates in Uganda. The employers claim that most TVET graduates in Uganda lack some competencies needed to achieve their tasks at work. Among these responsibilities are product finishing, reasoning and decision-making, material selection, quantity estimate, facility management, system understanding, monitoring, and developing system designs, as well as technological application challenges (Kintu et al., 2019).

2.3.1 Characteristics of Real-life Project-Based Learning

With assistance from the Autodesk Foundation, Thomas (2000) conducted a meta-analysis of previous studies on the project-based learning approach. Thomas first reviewed the research on the various classified forms in light of the realization that multiple forms of experiential learning exist and have been applied in various ways and under various circumstances, and then he chose those that, based on current practice and theory, appear to have an overlapping set of core components.

His study was incorporated in his final analysis under the headings of problem-based learning, project-based instruction, expeditionary learning, and project-based learning. Project-Based Learning is characterized by Thomas (2000) as the all-encompassing method by identifying themes within each of the aforementioned models.

Thomas (2000) identifies the following five requirements as being included in an RLPBL curriculum, notwithstanding the fact that there is still no singular, exclusive collection of characteristics: centrality, when the project serves as the curriculum's focal point; Constructive investigations that use inquiry, knowledge development, and resolution; autonomy; a change from teacher-directed to student-directed learning; and realism, with an emphasis on real-world issues and topics for which answers may be put into practice.

In an experimental study conducted at the undergraduate level by Kuhn and Pease (2010) to determine the key elements of problem-based learning versus lecture/discussion, they discovered that a student focus on engagement with the problem, whether experienced collaboratively or individually, was a crucial element in driving the procedural process. According to Kuhn (2011), who conducted a comparable controlled experimental study of problem-based learning in a middle school population, engagement was crucial to igniting the learning process. He also discovered that whether students worked collaboratively or independently did not seem to act as an independent variable.

The seven key elements of project-based learning were validated by Beres (2011) in her investigation of its impact on student motivation in the adolescent mathematics classroom. Catching students' attention, motivating questions, empowering the student voice and giving them choices, useful group collaboration skills, inquiry and invention,

instructor feedback, and a final presentation are some of these (Larmer & Mergendoller, 2012).

These elements allowed students to generate their own ideas, work on them in groups, enhance them via review and group cooperation, and then present their finished output, which tremendously piqued their interest and drive.

2.3.2. Why Real-Life Project-Based Learning

It is essential for the growth of any country, regardless of context, to provide individuals with the appropriate information and skills to help them build their competence to actively engage in economic activities for a better quality of life. This is especially important for emerging nations like Uganda, who are lagging behind in terms of the development of their human resources as measured by the Human Development Index (HDI).

Although between 1990 and 2018, Uganda's performance in the field of human development improved. Although Uganda's HDI score improved from 0.312 to 0.528, representing a 69.1% rise, it still lags behind other nations in terms of human resource development (United Nations Development Program UNDP) (2019). For instance, Uganda's Human Development Index (HDI) rating for 2018 is 0.528, placing it at 159 out of 189 nations and territories examined and placing the nation in the low human development group. A long and healthy life, access to knowledge, and a reasonable quality of living are the three fundamental aspects of human development. The HDI is a summary indicator for evaluating long-term success in each of these areas (Website: <http://hdr.undp.org/en/data>).

Competency-based education and training (CBET) is a type of training used in Ethiopia, according to Getachew (2016), where the emphasis is on the development of competences. It is created to satisfy commercial and industrial purposes. It entails teaching people how to perform to the standards necessary for work, frequently throughout time, in a range of circumstances that have been agreed upon. In CBET, the focus is on ensuring that people perform at a high level, which is crucial for the success of business and industry.

In general, competence is frequently described as the capacity to carry out duties or produce work that meets predetermined requirements. It is the capacity to apply information, abilities, and attitudes to a variety of contexts within a certain career. This definition makes it clear that the terms "competence" and "competency" refer to a person's capacity to carry out an action to a needed standard. The term "doing something" in a specific career, specialization, discipline, or occupation is used to describe vocational competence. Competence-based education and training (CBET), according to Smith (2010), is a strategy that emphasizes "what a person can accomplish (the output) as a result of training in which the outcome is judged against set criteria, not against other learners."

As such, project-based learning is widely believed to be an approach to better achieve the CBET program.

The objectives of project-based learning include but not limited to:

- Establish a quality assurance process that will have the confidence of all stakeholders. Promote lifetime learning through progression and transfer.

- Graduate competent workforce with transferable current skills. Link education and training to the skills needed by businesses.
- Foster active, motivated learners and promote cooperation, creativity, and independent thought.
- Develop attitudes and abilities to adjust quickly to change.
- Encourage trainees to reach their maximum potential.

Different nations are emphasizing the need of using real-world project-based learning to provide the necessary information and skills to increase production, access to career opportunities, and living standards (Afeti, 2006; UNESCO, 2002).

Project-based learning is available in both educational institutions and the workplace and combines a variety of learning experiences relevant to the working world (UNESCO, 2016). Using a project-based learning method, participants gain the abilities, information, and attitudes necessary to engage in fruitful employment, adapt to quickly changing labor markets and economies, and participate as responsible members of their community (African Union, 2018). Afeti (2006) contends that raising productivity, boosting competition, and fostering economic growth all depend on skill development.

Real-world project-based learning enhances a person's knowledge of science and technology in a wide range of occupations that call for technical and professional competencies such as problem solving, initiative, teamwork, collaboration, and specific occupational skills. This type of learning contributes to skill development. A new CBET curriculum was introduced in 2016 as part of all Ugandan educational development

efforts through the national curriculum development center in acknowledgement of the aforementioned. This curriculum viewed the use of real-world projects as essential to addressing the socioeconomic underdevelopment of the nation by developing knowledgeable and skilled labor (GoU, 2008).

PBL is well renowned for offering practical experience, addressing issues from the real world, encouraging group collaboration, and being considered as offering a larger range of transferrable abilities (Matej & Zavrsk, 2015). There is, however, no data on whether the sincere real-life project-based approach has succeeded in Uganda since 2016. The organization of public technical vocational institutes in Uganda (TAPTVIU) has complained on several occasions that the implementation of the new curriculum failed to take into account the requirement for appropriate materials, equipment, and labor.

2.4 Rationale and Advantages of the Real-Life Project-Based Approach

The basic justification and motivators for RLPBL as stated in the literature are discussed in the part that follows. A summary of the alleged benefits of the RLPBL strategy to students, employees, and the economy is then given.

With this strategy, the third national development plan, which has as its goal "to increase average household incomes and improve the quality of life of Ugandans," and the vision 2040, which is "A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years," will move along more quickly (GoU, 2021). Project-based learning is further pertinent for Uganda since it might help close the skills gap. According to Lucas et al. (2012), the advantages of practical-oriented learning are obvious. No one can become a brilliant Argentine football player like Diego Maradona, a

world-class marathon runner, a five-star hotel chef, a proficient nuclear submarine officer, or a huge jet pilot by reading and listening in a classroom. These folks must essentially dance, operate airplanes, and cook. The current best football player in the world, Lionel Messi, must play the game realistically. The BTVET Strategic Plan for Uganda, often known as "Skilling Uganda," appears to be cognizant of this when it states:

Business, Technical, Vocational Education and Training (BTVET) is increasingly being viewed as the solution against the supply driven, academia-focused formal training programs which have failed to provide graduates with competencies and skills that are relevant to the needs of the current labour market. (GoU, 2008)

The informal sector, specifically the Small and Medium Enterprises (SMEs) discovered by the Uganda Bureau of Statistics, is the best opportunity for employment as well as the primary driver of economic development in Uganda, claim Okware & Ngaka (2019) in their book *Rationale and Challenges of Technical Vocational Education and Training in Uganda* (Dyer, 1999; UBOS, 2013).

Hager (2008) also found that, in contrast to popular opinion, the majority of practical education and training mostly take place informally at work and throughout the course of employment. Therefore, the only real site of intersection for the various types of competences to generate marketable and job-ready graduates is the workplace, and by extension, real-life project-based learning. That is why Okware & Ngaka (2019) advise Uganda to invest in and certify real-life project-based learning wherever it takes place

rather than focusing on the conventional formal Academic Based Education and Training (ABET).

Building more industrial parks, more Centers of Excellence (CoE), luring more investors for manufacturing industry and service units to act as dual places for the combined delivery of learning and work experience, as a way to tap into the novel concept of Real-life Project-Based Learning, would be Uganda's preparation for such an education and training-work divide.

Real-life project-based learning is an instructional strategy that has the ability to significantly alter trainer practice and student learning, according to Harris (2014) in his study on the difficulties of adopting project-based learning in middle schools in Pittsburgh. The study also found that because the method encourages students to collaborate with others, solve real-world problems, and communicate their findings, it is likely to be an exciting prospect for educational leaders hoping to create students who are prepared for the challenges and solutions of the future.

2.4.1 Philosophies and Drivers for Project-Based Learning

The implementation of RLPBL in education has four key motivations, according to Langley & Miky (2010): pedagogical/andragogic; professional; democratic and humanitarian; and developing critical thinking. While the first three categories roughly agree with the factors noted in the literature, the fourth category—critical thinking—was less clear, and the need of using multidisciplinary ways to tackle complex modern challenges was underlined.

2.4.2 Educational Philosophical Roots of RLPBL

According to Morgan Morgan (1983), PBL is not only a technical teaching strategy but also a curricular structure that may enhance basic training-related solutions. He connects RLPBL to the educational and psychological theories of significant US thinkers from the 20th century, such as John Dewey (on the value of learning from experience), Jerome Bruner (on learning as an active process in which the learners' transformation of information creates motivation, retention, and personal development), and Carl Rogers (on the value of the topic's perceived relevance for motivation) (Morgan, 2008).

The experience of hands-on learning in Noticeably Bound classrooms, insights from "problem-based learning," and ideas from cognitive research about the significance of context to learning are more recent influences that have been mentioned (Thomas, 2000).

While de Graaf and Kolmos (2007) credit prominent American teacher William Kilpatrick with helping to popularize project learning by pointing out the connection between motivation and choice of subject of study. Adherence to social constructivism, which places emphasis on learners' understanding of the role of social environment in the construction of knowledge systems through active learning, is closely associated with these pedagogical ideas (Harmer, 2014).

RLPBL is thought to provide a learning construction site where participants contribute a variety of voices, ideas, and approaches to co-create knowledge that is socially beneficial (Von Kotze & Cooper, 2016). As a result, RLPBL can be seen as one reaction to changes in pedagogical thinking over the past 50 years that have advocated a move away from a model in which trainers impart knowledge to largely passive learners in favor of one in

which learners become engaged and active participants in the co-construction of knowledge (Blumenfeld et al., 1994). According to Mehmet & Mikail (2015), the strategy strives to cultivate engaged, motivated students and to promote creativity and independent thought.

2.4.3 Skills for the 21st Century

RLPBL is adopted in TVET in response to the idea that technical graduates should have skills that are useful to potential employers (Kolmos, 2009). These requests come from the government, business, and professional accrediting organizations, as well as from students dealing with extremely competitive employment markets (Harmer & Stokes, 2014). It is commonly considered that traditional lecture-based education, especially in fields like engineering, no longer equips graduates with the diverse professional skills they require. These broader transferrable abilities were perceived as being provided by the PBL's practical application, real-world problem solving, and small group work projects (de Graaf & Kolmos, 2007). Employers are looking for graduates with abilities that are applicable to the workplace and occasionally come from certain industries.

For instance, Harmer (2014) created a boat design and building project at the higher education level in Taiwan in response to a lack of qualified boat builders. The need for evolving or broader skill sets may also be driven by professional organizations like the Accreditation of European Engineering Programs and Graduates by Lehmann et al. (2008), while welfare reforms and fierce competition for graduate jobs mean that students need skills beyond traditional academic qualifications. The business studies initiatives Botha (2010) mentions in South Africa were developed in part to fill a demand for more

skilled entrepreneurs. RLPBL is said to improve several abilities, including creative thinking, teamwork, and project management (Lehmann, Christensen, & Du, 2008).

The use of RLPBL in institutional rebranding (Kolmos & de Graaf, 2007) in connection with increased competitiveness and pressure for student recruitment and retention as a result of government-led changes in technical education financing is another reason for its use (Kolmos & de Graaf, 2007; Graham, 2010). Because of this, Graham claims, "a number of UK engineering schools have redesigned their curriculum around project-based or active learning" and "recruitment as a significant incentive, increasing attention has been placed on advertising the first year of study" (Graham, 2010: 6).

2.4.4 Increasing Complexity of Contemporary Issues

Like much of Sub-Saharan Africa, SSA, Uganda now has significant rates of underemployment and unemployment among its young and/or graduates (Okware & Ngaka, 2019).

A mismatch between the skills offered by the educational system and those demanded by the job market was also seen to be a direct effect of the academic model of education and training. Business, Technical, and Vocational Education and Training (GoU, 2012), African Union (AU, 2007), Ssekamwa (1997), and the Government White Paper on Education (GWPE, 1992), as well as the BTVET Act of 2008 and the TVET Policy of 2019 all support this. The Technical, Vocational Education and Training (TVET) Policy is one of the measures the government has implemented to solve this issue through revamping the educational system (GoU, 2019).

It has been stated that the RLPBL approach emphasizes the method and practical skills involved in knowledge development, encouraging learners to think critically and assist them examine alternate ways of thinking and doing (Von Kotze & Cooper, 2000). The capacity of RLPBL to offer the kinds of abilities, attitudes, and comprehension required to address difficulties in a modern setting of growing complexity, when issues and initiatives transcend clearly defined fields and sectors, is, nevertheless, a rationale that is increasingly frequently highlighted. In the context of the skill sets required "in a world where systems steadily get larger and the limits for engineering knowledge and abilities are increasingly difficult to recognize and define," Lehmann et al. (2008), for instance, explore RLPBL.

These include talents to learn continuously in a variety of social, cultural, and globalized contexts, as well as technical skills like as cooperation, communication, and project management (Lehmann, 2008). The literature highlights a new partnership between research and society in which science has been contextualized and now necessitates interpersonal abilities and behaviors like cooperation and communication (Kolmos, 2009).

The study of the environment and sustainability, which is situated at the intersection of social, economic, and natural systems, is particularly important given the growing complexity, interconnection, and pace of change in the research objects (Stauffacher et al., 2006; Du, Su & Liu, 2013). PBL was seen to be ideally equipped to investigate these links and complexity because of its multidisciplinary focus, embracing of open-ended inquiries, and investigation (Stauffacher et al., 2006).

2.4.5 Democratic and Humanitarian Principles in RLPBL

A further driver behind the adoption of RLPBL is a commitment to what Helle, Tynjala, & Olkinuora (2006) describe as democratic or humanitarian ideals. Kolmos (2009) locates the origins of RLPBL and RLPBL in student protests and demands for greater democracy in TVET in the 1960s and in the early adoption of the approach in training institutions in Germany, Netherlands, Sweden and Denmark.

These principles and how they may be put into practice are described by von Kotze and Cooper (2000) who adopt a RLPBL model developed at the Katholieke Universiteit of Leuven in Belgium. Applying the model in adult education in Southern Africa, these authors emphasize the importance of working in and for the community for social democratic ends. Learners' prior knowledge and experience gained through community engagement and nurtured in collective struggle is valued and brought to bear upon the creation of socially-relevant skills (Von Kotze & Cooper, 2000).

However, while several approaches discuss the importance of interactions with and contributions to the world outside academia (Nation, 2006; Botha, 2010; Cheung & Chow, 2011; Green, 1998). The RLPBL model discussed by Von Kotze and Cooper (2000) is exceptional in its explicit emphasis on social responsibility and the importance of learners and trainers contributing to the communities in which they work, particularly to those members who are less privileged.

Furthermore, De Graaf and Kolmos (2009) suggest that the project approach has not realized its aims for social change and that more emphasis is now placed on its ability to

develop valuable professional skills. They emphasized that project based learning due to the fact that;

Talk to me... and I will forget, Show me...and I will remember, Involve me...and I will understand and Step back...and I will act (De Graaf and Kolmos, 2009)

2.5 Key features of the Real-Life Project-Based Learning

2.5.1 Learning by Doing

Central to the RLPBL approach is the idea that learning is most effective when learners put theory into practice - a philosophy derived from US educationalist John Dewey. In RLPBL the student role changes from learning by listening to learning by doing (Stauffer *et al.*, 2006), a key tenet identified by the majority of studies reviewed (Baron *et al.*, 1998; Van Kotze & Cooper, 2000; Danford, 2006; Nation, 2006).

As Blumenfeld *et al.* (1991) explain that the doing and the learning are inseparable, and the artifact can be shared and critiqued leading to modification and further learning. The hands-on element of the RLPBL approach may be particularly well-suited to some disciplines such as Business Studies which is ‘practical-orientated’ (Botha, 2010) or to Geography with a tradition of fieldwork (Nation, 2006).

However, the use of the approach within a wide range of disciplines which suggests the ‘doing’ element may be successfully incorporated into a broad range of courses such as engineering, medical, Agriculture and business. The central position of the approach as Lehmann *et al.* (2008) point out, is the to a further important characteristic of learning by doing being centered on real-life problems which capture learners’ interest.

2.5.2 Real-life Problem Solving

The real world task is central to the practice of RLPBL across the disciplines (de Graaf & Kolmos, 2009; Thomas, 2000; Bell, 2010; Hanney & Savin-Baden, 2010). This connection between academia and external social, political, and environmental realities is argued to stimulate and sustain student interest and motivation (Bell, 2010). RLPBL learning Centre's on a real-life problem requiring a solution and which, importantly, drives the research and the learning process (Blumenfeld *et al.*, 1991; Stauffacher *et al.*, 2006). A recent review of RLPBL in UK higher education is engineering found authentic content was a key element (Graham, 2010).

Furthermore, the problem must usually be complex and open-ended in order to allow a range of possible solutions and responses (Kahn & O'Rourke, 2004). Examples from the literature range from technical questions, such as how to speed up motion recognition software Otake *et al.* (2009), to those requiring a combination of scientific and social investigations such as a pre-feasibility study for a multi-purpose leisure trail on a disused railway (Nation, 2006), to social issues, such how to help adult learners returning to education (Green, 1998).

Who determines the problem (teacher, student or external partner) varies widely across the cases described in the literature?

Danford (2006) claims that a key feature of RLPBL is that learners have some choice of topics as well as the nature and the extent of the content in the project. Although majority of projects are initially identified by the lead staff member and developed further by learners.

Describing RLPBL in schools, Bell (2010) also insists that the learners' choice of a topic, based on questions that have irritated their natural curiosity, is central to the approach as it fosters their motivation. However, several cases in the literature rely solely on teacher-defined questions. Within RLPBL on sustainability, Brundiers & Wiek (2013) found project teams were rarely solely responsible for choosing and structuring projects and Spronken-Smith and Kingham (2009) provide an example of staff choice of research question for Geography learners examining nitrogen oxide levels in the local environment.

Alternatively, Moehr *et al.* (2004), describing the use of RLPBL with learners of health informatics, see ideal projects as defined by professionals for their purposes rather than specifically for the learners, highlighting the importance of the external partner in some projects. The differentiation between the extent of teacher versus student control of the project forms an essential part of Kolmos's (1996) categorization of project types which includes: (a). The assignment project; this is where the significant input and control is from trainers who choose problems and topics closely related to the academic subject. (b). The subject project; this is where learners choose their methods for investigating their choice of a range of pre-selected problems; and (c). The problem project; this is where the problem determines the choice of disciplines and methods" (Kolmos, 1996).

Each is suitable for various study phases, according to Kolmos, and offers various skills and learning outcomes. Blumenfeld *et al.* (1991) contend that in order for meaningful ownership of the process and investigation to take place, the outcomes must not be preset, not who determines the issue. On whether the problem can be simulated or has to be real,

there is little agreement in the literature. According to Morgan (1983), it might be either, but the students must have some input into how their project is designed.

It is crucial to keep in mind that, as Moehr (2004) stated, certain initiatives entail collaborations with outside customers and provide real professional results that these outside actors may employ. Examples include the worldwide market research conducted for corporate partners by business students at Helia University in Finland (Danford, 2006). Students at Melbourne University conducted feasibility studies for environmentally friendly waste treatment facilities for a new campus in Vietnam, and it was obvious that there was very little student choice in this case (Meehan & Thomas, 2006).

2.5.3 The Role of the TVET trainer: Guide-on-the-Side

Danford (2006) discovered that there is widespread consensus in the literature that the trainer's function in RLPBL changes from sage on the stage to guide on the side. This is because it is a student-centered approach. Due to these increased difficulties, the trainer needed more resources, assistance, and capacity-building. In the RLPBL literature, the trainers' function is frequently described as that of a facilitator (Morgan, 1983; Green, 1998; Frank, Lavy & Elata, 2003; Frank & Barzilai, 2004; Lehmann et al., 2008; Otake et al., 2009). Additionally, Stauffacher et al. (2006) described how the job of the trainer shifts from that of a knowledge distributor to that of a process manager, assisting students in their learning process by kicking off reflection processes and assisting them, as needed, on substantive issues.

Additionally, learning also results from interactions, ideas, and expertise shared by other group members (Frank, Lavy & Elata, 2003). Meehan and Thomas (2006) served as mentors to their environment learners who were working on projects in Vietnam, whereas Frank, Lavy & Elata's (2003) experience working with engineering students in Israel involved the trainer primarily serving as a supervisor and moderator.

Traditional hierarchies may be dismantled thanks to the trainer's new function, as Botha (2010) noted when he discovered that trainees showed trainers what true entrepreneurship is all about. Less control from the teacher encourages students to be more in charge of their own education (Donnelly and Fitzmaurice, 2005), frequently choosing the topic and techniques of the research and using past knowledge to identify their learning requirements (Kahn & O'Rourke, 2004). The majority of projects are guided by the students themselves (Thomas, 2000); in fact, Morgan cites student autonomy and ownership of their own learning as the essential elements of RLPBL (1983).

2.5.4 Interdisciplinary

The RLPBL places a strong focus on interdisciplinary learning (Danford, 2006; Lehmann, 2008; de Graaf & Kolmos, 2009; Otake et al., 2009; Hanney & Savin-Baden, 2013). Projects sometimes integrate the natural and social sciences or include fields outside of the physical sciences (Kolodner et al., 2003). (Nation, 2006; Lehmann, 2008). This emphasis on interdisciplinary learning reflects the idea that HE must provide students the flexibility and holistic thinking to address challenges that transcend disciplinary boundaries due to the complexity of urgent current social or environmental crises.

2.5.5 Collaboration and Group Work

The usage of group work is another essential component of RLPBL (Van Kotze & Cooper, 2000). The student activity, according to Hanney and Savin-Baden (2013), revolves around a complicated series of interactions between team members across time and makes use of a number of crucial transferrable abilities, including teamwork, planning, and communication.

As a result, a component of the learning goals is the practice of working in teams, developing collaborative abilities, and exhibiting cooperative attributes (Danford, 2006). In order to develop new professional skills, behaviors, and networks, collaboration can also involve parties outside of academia (Stauffacher et al., 2006; Cheung & Chow, 2011), such as community organizations (Jarmon et al., 2008), corporations (Danford, 2006), or even an overseas consulate (Korfhage Smith, 2010). While developing vital abilities, group work is also known to increase the risk of conflict and student discontent.

2.5.6 An End Product

The project's outcome is given a lot of attention in the RLPBL method. Quality product production, according to Danford (2006), is a defining characteristic of PBL and one that directs project planning, production, and assessment. The literature describes a wide range of outputs, often dependent on the field, although it is typically claimed that some sort of end result or artifact is desired.

For instance, RLPBL is defined as a protracted action that "results in a product, presentation, or performance" by Donnelly and Fitzmaurice (2005). Products range from a normal dissertation or presentation for academic purposes Spronken-Smith and

Kingham (2009) to a report from a professional consultant Danford (2006) or Nation (2006) to exhibits like fashion displays, reality TV programs, music videos, and board games (Botha, 2010).

The output can be chosen by the students (the South African business studies groups mentioned by Botha (2010) were allowed to choose any end product which might form part of an exhibition) or the academic staff, much like with the question of who defines the problem. Additionally, the finished output is frequently disseminated, either among classmates and faculty members or among other audiences like collaborators in the community or business sector (Danford, 2006). However, Bell (2010) asserts that it's crucial that the target market be acceptable and real.

2.6 Implementation of RLPBL for Competence Development of TVET trainees

Trainers have long recognized the benefit of putting students in real-world situations to help them learn and grasp concepts more deeply (Boss, 2012; Markham, 2011). Similarly, educators have long recognized the significance of projects as a tool for teaching students' new ideas. Project-based learning, however, is more than merely completing assignments, just as it is more than a straightforward real-world experiencing activity (Markham, 2011). Many people view project-based learning as a way to refocus the training approach and transmit the skills necessary to equip students for work in the contemporary global economy, rather than just as an instructional tool (Bell, 2010; Gut, 2011; Markham, 2011; Stanley, 2012).

Recent research on RLPBL in higher engineering education in the UK revealed that genuine material was a crucial component (Graham, 2010). In order to allow for a variety

of potential answers and replies, the challenge should often be complicated and open-ended (Kahn & O'Rourke, 2004). Examples from the literature range from technical issues, like how to speed up motion recognition software Otake et al. (2009), to those requiring a combination of scientific and social investigations, like a pre-feasibility study for a multi-purpose recreational trail on a defunct railway (Nation, 2006), to social issues, like how to assist adult learners returning to education (Green, 1998).

In addition, there are significant differences in the situations mentioned in the literature about who decides the problem—the instructor, the student, or an outside partner. A crucial component of RLPBL, according to Danford (2006), is that learners have some control over the topic, as well as the kind and scope of the project's material. Despite the fact that most projects are originally chosen by the lead staff member and then further developed by students. Bell (2010) emphasizes the importance of the students' choice of a topic while describing RLPBL in the classroom. This decision should be based on questions that pique their natural curiosity.

However, a number of situations in the literature only use questions that the teacher has defined. Kolmos' (1996) classification of project types, which includes: (a) the assignment project, significant input and control from trainers who select problems and topics closely related to the academic subject, includes the distinction between the degree of teacher versus student control of the project. The issue project, where the problem affects the choice of disciplines and techniques, is where learners can pick their methods for researching a variety of difficulties that have been preselected (Kolmos, 1996). Each offers diverse skills and learning outcomes, making it appropriate for different phases of study, according to Kolmos. Nevertheless, Blumenfeld et al. (1991) argue that it is more

important that the results be not preset so that actual ownership of the process and exploration may occur. On whether the problem can be mimicked or must be real, there is, however, little agreement in the literature. According to Morgan (1983), it might be either, but the students must have some input into the project's design.

According to Moehr (2004), several initiatives in Finland and Vietnam entail collaborations with outside customers and result in legitimate professional outputs that these outside actors may make use of. Examples include the worldwide market research conducted for corporate partners by business students at Helia University in Finland (Danford, 2006). The Melbourne University students' feasibility studies for environmentally friendly waste treatment facilities for a future campus in Vietnam (Meehan & Thomas, 2006). Here, it was obvious that the student's options were constrained.

Getachew (2016) looked at the difficulties encountered in adopting a competence-based system in Ethiopia with the goal of enhancing current and future TVET practices. The study found that TVET teacher training was not in line with the demands of competence-based TVET as such through data collecting utilizing questionnaires and unstructured interviews. The study came to the conclusion that because TVET trainers primarily used transmissive delivery approaches dominated by lecturing and trainee assessment methods did not focus on individual competence development, they were not well-prepared to handle their teaching responsibilities as competence-based TVET demands. Trainers were unable to complete industry-based practica, and the only typical professional activities that TVET trainers participated in for professional growth were reading, attending workshops, and attending seminars. Collaboration between trainers was hardly

employed, there was no institutionally-wide professional development strategy, and TVET trainers did not actively conduct research.

Real-life project-based learning represents a radical departure from conventional training methods (Bender, 2012), so a trainer accustomed to that method would likely experience some degree of awareness of the differences between their traditional methods and the novel real-life project-based learning approach. There is material available to assist educators interested in implementing project-based learning, including tools that direct instructors in building units and evaluating students (Mergendoller, et al., 2013).

A case study of the Kaiboi Technical Instruction Institute conducted by Simiyu (2009) in Kenya found, among other things, that the principal and team made sure that machinery and equipment were functional and supplies were easily accessible for the performance of efficient practical training (UNESCO-UNEVOC, 2009).

Wenani (2019) conducted an action research study in Uganda with the goal of enhancing trainees in building and construction at Amero Technical Institute's performance on the Real Life Project module. The results demonstrated that group instruction and learning improved student performance and motivation, which might raise the caliber of TVET graduates. It was also discovered that TVET Trainers were not paying close attention to the project-based learning strategy, endangering the module's effectiveness.

2.7 Assessment Approach of Project-Based Learning of Trainees in TVET

The opportunity to provide and receive feedback, improved relationships between peers and learners and trainers, and increased self-esteem related to formative assessment are the advantages mentioned by the developers of RLPBL (Frank & Barzilai, 2004). Additionally, according to Wilkinson et al. (2002), many students utilized their project

experience as a platform to market their abilities in later job interviews. The methods used to evaluate projects also varied greatly throughout the literature. Numerous initiatives combine different approaches and levels of assessment.

For instance, the evaluation is complicated and multi-leveled in the project-based course mentioned above by Van den Bergh et al. (2006), and while individual marks are provided, all written outputs are collectively generated. Before the final presentation, TVET instructors gather to talk about their supervisees and settle on a group grade. Next, each student receives a unique grade from the TVET trainers based on their performance during the academic year. Each trainer determines their own criteria for this. The group presentation is evaluated by TVET trainers and students, and the group report is evaluated by a panel of trainers.

Other courses include a combination of group product or artifact evaluation, presentation assessment, and written report assessment, which may be completed alone or in groups (Nation, 2006). For instance, a report, a group public presentation, and a viva are some of the ways that learners are evaluated at the conclusion of the semester according to Lehmann et al. (2008). To make sure the evaluation of project processes are taken into account, meeting minutes from groups are frequently included in the assessment (Wilkinson et al., 2002).

In order to allow staff to examine both group and individual contributions, Wilkinson describes a three-stage evaluation process that involved a group report, team meeting minutes, and an individual report for engineering learners' computerized "mouse organ" projects. However, in the business entrepreneurship projects outlined by Botha (2010) no

written assessment was performed and instead TVET trainers used an assessment sheet to evaluate project outputs displayed. Likewise, assessment for a turtle trade survey project solely relied on learners' presentations to local schoolchildren and peer-assessment of videos of these presentations (Cheung & Chow, 2011).

Other institutions' courses include the external client in the evaluation procedure (Danford, 2006; Lockrey & Bissett Johnson, 2013). As Lockrey and Bissett Johnson discuss how different criteria are utilized by industrial partners and academic personnel to score the same student project, this raises the question of the standards employed by outside assessors.

The challenge of evaluating an individual's contribution to group work has been brought up in the literature as one problem (Van den Berg et al., 2006). To overcome this problem, Moehr et al. (2004) describe how students are videotaped as they complete various project components while being seen by their peers through a one-way mirror. Although it's unclear if this is utilized for formative or summative evaluation, it lets the learners who are watching other groups both criticise and learn from them.

Numerous studies also stress how crucial it is to evaluate both the process and the results. Thus, personal (reflective) reports and participation in weekly group meetings, each of which accounted for 10% of the final mark, were evaluated by Frank and Barzilai (2004) in addition to the physical model, presentation, and group report.

a poll on preferred assessment formats among students According to Van den Berg et al. (2006), learners were apprehensive of self- and peer evaluation because they felt they were too subjective but accepted co-assessment (by peers and staff) since it combined a

peer assessment aspect with what they felt was a trainer's involvement as a safety net. The reflective diary was the most popular method of evaluation because, in their opinion, it provided a window into the learning process and group dynamics, served as a means of giving the trainer feedback, and allowed students to defend their performance. Although learners favored formative evaluation of journals, they were also ready for some of it to be summative.

However, students believed that the reflective notebook ought to be private so that no other students could view it and that entries shouldn't be made too frequently. In conclusion, Van den Bergh et al. (2006) discovered that it was difficult to establish appropriate evaluation for the projects and that there was conflict between students' desire for clear standards and TVET trainers' desire for their academic independence. They advise employing a variety of assessment types and adjusting the assessment to the learning environment.

2.8 A Framework for High Quality Project-Based Learning

The HQPBL Framework, also known as the Framework for Quality Project-Built Learning, is based on the knowledge, study, and experience of hundreds of educators who kindly contributed their thoughts and criticism. It lists six requirements that must all be met by a project-based learning method in order for it to be considered to be of high quality. 2018 Buck Institute for Education.

However, the existence of a criterion is merely a starting point and not a goal in and of itself. You can evaluate how well each criterion has been implemented in turn. Projects that meet all six of the following criteria—intellectual challenge and accomplishment, authenticity, public product, collaboration, project management, and reflection—will be

the most memorable and have the biggest influence on students' learning and growth (hqpbl.org, 2018). The six requirements are shortened to (PACIRP).

2.8.1 Project Management process

Students apply a project management methodology that enables them to move efficiently through the phases of project initiation, planning, execution, monitoring, and closing. The following are the leading questions for this criterion: What degree do students:

- Manage themselves and their teams efficiently and effectively throughout a multi-step project?
- Learn to use project management processes, tools, and strategies?
- Use the perspectives and processes of design thinking, as proper?

People work on projects, whether at work or in their personal life, and it helps to be adept at effectively managing time, tasks, and resources. PBL teaches students how to apply project management procedures, equipment, and techniques that are commonplace outside of the classroom. When managing projects, trainees may also adhere to the design thinking process (Buck Institute for Education , 2018).

2.8.2 Authenticity

Students engage in meaningful initiatives that are pertinent to their culture, daily life, and future. How much do students:

- Engage in work that has an effect on or otherwise links to the world outside of the Institute, as well as to their own personal interests and concerns?

- Utilize the equipment, methods, and/or digital technologies used outside of the classroom?
- Make decisions on the subjects, activities, and/or products of the project?

Projects should be perceived as "real" in order to energize students and demonstrate the relevance of what they are learning at the institution. Project-based learning simulates real-world situations that occur outside of the Institute or College. It makes advantage of the resources, methods, and technology there. It should have an effect on other individuals and communities, and it can relate to young people's interests and worries. Project-based learning should allow students to have a voice and make decisions about their work (Buck Institute for Education , 2018).

2.8.3 Collaboration

Students work in groups with other students in person or online, and/or they seek advice from mentors and experts who are adults. Here is the guiding Questions include: How much do students:

- Complete complicated jobs in groups.
- Develop your leadership and teamwork skills?
- Gain experience working together with community residents, companies, and organizations?

In today's environment and business, project-based learning may be conducted on an individual basis. It's crucial to develop your collaborative skills. The majority of the

project work in PBL should be completed by teams. This does not suggest that project activities are simply divided, completed independently, and then thrown together at the end without any synthesis or discussion. When students really cooperate, they bring their unique knowledge, skills, and abilities to a joint project while honoring the contributions of others. In certain projects, students work with adult professionals, people of the community, and organizations in addition to collaborating online with students from other universities (Buck Institute for Education , 2018).

2.8.4 Intellectual Challenge and Accomplishment

Learners pursue excellence, have critical thinking, and deep learning. The Guiding Questions for this criteria include how much do students:

- Conduct extensive research on difficult subjects, concerns, and problems?
- Put an emphasis on ideas, information, and abilities crucial to topic areas and academic disciplines?
- Receive the guidance and assistance based on research as necessary for your learning and project success?
- Commit oneself to producing just the best work?

Project-based learning shouldn't only consist of "hands-on experiences" or "fun activities" that need no thought. When working on a quality assignment, students must first critically consider a complicated topic or subject for which there are many possible solutions. For trainees to effectively finish a project, it is imperative that they understand crucial academic material, ideas, and abilities. It's important to push students to deliver

the best product or service they can. Learners should be assisted and encouraged in their efforts to accomplish this (Buck Institute for Education , 2018).

2.8.5 Reflection

Throughout the project, students reflect on their work and their learning. The following are the guiding questions for this final criteria in the RLPBL framework: What degree do students:

- Acquire the ability to evaluate and make adjustments to their own and other students' work?
- Consider, discuss, and write about the academic material, ideas, and success skills they are learning?
- Use reflection as a method to deepen their understanding of themselves?

Reflecting on our knowledge and actions helps us learn more. Project-based learning teaches students to evaluate the quality of their work and consider how to do it better. They should take frequent breaks to reflect on what they are doing and learning, not just at the end of the assignment but all along. Reflecting on their work helps students remember project material and skills longer, feel more in charge of their education, and become more self-assured (Buck Institute for Education , 2018).

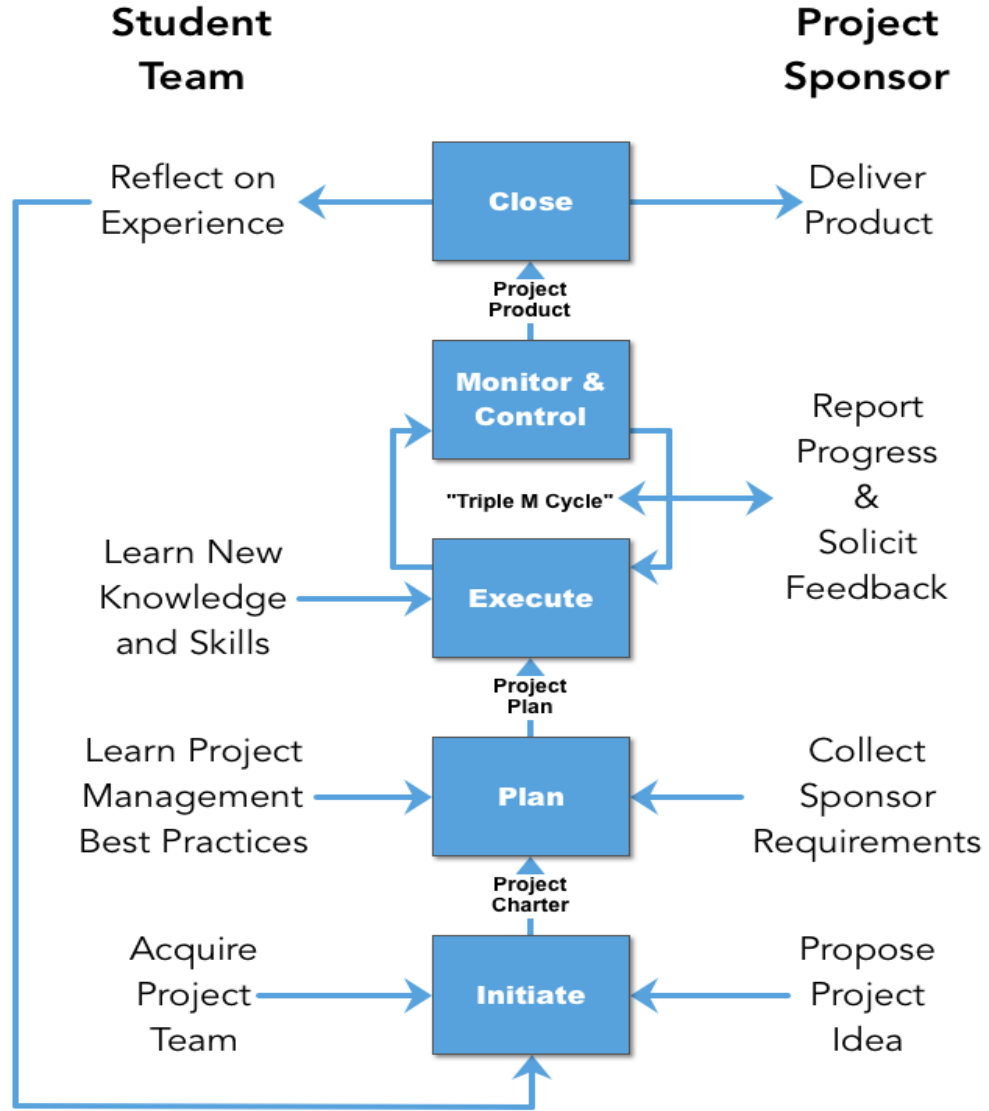
2.8.6 Public Product

The work of students is presented, debated, and reviewed in public. These topics might be the Guiding Questions' primary focus:

- How much do students share their ongoing projects with peers, instructors, and others for feedback?
- Display their work and talk about what they've learned with friends and individuals outside the college? get comments from and interact with their audiences?

In a typical college, the majority of learning takes place in a one-on-one setting between a trainer and student; students do their own work and present it exclusively to the trainer. In project-based learning, learners make their work public by sharing it with those outside of the TVET institute in addition to the trainers. This happens both during project-based learning, during the process of developing a product and conducting formative and summative assessments, as well as after the project is finished, when the result is presented to a panel of experts and debated with an audience. The final presentation and open procedure motivate students to raise the caliber of their work while also showcasing their knowledge and abilities (Buck Institute for Education , 2018). See the below RLPBL process Model

Project-based Learning/Project Management Conceptual Model



Developed by: David Hutchison, PhD, PMP for EduProject.org

Note: The initiate, plan, execute, monitor & control, and close process groups are detailed in the PMBOK® standard. They are referenced with the permission of the Project Management Institute.

Figure 2.1: Project Management Conceptual Model
(Source: Hutchison, D. (2017). EduProject.org)

2.9 Internal and External Quality Assurance

In PBL, Quality Assurance (QA) processes can be internal or external. External QA refers to a situation in which a national QA agency, professional body, or accrediting agency (UBTEB) reviews the operations of TVET (institutional) or its programs to determine the degree of compliance with the established standards (Okae-Adjei, 2016).

Through the use of accreditation, which includes a self-study or self-evaluation, peer assessments by a panel of specialists, and a reporting system, it is carried out. According to Parri (2006), an external QA is required to demonstrate that the institution's objectives will be met. External authorities frequently demand that institutions have effective internal QA procedures.

The internal policies and procedures of a TVET institution or program that guarantee that the TVET institution is carrying out its objectives and is in compliance with the standards that apply to TVET generally or to the profession or discipline are known as internal (institutional) QA (Parri, 2006). According to Boyd & Fresen (2004), both techniques are crucial in varying degrees for a successful QA at TVET institutions. While internal quality assurance may result in continual quality improvement, external quality assurance systems assist and facilitate internal processes.

2.10 The Advantages of RLPBL

According to the literature, the major benefits of RLPBL include improved practical outcomes, the development of broader abilities, an increase in learner motivation and enjoyment, expanded outreach and participation outside of institution circles, and

advantages for trainers. Before focusing on the difficulties with the strategy, each of these will be covered in turn below (ILO, 2015).

RPPBL gives learners the fundamental skills they need to function well in today's industries. These fundamental abilities, which include the ability to learn, communication, problem-solving, and teamwork, are crucial for both workers and the businesses that employ them. They help both groups navigate change and find decent employment while also enabling businesses to adopt new technologies and expand into new markets (Coskun et al., 2016).

2.10.1 Improved Academic Achievement

Although there is some evidence in the academic literature that RLPBL improves academic achievement, very few studies have measured this effect at the TVET level. The majority of studies have instead sought to either describe the project-planning process or comprehend the reactions of the students to the method. Nevertheless, some people assert that their academic performance has improved. Pre- and post-testing was employed at the academic level by Baron et al. (1998) to demonstrate how learners at all levels who participated in their playhouse design project improved in their comprehension and communication of fundamental math and geometry.

Barak and Dory (2003) evaluated the outcomes of two groups of undergraduate chemistry students at a higher education institution in Israel, one utilizing traditional techniques and the other using IT-based project-based learning to create computer models of molecules, in the higher education sector. The project-based learners outperformed the non-RLPBL

group on both qualitative and quantitative criteria in their post-test assessments and final exams, according to the authors.

Additionally, Frank, Lavy, and Elata (2003) discovered that their engineering projects were very beneficial to academically underachieving students since the teaching assistant was able to identify and assist students who needed extra assistance while working on the project. Although learners were motivated and demonstrated better teamwork, communication skills, and understanding of professional practice, one study by Mills and Treagust (2003) found that "they may have a less rigorous understanding of engineering fundamentals," suggesting that improvements in academic standards in RLPBL cannot be assumed. Further study in this area is required since there is a dearth of studies that accurately assess academic development at the TVET level utilizing a control group and/or pre- and post-project assessment.

2.10.2 Wider Set of Skills

However, there is broad agreement in the research that RLPBL aids students in developing a wide range of abilities beyond conventional academic topic knowledge. However, these abilities are not limited to RLPBL and can come from other teaching strategies as well (Frank, Lavy & Elata, 2003).

On the other hand, even if some of these abilities were self-reported through student surveys or other forms of assessment, their existence is not substantiated by facts. However, the range of abilities, which reflects the variety of project types mentioned in the literature, points to the possibility that the strategy may support the development of conventional academic abilities as well as professional and personal qualities. Although it

is debatable whether this is strictly a result of the project method or might be seen in other types of group work, it is frequently asserted that project work improves group work abilities.

Similar to how critical thinking and communication abilities are usually mentioned, various learning styles may also display these traits. According to the literature, students, particularly those working in professional settings like hospital health information departments (Moehr et al., 2004), acquire critical knowledge and skills that are applicable to the workplace, and student evaluations indicate that students value the chance to develop professional skills as part of their academic studies (Joyce, 2013). When project work was voluntary, students voluntarily participated to broaden their knowledge, network, and experience (Otake et al., 2009).

A greater understanding of the larger social context and restrictions experienced by working engineers was also discovered to be gained by learners through the application of RLPBL in engineering (Frank et al., 2003). RLPBL, which is a component of a science and technology MSc, enabled in-service trainers acquire cross-disciplinary topic knowledge, which, according to Frank and Barzilai (2004), increased their understanding of social settings. Other advantages mentioned by the authors were the capacity for giving and receiving feedback, enhanced relationships between classmates and teachers, and enhanced self-esteem related to formative evaluation (Frank & Barzilai, 2004).

Furthermore, according to Wilkinson et al. (2002), many students used their project experience as a means of emphasizing their talents during subsequent job interviews.

2.10.3 Motivation and Enjoyment

The literature evaluations highlight how much students love RLPBL activities and connect this to learning motivation. Some of these findings were drawn through practical experience and years of observation of the approach used in classrooms or higher education institutions rather than study (de Graaf & Kolmos, 2007; Bell, 2010). Others evaluated learners' perceptions of their learning experience using a variety of research techniques.

For instance, Frank et al. (2003) employed observation, analysis, and semi-structured interviews with students to determine that they liked this kind of learning and that it enhanced their drive to study. Student assessments of a sustainability course in Beijing revealed that 100% of participants thought the RLPBL method was more effective and stimulating than a lecture-based approach. While 70% of respondents to Botha's post-course student questionnaire said they loved the project, 90% said they had an average or favorable overall view of it, according to Du, Su, and Liu (2013) (Botha, 2010).

Engineering students at Nottingham University loved a hands-on approach to learning and found satisfaction in finishing a project, according to an analysis of their comments across three years (Joyce, 2013). Notably, Botha discovered that project work happiness was strongly connected with students' development of abilities (Botha, 2010). In the context of education, Thomas (2000) cites a research by Bartscher, Gould, and Nutter (1995) in which 93% of students claimed greater interest in the topics covered and 82% of students said projects helped drive them. Meehan and Thomas (2006) established that students were pleased with the project work through examination of the reflective

component in student reports, films of debriefing meetings, and audiotaped informal interviews.

Similar to this, Spronken-Smith & Kinghams' (2009) student course assessments showed that students liked working on their projects and that the introduction and subsequent modification of PBL increased the course's perceived quality. Dropout rates were dramatically decreased at UCL, where RLPBL is used in five-weekly cycles over the course of the first two years of the engineering program, and RLPBL had received excellent comments from both staff and students (Graham, 2010).

On the other hand, Stauffacher et al. (2006) observed that "a large percentage of learners were always reserved or reticent," and they explained this by pointing out that they were resistant to a novel learning style with non-traditional means of evaluation. The use of problems that are relevant to the learners' interests and experience is also seen as intrinsically motivating (Kahn & O'Rourke, 2004; Graaf & Kolmos, 2007), and it is argued that the element of student choice enabled by project-based learning underpins higher levels of motivation (Blumenfeld et al., 1991; Kahn & O'Rourke, 2004). While Baron et al. (1998) contend that "if learners know they will be performing real-life tasks in the community, they will be driven to study," Van den Bergh et al. (2006) found that students put out more effort in project-based learning than in other courses.

Engineering students at Nottingham University expressed satisfaction for the "flexibility for creativity and invention" given by RLPBL, while Frank et al. (2003)'s study of engineering students found that the rivalry between groups helped enhance motivation (Joyce et al., 2013). Australian design and engineering students also thought that working

with business partners and getting an opportunity to solve real-world issues would motivate them more (Lockrey & Bissett, 2013).

Research on the motivational benefits of RLPBL is, however, less clear-cut. According to Edelson, Gordon, and Pea (1999), it may be more difficult to maintain students' motivation due to the intensive and protracted nature of project work. This claim is supported by in-depth interviews with staff and students conducted as part of a study by Van den Berg et al., who discovered that motivation was lower than expected and decreased throughout the project.

2.10.4 Diverse Learners and RLPBL

There are few references in the literature to issues of gender, diversity, widening participation, or learners with disabilities or different learning styles, aside from brief mentions of the value of having a balance of genders on supervisory teams and the suitability of RLPBL in engaging students with different educational needs and backgrounds (Thomas, 2000).

A small mention of PBL's capacity to serve students with special educational needs and those from various backgrounds may be found in the literature Blumenfeld et al. (1991). Bell (2010) notes that this is anecdotal rather than backed by research. It is suggested that the setting of project work makes it easier to identify and fill up knowledge gaps in students' earlier experiences. Project-based learning, according to Kahn & O'Rourke (2004) and the authors, allows students to study at their own pace and in their own style. However, as will be addressed below, conflicts around group work have occasionally

been caused by perceived inequalities in individual contributions (Mills & Treagust, 2003).

According to Thomas, research by Rosenfeld and Rosenfeld (1998) revealed that RLPBL catered better for students with learning styles unsuited to fact-based transmission, and research by Horan, Lavaroni, and Beldon (1996) based on observational techniques revealed that lower ability students gained the most in social participation and critical thinking behaviors (Thomas, 2000).

However, writers have also noticed challenges controlling "skills progression" where a modular undergraduate Geography degree meant some learners had not attended pertinent courses, especially those giving mathematical skills necessary to the project (Spronken-Smith & Kingham, 2009). It is evident that more study is required in the area of paying attention to the experiences and requirements of various learners within RLPBL.

2.10.5 Enabling Outreach

RLPBL has also been shown to have the ability to encourage interaction outside of the academic setting. The literature offers illustrations of initiatives creating alliances between authorities, business, experts, and communities. One example is a study carried out by students from Ohio University for the Appalachian Regional Commission (ARC), a US government agency charged with promoting sustainable development and reducing poverty. The students conducted a pre-feasibility analysis of an abandoned railway, working with and reporting to local and government leaders (Nation, 2006).

Non-academic partners may profit from this form of collaboration because they gain access to "cost-effective resources (learners)," academic staff knowledge, and global linkages. Danford (2006) as well as the conclusions of the students (Lehmann et al., 2008). Similar to this, student surveys of turtle flesh dealers in China assisted in gathering crucial information for researchers, NGOs, and governments engaged in endangered species protection (Cheung & Chow, 2011).

In addition, partnerships assist students in connecting with experts and potential employers (Nation 2006), and if successful, they can improve the institution's image (Danford, 2006). According to a report by Moehr et al. (2004) on student audits of health information departments in Canada, professionals can benefit from benchmarking their information strategies, they may use the findings of the projects to improve their own operations, and the projects can help create job opportunities for students. Other efforts urged students to consult staff and portrayed other actors or organizations as providers of knowledge and information without the formality of a partnership (Du et al., 2013).

2.10.6 Other Benefits of RLPBL

Academic personnel may benefit from PBL as well. Van den Bergh et al. (2006); Spronken-Smith & Kingham (2009) greater collaboration and integration between students and staff; and the possibility for staff to include their research interests inside their teaching are a few of these. Additionally, project work may reveal significant research gaps (Spronken-Smith & Kingham, 2009).

Khorfhage (2010) discovered that PBL helped staff members' team-teaching abilities, with professors learning from one another and through collaborations with students,

businesses, and governmental organizations. Another benefit of RLPBL that has been mentioned is the chance for students to learn via revision. In one research, students were eager to modify and enhance designs in response to criticism and reflection. They also drew on a range of resources to create iterative changes (Baron et al., 1998).

UK engineering students appreciated the options for revision because, as one student described it, "it forced you to think, and if it didn't work, it forced you to reconsider" (Joyce, 2013). Another benefit of practical projects is that they provide students a better understanding of the field they are studying in as well as a deeper sense of affiliation and connection with the faculty (Frank et al., 2003).

2.11 The Capabilities of TVET Trainers' regarding RLPBL for Competence

Development in Uganda

To better meet social and economic expectations, Uganda is working to improve its education and training institutions. Trainers are viewed as being essential to these attempts to improve quality. In reality, it is acknowledged that the single most important institutional factor impacting learners' accomplishment is the trainers' talents (Educaid.be, 2016).

Trainers have long recognized the benefit of putting students in real-world situations to help them appreciate learning on a deeper level (Boss, 2012; Markham, 2011). Real-life project-based learning, on the other hand, is more than just "doing projects" and more than just a straightforward "real-life" experiential activity, according to Markham (2011); it is a method for reorienting the training approach in order to impart the necessary skills

to equip students for employment in the contemporary global economy (Bell, 2010; Gut, 2011; Markham, 2011; Stanley, 2012).

The implementation of competence-based TVET depends critically on the professional development of trainers and their training of TVET instructors (Gatachew, 2016). In order to prepare trainers for the upcoming competence-based TVET, programs for their professional development and trainer training have been implemented in the Ugandan TVET system.

The results of a survey and interviews with tutors and aspiring TVET trainers conducted as part of Gatachew's (2016) study on the preparedness of training colleges' instructors revealed that the TVET curriculum is an adaptation of engineering courses, with courses chosen from the engineering department and modified by instructors rather than having standard curricula that accurately reflect the current TVET curriculum.

In the meantime, educaid.be (2016) found that the "trainer quality" and in particular the idea of a capable TVET trainer remain to some extent an elusive concept because it involves numerous factors, such as individual qualities (dedication, enthusiasm, caring for learners, patience, resilience, etc.), technical and andragogic competencies, and interpersonal skills (fostering relationships with students and colleagues).

Three Hs have been used to describe the combination: head (knowledge), hands (dexterity), and heart (commitment). What are the ideal qualities in a TVET trainer? is the fundamental query. Lucas (2014) highlighted project-based learning as the andragogic strategy that yields the highest learning results in his background note for the UNESCO-UNEVOC e-Forum on Vocational Pedagogy. He suggested six learning

outcomes wanted in TVET and explained what they are, why they matter, and what we can do about them.

In a perfect world, a skilled trainer would tackle these learning objectives through project-based learning. A TVET trainer is traditionally required to have at least one qualification above the trainee, and vocational training outcomes are described in terms of skills or competencies relating to a particular trade. Recently, however, there has been a greater interest in what are being referred to as 21st century or wider skills. We contend that a variety of skills contribute to the working competence of a vocational trainer and that these skills complement rather than diverge from the set necessary for a "academic" lecturer. Following are the six TVET trainer skills listed in the literature (Lucas, 2014).

1. Routine expertise (being skillful)
2. Resourcefulness (stopping to think to deal with the non-routine)
3. Functional literacies (communication, and the functional skills of literacy, numeracy, and ICT)
4. Craftsmanship (vocational sensibility; aspiration to do an excellent job; pride in a job well done)
5. Business-like attitudes (commercial or entrepreneurial – financial or social - sense,
6. Wider skills (for employability and lifelong learning).

2.11.1 Routine Expertise is the Core of Working Competence

It requires the capacity to carry out expert routines and tasks at a high quality. It has to do with the application of substances, tools, and intangible ideas. Practical skill can only be

attained with time and experience. According to Anders Ericsson, becoming an expert generally requires 10,000 hours of focused practice (Ericsson et al., 1993).

2.11.2 Resourcefulness

Sometimes a skilled TVET trainer has to pause and reflect. They need to be able to react appropriately if they come upon something unusual. Expert trainers are able to recall information that applies to novel and unexpected circumstances, going beyond the routine and the familiar. Trainers must be able to apply their expertise in a variety of settings that may not exactly mirror those encountered during training (Ericsson et al., 1993).

2.11.3 Functional Literacies

Literacy and math/numeracy abilities are referred to as functional literacy. The capacity to grasp published and written materials relating to various situations in order to identify and comprehend pressing concerns is referred to as having literacy abilities. The capacity to use facts and other calculated ideas in different situations to solve a variety of issues is referred to as having numeracy abilities (Lucas, 2014).

2.11.4 Craftsmanship

Craftsmanship is the enjoyment, satisfaction, and perseverance that come from performing a good job (Berger, 2003). We believe that the craftsmanship has been severely underrepresented in the literature on vocational education and training. Strong arguments are presented supporting this conclusion by Rose (2005) *The Mind at Work* literature, Richard Sennett's *The Craftsman* by Giovannini et al. (2015), and Crawford (2009) *The Case for Working with Your Hands*.

2.11.5 Business-Like Attitudes Are Essential

Work may sometimes be not for profit. Many services, for example in social services and healthy and the environment are 'third sector' and not run for profit. A business-like attitude would manifest itself in behaviours such as punctuality, orderliness, willingness to put in necessary time and effort, and exhibition of customer care service that exceed client expectation (Lucas, 2014)

2.11.6 Wider Skills

The different categories of "wider talents" that are considered vital include "broader skills," "competencies," "dispositions," "capabilities," and "habits of mind." In addition to highly developed fundamental talents, employers frequently want individuals with broader abilities such as problem-solving, teamwork, resilience, and entrepreneurialism. According to certain academic research, project-based learning experiences can help students develop the 21st century abilities that the Partnership for 21st Century Skills has identified. Bell (2010), Barell (2010), and Bender (2012).

2.12 TVET Managers roles in implementing Real-life Project-Based Learning of Competence Development of TVET Trainees in Uganda

Real-Life Project-Based Learning (RLPBL) is a significant instructional approach that helps students master employment skills and subject knowledge, develop life skills essential for future success, and develop the personal organization needed to tackle challenges in their lives and the rest of the world, according to an increasing number of educators worldwide, both in and out of the classroom. It is thought to provide a significant contribution to competence-based education and training (CBET) procedures

by raising trainees' levels of competition in terms of knowledge, attitude, and life skills for gainful work and entrepreneurship (Project Management Institute, 2013).

Real-world project-based learning offers many admirable goals and objectives, much like many other learning programs. However, it is still to be seen if TVET Managers will effectively support the new learning endeavor and whether the well-intentioned principles introduced into the curriculum will transfer into capabilities for the real world of work (ILO, 2015). No of their ability, location, or background, all students should have access to excellent Real-life Project-Based Learning.

Terblanche (2017) used data analysis, a survey, and focus group interviews to conduct a research on the leadership potential of TVET institutions to drive curricular change in South Africa. According to the study, the TVET institution leadership need ongoing capacity training in order to comprehend new methods of curriculum reform. Such programs ought to address the social and cognitive skills needed for institutional leaders to manage curriculum change and its associated difficulties, as well as management techniques for present and upcoming difficulties in curriculum, such curriculum design and development. The study also showed that industry engagement and assistance in the TVET sub-sector were essential for curriculum renewal, increasing trainee employability, and addressing the shortage of industry expertise and experience among TVET Institution executives (Terblanche, 2017).

In Libya, Triki (2010) conducted research utilizing a quantitative, exploratory, and descriptive technique on the technical and vocational education and training program for the country's chemical industry. This study showed that there was no structure to increase

the connection between TVET providers and the sector that educational TVET managers might utilize to establish new TVET or enhance already-existing TVET.

In Uganda, Kintu et al. (2019) used a modified SCANS (Secretary's Commission on Achieving Necessary Skills) questionnaire to conduct research on employers' perceptions of TVET graduates' employability. According to the study, the majority of employers have a poor opinion of TVET graduates' ability to manage money, materials, and facilities as well as decision-making, reasoning, self-esteem, sociability, and integrity. This may be because the majority of employers are not involved in curriculum design. The study suggested that TVET institutions could improve the areas that were adversely regarded by teaching trainees the required employability skills so they could become easily employable. There is still a lack of consensus about the components of real-world project-based learning. Recently, professionals and organizations have developed a variety of RLPBL models and standards. Usually, these are written from a managerial position viewpoint (UNESCO-UNEVOC, 2009). Institutional management should pledge to develop and provide trainers and trainees with resources and services that will assist them in implementing project-based learning in accordance with the six RLPBL criteria.

The establishment of an RLPBL school culture is another duty of management. It is crucial for initiatives to be successful. structural requirements including flexible regulations for curriculum delivery and evaluation and enough time for TVET educators to study and plan. The underlying idea that all students can learn and that their voices should be heard in their own education and training is also significant (UNESCO-UNEVOC, 2009).

Project-based learning gives students more control over their learning than more conventional instructional methods do, so TVET managers who adopt a project-based learning instructional approach must be dedicated to best practices in student learning and best practices in the management of that learning. To be effective, it has to be well-organized, well-planned, and well-managed. However, within a rich collaborative inquiry learning culture, project-based learning may successfully act as an educational canopy beneath which a variety of training methodologies are deployed (Bender, 2012).

Project-based learning does have certain advantages, but it cannot solve all training problems. Project-based learning should be utilized by TVET trainers sparingly, in conjunction with other training methods, and in ways that make the most of each instructional strategy's advantages. 2016 (Hutchison)

Project-based learning and the "4Cs," which are defined as "critical thinking and problem solving, communication and cooperation, and creativity and invention," are linked in some of the research that has been evaluated (Bender, 2012; Bell, 2010; Gut, 2011; Barell, 2010). Training institution executives should make a commitment to developing the skills and circumstances required for TVET instructors to execute real-world Project Based Learning as outlined in the seven RLPBL stages.

2.12.1 Real-life Project based learning Phases

Seven project phases, according to Hutchison (2016), contribute to promote project-based learning management. They consist of initiating, planning, carrying out, evaluating, publishing, and finishing. Notably, the processes of executing and assessing are completed simultaneously.

1. Preparing

Through organized lectures, activities, and conversations, learners are prepared for project-based learning throughout this phase. The instructional context is built up by the trainer to promote project-based learning. This might involve modifying the classroom's physical layout to encourage collaborative inquiry (e.g., grouping tables and chairs).

2. Initiating

An concept for a project is summarized at the initiating phase, and permission to move further is obtained. The trainer, one or more students, or an outside sponsor can all launch a project. The initial project team members have been chosen. The project's scope has been established. Making sure a project idea is feasible is a critical objective at the beginning phase (e.g., not too ambitious or time consuming). A notion should ideally be written down and presented to the trainer and/or a group of peers, especially in the event of a project that was started by a student or sponsor. A project enters the planning phase after the Principal and/or trainer give their approval for it to continue forward.

3. Planning Phase

The planning phase entails laying out a project's plans in detail and gaining stakeholder support. A formal project proposal is created, which may include information regarding the length, target audience, sponsor, client, justification, learning outcomes, deliverables, staff, resources, budget, tasks, timeline, risks, and evaluation rubrics, among other things (depending on the situation). The project enters the executing phase when the project proposal is approved. The project proposal is transformed into the project plan, which is used to gauge the project's progress.

4. Executing and 5. Assessing

Executing and evaluating a project entails overseeing its advancement in order to increase its likelihood of success. According to the project plan, the project is carried out. The project team members have a continuing duty to monitor, document, and report on their progress to one another and the trainer. Additionally crucial are regular updates to the project sponsor (if appropriate).

When a project team's work is being checked, the trainer is an essential player. Trainers facilitate meetings to change the project plan as needed, for instance, and give learners direct instruction to assist the project-related knowledge, attitude, and skill development of the learners.

The trainer uses appropriate objective and curriculum-based assessment methods to formatively evaluate the work of the project team and individual learners throughout the executing and assessing stages.

When a student team regularly assesses the project's development in comparison to the project plan, the Triple-M Cycle initiative demonstrates that project-based learning is successful.

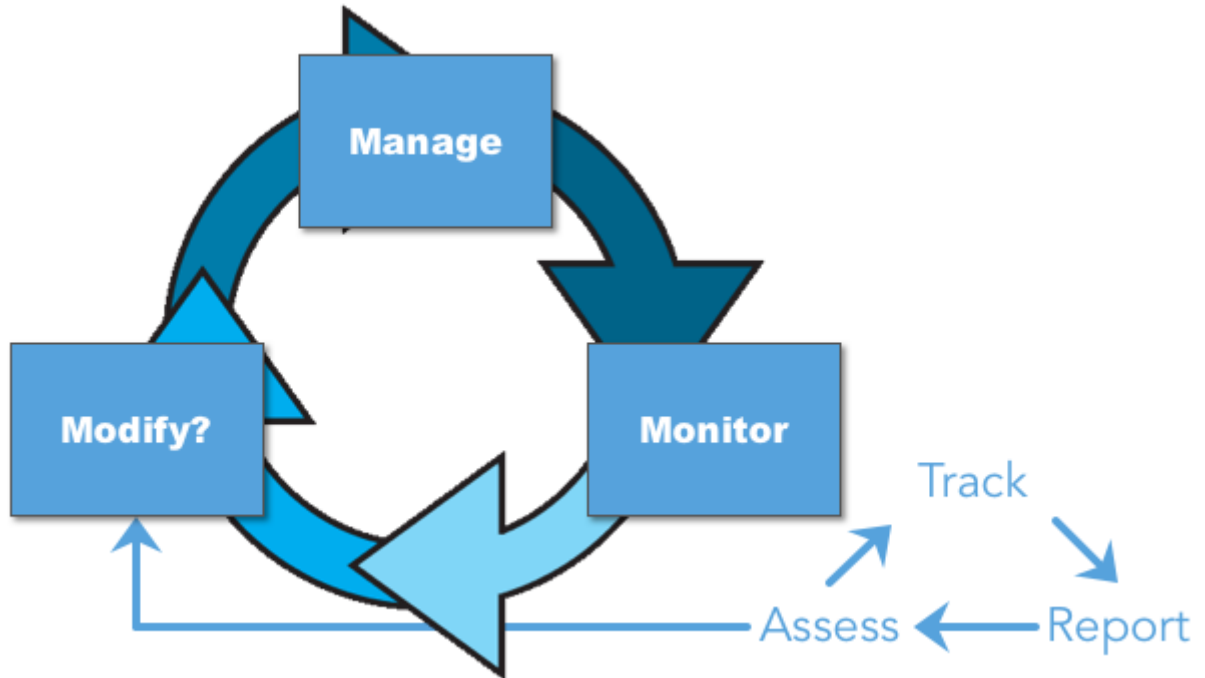


Figure 2.2: Triple-M Cycle (5 Source: Hutchison, D. 2017. EduProject.org.)

Hutchison (2016) created the Triple-M Cycle (see picture above), which organizes the processes of managing, monitoring, and modifying, based on the project management standards. These are the monitoring sub-processes:

2.12.2 The monitoring sub-processes

1. Tracking: A procedure for keeping records. The project team uses a series of text and visual organizers that have been carefully chosen to continuously track its development.
2. Reporting is a form of communication. Each member of the project team updates the other members on their progress as well as, and perhaps more significantly, the trainer and project sponsor.

3. Assessing: The act of evaluating. In light of the project's development, evaluations of the product quality and time management are made. Projects that don't follow the project plan will need to have their requirements revised, and the project plan will need to be updated.

6. Publishing

The distribution of the finished product(s) to others is what this is. The idea of openly sharing project outcomes with others is fundamental to project-based learning. The open sharing of project results emphasizes the project-based learning's real-world focus. As students prepare the finished products of their projects for distribution to audiences outside than the project team, instructors, and classmates, it also raises the incentives for learners.

7. Closing

Closing is the formal conclusion of the project. The project team meets with the college administration, the project sponsor, and the reviewing body to request their summative feedback and obtain approval for the finished output. The project assets are archived, which includes the finished product, interim deliveries, status reports, and other documentation (and, where workable, digitized). The project team concludes it with reflection exercises, talks, and/or documentation of best practices and lessons learned. Both are incorporated into future projects, and the contributions of each team member are acknowledged (Hutchison, 2016).

2.13 Challenges in implementing real-life project-based learning for competence development of TVET Trainees in Uganda

Real-world project-based learning is seen as an innovation for CBET curriculum implementation. CBET is a significant educational innovation in vocational training that comes with a number of requirements, making its implementation difficult (Wesselink, et al., 2003). For instance, CBET demands a complete shift of attitudes, practices, and understandings of the teaching and learning process as well as evaluations, which is difficult for trainers who previously worked in the conventional educational setting (Gulikers, 2009; Kouwenhoven, 2003; Wesselink, 2010).

In a similar spirit, Kwakman (2003) said that CBE trainers no longer impart pre-made information but rather assist the trainees in conducting research and creating their own expertise. This suggests that, prior to implementation, TVET educators should acquire sufficient knowledge and awareness of not just the principles governing the CBET system but also of what CBET really includes. In a similar spirit, project-based learning in real-world settings requires that TVET Trainers be well prepared in advance.

For underdeveloped nations like Uganda, preparing these trainers for RLPBL is a difficult endeavor since it takes a lot of time, effort, and money. A favorable attitude toward RLPBL must also be developed, and teacher training programs must be restructured.

Additionally, CBET implementation necessitates collaboration between educational institutions on many levels, which takes a lot of work (Wesselink, 2010). In order to establish the internship program as a foundation for tying classroom learning with

workplace practice from the planning phases to implementation, the cooperation of employers with TVET colleges is essential.

RLPBL necessitates a variety of training resources and facilities since it emphasizes the development of individual competency. This allows students to continually practice both independently and in groups. Given the foregoing, RLPBL's requirements differ significantly from those of conventional educational methods. These conventional procedures, which make up the bulk of the educational system in Uganda, place a greater emphasis on theory and the dissemination of information than on practical demonstration. Therefore, for the effective implementation of educational programs like PBL, countries like Uganda need to develop a solid basis in terms of manpower, resources, institutional structure, and the right mentality.

The TVET Trainers play a crucial role at various stages in any educational reform (Campos, 2005; Carl, 2009; Handler, 2010). In reality, Gulikers (2013) and Wesselink (2010) emphasized that the trainers are ultimately responsible for the competence-based education's practical implementation. According to OECD (2011), trainers who actively participate in policy creation and implementation create a sense of "ownership" over the change, which boosts the chance of reform implementation success. Other studies are less certain about the motivating benefits of PBL. According to Edelson et al. (1999), it may be more difficult to maintain learners' motivation due to the intensive and protracted nature of project work. This claim is supported by in-depth interviews with staff and students conducted as part of a study by Van den Berg et al. (2006), who discovered that motivation was lower than expected and decreased throughout the project.

Trainers have difficulty implementing RLPBL, according to Harris' (2014) study on the difficulties of project-based learning in Pittsburgh middle schools. He also discovered the top five difficulties that project-based training implementers thought would be the most difficult. The following criteria have to be met: "Time to implement," "Meeting all testing accountability requirements," "Implementing the project within the school's timetable," "Fitting all the standards," and "Designing the project." Because the learning experiences connected to project-based learning are typically group-based, cross-curricular, and complex, some trainers may find it difficult to assess project-based learning during training (Bell, 2010; Bender, 2012; Boss, 2012).

Other difficulties include managing student groups, transitioning from giving instructions to allowing more group work, and co-teaching with other educators. working along with other trainers, Complying with all standards and the testing accountability requirements (Harris, 2014).

Intykbekov (2017) conducted study on project-based learning, its advantages, and difficulties among secondary school teachers in Kazakhstan. His sample, which included four male trainers who teach Chemistry, Computer Science, English, and Physics at a Kazakh-Turkish Lyceum in the northern region of Kazakhstan, was based on a qualitative case study. Lack of time, lack of knowledge, and issues with group work were listed as the difficulties the participating trainers faced when implementing RLPBL. However, he also confirmed that RLPBL is a helpful teaching strategy that has the potential to increase trainee engagement and help them comprehend the subject material more deeply through self-learning and learning by doing.

In addition, Triki (2010) did a descriptive and exploratory research in Libya to find out how engineers and technicians in the manufacturing and chemical industries felt about TVET programs and other work-related concerns. According to the report, there was a significant mismatch between TVET results and the precise needs of the sector.

It also showed that the TVET sub-sector is plagued by a lack of people and physical resources, a lack of a framework for the advancement of TVET, and a widening gap between TVET institutions and the industry.

Meeting state accountability norms is a topic that is addressed in certain literary works (Bender, 2012; Markham et al., 2003). According to Markham et al. (2003), "standards-focused" project-based experiences must be developed in order to "blend well with the era of responsibility and performance."

The research made the recommendation that the trainer should have several one-on-one sessions with the trainee in order to analyze the project's development and individual contribution. Trainers also demonstrated the need to take extra time out of the usual schedule, for instance, to address the difficulty of time for project-based learning planning and implementation.

A real-life project-based learning method has the potential to improve the competence development for employment, competitiveness, and growth of TVET trainees in Uganda, according to the reviewed literature. Although there has been some effort to realize competence-based training through real-world project-based learning, little is known about how it is being implemented. It is also unknown whether TVET trainers adhere to the process or possess the necessary skills, and the challenges in the Ugandan context

given the severe limitations seen in other countries, such as a lack of training facilities, a weak school-industry linkage, being a new approach, and complexity of implementation.

2.14 Research Gaps

The finest teaching and learning practices for TVET must be understood if it is to be improved in all of its varied forms. An effective model of vocational pedagogy, or the science, art, and skill of imparting vocational education, in brief. It is necessary to clearly and confidently articulate the teaching and learning approaches that are most beneficial for a variety of learners wanting to develop skills, competencies, and attitudes in a variety of circumstances (UNESCO, 2014).

In contrast to the past, workforce training is today seen as being of utmost importance.

Compared to a university education, vocational education was considered an education for failures. However, there is worry that TVET education institutions, particularly in poor countries, do not currently offer the skills required for the 21st century, particularly those in innovative processes and services (UNESCO, 2014).

Technical, Vocational Education and Training (TVET) is known as Business, Technical, Vocational Education and Training in Uganda since it involves business education (BTVET). The BTVET Act is the most important legal framework directing the creation of policies and changes for this educational sector (2008). The Act states that the goal of BTVET is to increase an individual's productivity potential for employment and self-employment and to provide a greater number of people with relevant and high-quality knowledge, values, and skills for purposes of academic advancement and employment in the labor market (GoU, 2008). Van den Bergh et al. (2006) claim that there is improved

collaboration and integration between students and staff, as well as staff members' capacity to apply their findings within their teaching.

According to Khorfhage (2010), PBL improves team-teaching abilities since members learn from one another and from collaborations with students, businesses, and government organizations.

Another benefit of RLPBL that has been mentioned is the chance for students to learn via revision. In one research, students were eager to modify and enhance designs in response to criticism and reflection. They also drew on a range of resources to create iterative changes (Baron et al., 1998). Another benefit is that practical projects provide students a concrete understanding of the field they are studying in as well as a better sense of affiliation and identification with the instructors (Frank et al., 2003).

Additionally, RLPBL promotes a diverse body of knowledge that prioritizes unconventional academic discourses and methodologies including oral histories and regional environmental knowledge (Botha, 2010). Other research discovered that students' participation in sustainability and/or conservation initiatives led to pro-environmental behaviors (Cheung & Chow, 2011).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter focuses on the methods used to carry out the study. It covers the philosophical research paradigm, research design, study area, target population, sample size and sampling technique, study variables, data collecting tools, validity and reliability of tools, administration of research tools, data analysis, and ethical issues.

3.2 Research Philosophical Paradigm

The methods used to conduct research studies differ from one study to the next. There are clear guidelines or standards that direct a researcher's activities and assumptions when performing a study. A paradigm is a set of criteria and regulations like these. According to Weaver and Olson (2006), paradigms are collections of ideas and behaviors that control how research is conducted within a field by providing the tools, frameworks, and procedures for doing so.

Furthermore, Pragmatism is an emerging research paradigm where practical abilities and the effects of concepts and behaviours are important components of meaning and truth. This research paradigm supports the use of mixed methods of inquiry concurrently to generate evidence to support best practice while maintaining a prioritized focus on trainee outcomes (Shaw et al., 2010). As a result, the pragmatism paradigm was chosen as the proper philosophical paradigm to support this investigation.

The American philosopher and educator John Dewey's justifications and explanations of pragmatism serve as the foundation for this research (1859-1952). According to Dewey, pragmatism emphasizes learning via experience rather than formal teaching and memorizing of facts. Dewey defended his ideas by pointing out that students should be trained to be orderly and adaptable so they may become used to a constantly changing environment. Learning strategies that emphasize practical problem-solving, group projects, experimentation, and collaboration frequently assist students in becoming responsible and productive citizens in the future.

The word "pragmatism" comes from a Greek word that means "to be active." The reality or essence of any information or a claim, according to pragmatism, is in its observable practical implications rather than anything abstract (Sharma et al., 2018). Learning by doing is emphasized in pragmatic training as an alternative to memorizing of facts, attitudes, and abilities (Khasawneh, 2014).

The emphasis of pragmatist's' instructional strategies is on practical problem solving, experimentation, and projects, usually requiring students to work in groups. The curriculum takes into account how various trades might collaborate to focus on solving actual issues in a multidisciplinary manner. Pragmatists contend that new students should do experimental inquiry to apply their knowledge to actual circumstances rather than receiving structured forms of information (Syeed et al., 2022).

As a result, this method equips students for future employment, daily life, and citizenship. In social science research, pragmatic techniques are used to obtain information about the study topic by focusing on it (Creswell & Plano Clark, 2007;

Morgan, 2007; Patton, 1990; and Teddlie & Tashakkori, 2010). Pragmatism is not dedicated to any particular system of reality or philosophy (Morgan, 2007 and Creswell, 2014). Additionally, Mackenzie & Knipe (2006) contend that techniques from both positivist and interpretivist perspectives may be included in pragmatism.

The four basic types of pragmatism, according to Sharma et al. (2018), are biological pragmatism, experimental pragmatism, nominalist pragmatism, and humanistic pragmatism. However, because it focuses on real-world initiatives, this research will be grounded in experimental pragmatism. Pragmatists are experimentalists who think that the experimental method is the foundation of modern science. It is true that it can be discovered through experimentation.

No truth is absolute; truth is only understood to the extent that it is useful in actual practice. This standard of truth is employed by pragmatists in all aspects of life. Only through experimentation can the issues facing humans be resolved. They value action over ideas more highly. The way to gain competence is via activity. As a result, the qualitative or interpretivist paradigm was coupled with the quantitative/positivist paradigm in this study. In addition to other factors, the positivist approach uses quantitative techniques, whereas the interpretative view favors qualitative techniques (Sharma et al. 2018).

3.2.1 Implication of Pragmatism to the Learner and to the Trainer

The pragmatic approach of teaching adheres to the notion of practical utility. The pragmatic method is an activity-based approach that emphasizes learning by experience and preparing students for real-world situations (Sharma et al., 2018). As a result, the

trainer's job is to motivate the trainee to explore and engage in creative learning on his own. Learning via experience fosters creativity, self-assurance, and teamwork. The trainer is viewed as a coworker, a mentor, and a facilitator by pragmatics.

The major responsibility of a pragmatic trainer is to pose challenges to his students and encourage them to come up with workable answers on their own. The instructor must offer chances for the learner's intrinsic abilities to naturally grow.

The positivist paradigm is founded on strict guidelines for measurement and reasoning, on the reality of things, and on unchangeable logic and prediction (Andrew, 2005; Cole, 2006; Weaver & Olson, 2006). Such rigid ideas won't be able to take into account the opinions of the numerous target groups on the topics under investigation.

As a result, the research approach will include qualitative techniques. By combining the two paradigms, the study will have access to both objective and subjective data, which will be examined to learn more about the impact of project-based learning on TVET trainees in Uganda's competence development.

3.3 Research Design

This thesis used a mixed-methods approach using a descriptive survey design. A research approach that promotes the systematic integration, or "mixing," of quantitative and qualitative data within a single study or ongoing program of inquiry is referred to as "mixed methods."

This technique was chosen primarily because it provides for a more thorough and effective use of data than separate quantitative and qualitative data collecting and analysis

(Creswell et al., 2011). This design's objective was to thoroughly examine the project-based learning strategy used in Uganda to increase the competency of TVET trainees. In a study, mixed methods research, according to Creswell (2014), mixes or integrates both quantitative and qualitative research and data. As a result, using a variety of methodologies in combination helps researchers to provide a more complete picture of the issue under investigation.

The authors go on to say that mixed-methods design takes into account a variety of data gathering techniques as well as a mixture of methodologies (qualitative and quantitative). Creswell (2013) asserts that a mixed methods approach enables various viewpoints or more thorough comprehensions of study findings. The researcher claims further that this approach will support the validation of both qualitative and quantitative procedures. Regardless of the length of the data collection period, participants' information will be gathered from them all at once (Creswell, 2011).

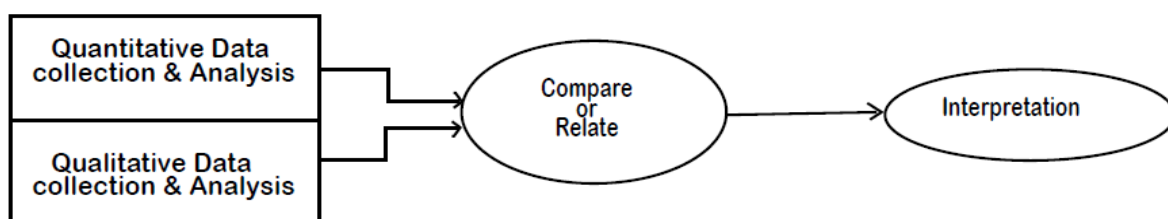


Figure 3.1: Graphical representation of mixed methods: convergent parallel design

(Source: Creswell, 2011)

As a result, one of the fundamental justifications for this design was that one data gathering form provides strengths to counteract the weaknesses of the other form (Creswell, 2011).

The benefits of using a mixed methods study are mentioned below.

Those from mixed techniques are compared to data from pure methods. It helps to explain discrepancies between quantitative and qualitative data. Second, mixed methods ensure that the research findings are based on the experiences of study participants and give voice to their point of view.

Thirdly, hybrid methodologies encourage academic dialogue. These investigations foster contact between researchers using mixed, quantitative, and qualitative research approaches, which broadens interdisciplinary team research. Fourthly, mixed techniques can clarify more information than is possible with simply quantitative research since they are very flexible and can be adapted to numerous study designs, including observational studies and randomized trials. By combining quantitative and qualitative data, it gathers rich, thorough data that mimic how people naturally get knowledge.

For instance, sports tales commonly combine qualitative (descriptions and photographs of highlights) and quantitative (scores or the number of errors) data to provide a more comprehensive story than each approach could achieve on its own (AHRQ, 2013).

However, mixed methods studies are difficult to implement and make assessments more complex. Mixed-method studies are difficult to organize and carry out. The study sample for the qualitative and quantitative sections of the research—whether it be same, embedded, or parallel—the scheduling (the order of the qualitative and quantitative portions), and the strategy for integrating data—all require careful consideration. For many researchers, integrating qualitative and quantitative data during analysis can be a difficult stage.

3.4 Study Area

About 800 kilometers inland from the Indian Ocean, Uganda is a country in East Africa that is situated across the equator. The most northerly and southerly points of Uganda's location are in latitudes $01^{\circ}29'$ S and $04^{\circ}14'$ N and longitudes $29^{\circ}34'$ E and $35^{\circ}02'$ E, respectively. Uganda's latitude and longitude are designated as $1^{\circ}00'$ N and $32^{\circ}00'$ E, respectively. Kenya to the east, South Sudan to the north, the Democratic Republic of the Congo to the west, Tanzania to the south, and Rwanda to the southwest border this landlocked nation. Its overall area is 241,551 square kilometers, of which 200,523 square kilometers are taken up by land (UBOS, 2017).

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The study was conducted at Uganda Technical College Bushenyi (UTC Bushenyi)-Bushenyi District based in western region and UTC Elgon-Mbale District in Eastern region of Uganda respectively. A total of ten (10) Vocational Training Institutes (VTI) from four regions of Uganda were selected. SASIRA Technical Institute in Nakasongola District and St Peters Kisubi Technical Institute-Wakiso District, Nakawa Vocational Training College and Ntinda Vocational Training Institutes-Kampala City in central

region. Iganga Technical Institute in Iganga District and St Kizito Madera Technical institutes-Soroti City in Eastern Uganda, Kiryandongo Technical Institute in Kiryandongo District and Kitgum Technical Institutes-Kitgum District in the Northern region, Kibatsi Technical Institute-Ntugamo District and Rwentanga Farm institute-Mbarara City from western region of Uganda.

S/N	Name of Institution and type	District/City	Region
1	Uganda Technical College (UTC) Bushenyi. Diploma awarding Institution	Bushenyi	Western region
2	Kibatsi Technical Institute. National certificate warding Vocational training Institute.	Ntugamo	
3	Rwentanga Farm Institute. National certificate awarding. Vocational training Institute with focus in Agriculture.	Mbarara City	
4	Uganda Technical College Diploma Awarding Institution	Elgon. Mbale City	Eastern Region
5	Iganga Technical Institute; Certificate awarding institution	Iganga	
6	St. Kizito Madera Technical Institute National Certificate awarding Institution	Soroti City	
7	Nakawa Vocational Training College Diploma awarding Institution	Kampala City	Central
8	Ntinda Vocational Training Institute. National Certificate Awarding Institute	Kampala	
9	St Peters Kisubi Technical Institute National Certificate awarding Institute	Wakiso	

10	Sasira Technical Institute	Nakasongora
11	Kiryandongo Technical Institute	Kiryandongo Northern Region
12	Kitgum Technical Institute	Kitgum

Table 3.1a: Location and type of Institutions involved the study

A accredited public tertiary institution, Uganda Technical College Bushenyi is located at 0.5475° S and 30.2459° E. It is overseen directly by the department of Business Technical Vocational Education and Training and is part of the Ministry of Education and Sports (BTVET). The University and Other Tertiary Institution, Act of 2001 governs it. The training of Diploma technical programs is required.

The district of Bushenyi has the Uganda Technical College Bushenyi, which is situated 50 kilometers along the Mbarara City-Kasese route. It is located in Bushenyi District, which has a population of 234,443 and is about eight (8) kilometers from the town of Bushenyi (UBOS, 2017). 700 students and 97 employees attend UTC Bushenyi.

Uganda Technical College Elgon (UTC Elgon) is a government-run postsecondary institution in Eastern Uganda that offers technical education and training at the diploma and certificate levels to the local populace. Its coordinates are 1.1533° N and 34.2183° E. It is located at the base of Mount Elgon and is about 14 kilometers away from Budadiri. The institution was chosen because it has the most students—922 at the moment—and it was founded in 1931.

The Ministry of Education and Sports has designated the three colleges as centers of excellence for TVET in Uganda, which is why they were chosen for this research. The 10

Vocational Training Institutes were chosen for this study's sample because of their variety in offering representation from all four regions of the nation. Despite sharing many of the same traits as the VTIs chosen for this study, being more accessible, and having a larger student population, other VTIs were taken into consideration. As a result, these research locations were suitable for examining the effects of project-based learning on the competence development of TVET trainees in Uganda. Appendix I shows the 116 districts of Uganda and the location of the twelve (12) institutions for this study.

3.5 Target Population

All components—individuals, things or objects having the qualities under study—made up a population or a target population. However, the researcher considered the main feature of the selection of study population to coincide with the study ethics which is based on the principle of willingness of participants to engage in the study (Shahroni et al., 2022). The 60 Ministry of Education & Sports officials, included the Uganda Business & Technical Examinations Board-UBTEB (20) People, the National Curriculum Development Centre (5), the Principals of the Training Institutions (12) and MoES headquarter (23). The 120 Heads of Department from Vocational Training Institutions, 400 TVET trainers, and the 4000 trainees made up the population for this study totaling to 4580 persons. The trainees were Ugandans pursuing national diplomas at technical colleges and national certificates at vocational training Institute facilities. About 10% of this population was female. This is as a result of the low enrollment of females in TVET institutions. The distribution of the target population is shown in Table 3.1.

Table 3.1: Target Population

Target Population	Total number
Ministry of Education & Sports officials, examining body, NCDC and Principals of Training institutes and colleges	60
Heads of Department of Training institutes and Colleges	120
TVET Trainers of Training institutes and Colleges	400
Trainees of Training Institutes and Colleges	4000
Total	4580

3.6 Sampling procedure

Sampling is a strategy for selecting a subset of a population to participate in the study (Taherdoost, 2016). It is the process of choosing a number of participants for a research in a way that ensures the chosen participants accurately reflect the broader group from which they were chosen. To choose the respondents, simple random sampling and purposeful sampling was utilized. A sample size of 21.1 for descriptive research was considered adequate (Mugenda & Mugenda, 2003). A sample size of 488 respondents was obtained using the sampling error formula (Creswell, 2011, pp. 609–612). These included 36 Heads of Department, 76 TVET trainers, 3 Ministry of Education personnel, 3 examination body, and 2 National Curriculum Development Center officials, as well as 12 Principals and 356 trainees who were divided into 30 groups of each 12 trainees on average.

The study used two methods of sampling. First, the researcher chose officials from the Ministry of Education, including TVET experts, officials from the examining body and National curriculum development center, as well as Principals. The department heads in training institutes and colleges, using non-probability sampling and purposive sampling.

The trainers and trainees selected at the vocational training institutes and colleges were chosen using purposive sampling method. The researcher discussed with the trainees and instructors who were involved in the real-life project-basing learning. This was because these groups belong to the target demographic and have the qualities needed for this investigation.

3.7 Sample Size

To raise the degree of confidence in the results, it is essential that a study employ the largest sample size feasible. According to Mugenda & Mugenda (2003), social sciences typically require a sample size of at least 10% of the target population. Additionally, Krejcie and Morgans' table (1970) for calculating sample sizes was used to calculate the study's sample size (Appendix, xiv). The MoES officials, 20 staff were selected, these included UBTEB (3) people, NCDC (2) staff, Principals (12) and MoES headquarter (3). Heads of department 36, TVET Trainers 76, and Trainees 356. Therefore, as shown in table 3.2, a sample size of 488 were selected as respondents for this study out of a target population of 4,580.

Table 3.2: Sample size of targeted respondents

Respondents	Total number	Sample size	Percentage
Ministry of Education officials including TVET Experts, examining body and National curriculum officials and Principals	60	20	33
Head of Departments Training Institutes and colleges	120	36	30
TVET trainers of Vocational Training Institutes and Colleges	400	76	19
Trainees from Training Institutes and Colleges	4,000	356	9
Total	4,580	488	100

3.8 The Study Variables

The independent and dependent variables served as the main guiding forces behind this investigation. The implementation process, the trainer's capabilities, role of managers, and RLPBL challenges are the study's independent variables and their predictors. The dependent variable for this study is thus defined by the competence development of TVET trainees. However, the intervening variables, such as government policies on education and training, community inclusion in the projects, and industrial involvement, had an impact on the relationship between the two sets of variables.

3.9 Data Collection Instruments

These are the tools that were modified for use in this study's data collection phase. The following instruments were employed in the study: a questionnaire, an interview

schedule, a discussion guide for focus groups, an observation check list, and documentation review of any applicable records. To allow the study to gather sufficient data regarding the evaluation of real-life project-based learning for competence development of TVET trainees in Uganda, several instruments, also known as triangulation, were used.

By merging several perspectives and techniques, the verification process known as triangulation boosts validity (Youssef, 2018, July). This study's triangulation strategy sought to confirm findings while also enhancing and broadening our understanding of a specific behavior pattern (Olsen, 2004). There are four types of triangulation, according to Duffy (1987) data triangulation (collect data from multiple sources to create a single body of data), investigator triangulation (use multiple observers rather than a single observer to gather and interpret data), theoretical triangulation (apply more than one theoretical position to interpret data), and methodological triangulation (using more than one research method or data collection technique).

In a single research, many "triangulation" techniques may be employed. Both data triangulation and methodological triangulation was used in this investigation. The four tools was used to their fullest potential in order to achieve the study's stated goals. For this investigation, both quantitative and qualitative data collection technique were used because mixed methods give an effective means of supporting evidence based practice as seen in real-life projects. It is as a grounded choice in order to complement and integrate the increasingly complex needs of contemporary researcher (Dawadi et al., 2021).

3.9.1 Questionnaire

Two sets of questionnaires were employed in this study to collect information from TVET department directors and trainers (See Appendixes vii and viii). According to Ngechu (2006), a questionnaire enables one to get prospective data from a sizable fraction of a population. The researcher included both closed-ended and open-ended items in the questionnaire. Respondents were permitted to openly express their feelings and ideas in response to the questionnaire's open-ended questions. A five point Likert scale was used for the closed-ended questions, with 1 denoting "strongly disagree" and 5 denoting "strongly agree."

The questions created were in line with the study's goals. The initial survey was directed at TVET instructors (Appendix VII). The framework for high-quality project-based learning served as the design model. It was divided into five components, including general or demographic data and the use of project-based learning in TVET.

The researcher concluded that it was useful and trustworthy for assessing the state of real-world project execution for TVET trainees in Uganda. The second survey (Appendix III) was utilized to collect information from department heads in TVET institutions. It had five sections: general or demographic data, the implementation procedure, trainer skills, and management support for project-based learning in the actual world. Challenges for TVET trainees in Uganda in developing their competency.

3.9.2 Interview Guide

The researcher created and sent structured and semi-structured questions to the responders. Interviews were done to help acquire highly tailored data and provide opportunity to elicit information from respondents (Gray, 2004). Interviews with representatives from the Ministry of Education, specifically the TVET O&M department, the TVET policy implementing secretariat, the Examining Body—UBTEB, the Curriculum development center—NCDC, and both Principals of Training institutes and colleges, were conducted both physically and electronically by recording the entire conversation.

The researcher received useful and insightful information via the use of interviews, and the questions that were discovered during the survey were also explained. In order to build a strong rapport with the respondents before conducting the interviews, the researcher set up appointments with them in advance at each location.

3.9.3 Observation Checklist

In this study, the direct observation method was used. By making notes and taking images of what happened throughout the project-based learning approach's implementation, the observer plays a passive role. This method gave researchers the chance to record activities, behavior, and physical characteristics without relying on subjects' desire or capacity to reply to questions (Powell and Steele, 1996). Observation studies, according to Gorman and Clayton (2005, p. 40), "involve the systematic recording of observed occurrences or behavior in a natural context.

The Vocational Training Institute or College employed this approach to observe and confirm the availability of various facilities and resources, documentation, human resources, and other operations or activities. This was done at each of the chosen research sites. This method was employed by the researcher to gather data from training sessions at the institutions that were based on real-world projects. The researcher requested permission to participate in certain real-life project activities in order to see how duties were carried out firsthand from the head of the institution, the head of the department, and finally the trainer in charge. Welding, plumbing, machining, automotive repair, building construction, ICT, electrical installation, fashion and design, woodworking technology, and hotel & institutional cooking were among the courses that were attended. For this, a well-organized observation checklist was created and used (Appendix XI)

3.9.4 Document Analysis

According to Kothari (2004), documents are authentic, official printed or written materials that provide certain materials and specific information or are used as proof of particular themes. Annual reports, term/annual calendars, timetables, test results, records of enrollment, rules or regulations, curriculum, Board or council minutes, and Memorandum of Understanding, to name a few, were used to compile relevant data for this study. The principals of the chosen training Institutes and Colleges often gave the documentation for analysis.

3.9.5. A Focus Group Discussion Guide (FGDG)

Another method employed by the researcher was FGDG (Appendix X). An expert, external moderator facilitates a focused discussion among a chosen group of individuals on a particular topic or issue in this qualitative research method and data gathering approach. To acquire information on trainees' attitudes and perceptions, knowledge and experiences, and practices while they engaged in RLPBL with various trainees, this technique involved gathering them in groups of eight to twelve trainees. Manju (2020) demonstrated that it is necessary to have a group of at least three and at most 12 trainees chosen at random from each targeted demographic (Manju, 2020). At least three popular courses from each university were utilized by the researcher to moderate the debate in focus groups using the focus group discussion guide (FGDG). A total of 30 groups from 10 different institutions physically met. To encourage active participation, masks and a bottle of soda or water were supplied to each learner. They gave their assent, and the data collecting method of voice recording and note-taking was used.

3.10 Validity and Reliability of the Instruments

The validity and reliability of the chosen and utilized research tools were employed to establish the dependability of this investigation.

3.10.1 Validity of the Instruments

Validity, according to Field (2005), fundamentally implies "measure of what is supposed to be measured." Similar to this, validity, according to Ghauri and Gronhaug (2004), demonstrates how effectively the data set covers the subject under inquiry.

Through collaboration with the subject matter experts (supervisors and trainers) of the School of Education Technology Department at the University of Eldoret, the validity of the research instruments was improved.

The focus of the instrument validation was on three areas: face validity, construct validity, and content validity. The content validity component checked the instrument's quality and availability of all necessary information. The construct validity component also took into account the instrument's length in relation to the target population. The creation of the final instruments took the experts' advice into consideration.

The researcher supplied instruments for use by heads of departments, heads of institutions, and TVET trainers to two experts who were requested to comment on the applicability of the items in the instruments in order to assure study validity. This made it easier for the researcher to weed out queries that weren't pertinent to the study's goals.

The Content Validity Index was then used to determine validity (C.V.I).

CVI = Number of questions considered valid on the draft

Number of questions on the draft instrument

$$\begin{array}{l} \text{Expert 1:} \\ \text{CVI} \quad = \quad \frac{6}{9} \quad = 0.67 \end{array}$$

$$\begin{array}{l} \text{Expert 2:} \\ \text{CVI} \quad = \quad \frac{7}{9} \quad = 0.78 \end{array}$$

Therefore, Average of content validity index was

$$\text{CVI} \quad \frac{1.45}{2} \quad = 0.72$$

According to Oso & Onen (2009), questions chosen with a validity co-efficient of at least 0.70 are deemed valid for the study, hence the questionnaires were valid for this study.

As a result, the Overall CVI for the instrument of 0.72 was approved as valid for the research.

3.10.2 Reliability of the instruments

The main goal of ensuring the study's reliability is to make sure that, if a later investigator conducted the same case study according to the same procedures as those described by an earlier investigator in this study, the later investigator should come to the same conclusions (Yin, 2009) in the relevant field of study. The equipment will be tested on 10 SME satellites located close to the researcher's home in order to assess dependability. After entering the responses into SPSS, a reliability analysis will be carried out. According to Table 3.1 below.

The degree to which a research tool produces consistent results after several trials is referred to as its reliability (Mugenda & Mugenda, 2003). According to Orodho (2005), the degree to which a certain measuring process consistently produces consistent outcomes or data over time is a measure of dependability.

Dependability's primary goal is to reduce random error and, as a result, raise the reliability of the data produced. According to Mehrens & Lehman (1991), low or nonexistent inter-item variability, an excessive number of challenging items, time constraints during testing, an extremely large topic area of the measure, and poorly designed items or questions are all variables that impair reliability.

At the Minakulu Technical Institute, which shared similarities with the 10 technical institutes and 02 technical colleges chosen for this study, a test-retest technique of the questionnaire for trainees, TVET trainers, and managers was piloted. Mugenda &

Mugenda (2003) claim that a pilot research that includes a sample that represents 10% of the entire sample and has homogeneous features is ideal for the study's first phases.

Pilot testing showed ambiguous questions and imprecise instrument instructions, which was a crucial stage in the study process. Additionally, it included significant feedback and recommendations from the respondents that allowed the researcher to enhance the effectiveness of the study instrument. According to Trochim (2007), the purpose of pilot testing is to lower instrument error rates.

There was a correlation between the results of both tests. When the instruments are correlated, the questionnaires for the trainee and the trainer produced a Cronbach's alpha (α) coefficient of 0.70, indicating that the instruments had good internal consistency and produced data with strong test-retest reliability. DeVellis (2003) asserts that acceptable values of alpha fall between 0.70 and 0.95 in order to justify these coefficient values.

Table 3.3: Reliability test

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
0.70	0.72	9

(Source: Author, 2022)

According to the table above, the scale employed for this particular sample has a high level of consistency, with a Cronbach's alpha of 0.70. According to George and Malley, a

Cronbach's Alpha score based on standardized items that is 0.7 is considered to be trustworthy (2003).

3.11 Data Collection Procedures

After the School of Education accepted the study's idea, the researcher filed to the Uganda National Council for Science and Technology for a research permission (UNCST). The researcher obtained approval to conduct the study in the chosen institutions from the Permanent Secretary Ministry of Education and Sports in Uganda for additional protocol processes.

The researcher then went to the study locations to set up the activity with the principal and become familiar with the target audience. After that, data was gathered using a mixed-methods technique. Because of this, combined quantitative and qualitative data can offer a deeper understanding of a study topic than each type of data could do on their own (Creswell, 2012). To enhance and promote in-depth inquiry during interview or qualitative sessions, the survey component was completed beforehand. Six research assistants were educated by the researcher before to data collection to make sure they were aware with the study's goals, tools, and to provide clarification when necessary. The distribution, administration, and data collecting from the respondents were made easier by the study assistants. The data gathering method and time were both shortened with the aid of the research assistants. To determine if the data is trustworthy or realistic, the completed instruments were gathered and examined for consistency. The replies will be measured on a five-point Likert scale as follows: 5 fully agree, 4 agree, 3 not sure, 2 disagree, and 1 fully disagree.

3.12 Data Analysis

Data analysis that is descriptive in nature was necessary for this study since it aims to determine how much independent factors affect the dependent variable. Using descriptive statistics, the validated data was modified, compiled, coded, and summarized. According to Kothari (2004), those descriptive statistics that use statistical measures of central tendencies, dispersion, and distribution allow for a meaningful distribution of scores.

Utilizing the Statistical Package for the Social Sciences (SPSS) version 16.0, quantitative data was analyzed while qualitative analysis was done on interview responses, observation checklists and questionnaire responses to open-ended questions. The observation checklist also helped to observe and judge the quality of products made by trainees during the real-life project-based learning. The results of the data analysis are presented in chapter four. Tables for frequency, percentage, and mean distribution were used to show the data. Additionally, scatter plots have been employed. It will be necessary to evaluate pertinent materials for this study in order to identify and understand study-related topics.

3.13 Ethical Considerations

This refers to the laws, ordinances, and customs that control how research is conducted. Before beginning the study, the researcher asked the School of Education for an introduction letter that could be used to get approval from various agencies. The idea was sent to an ethics review committee as the initial step. Because it is one of the most active in Uganda, the Mbarara University of Science and Technology Research Ethical Committee (MUST-REC) was chosen. The study plan was approved by the committee. The committee also authorized a document for informed consent, which was used to get

approval from the respondents prior to data collection. The Uganda National Council for Science and Technology (UNCST), the organization in charge of monitoring research activities in Uganda, had to be consulted before proceeding. The principals of the chosen training institutes and colleges will be asked for their consent, authorization, and approval. After the respondents had a good understanding of the study's goal and methodology, the dangers involved, and the requirements imposed on them, the researcher asked for their informed permission. No participant in this research was at any danger of experiencing extraordinary stress, shame, or any loss of self-esteem. The study also made sure that the participant remained anonymous and that the information was protected by the transmittal letter's assurance of confidentiality. On request, the respondents will get a summary of the results.

3.14 Summary

Aspects of research technique and design are covered in this chapter, along with how they connect to one another. It outlines the research paradigm and research design that were modified for this study, as well as the study's location, target population, sampling method, study variables, and the validity and reliability of the research tools employed. The techniques for gathering data, the pilot project, how the data will be processed, and the ethical issues surrounding the study are all further described in this chapter.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

488 study participants, including representatives from the Ministry of Education, TVET experts from the examining body and the National Curriculum Development Center, principals, head of departments of training institutes and colleges, TVET trainers of vocational training institutes and colleges, and trainees from training institutes and colleges, participated in a study on the review of real-life project-based learning for competence development of TVET trainees in Uganda. A five-point linkert scale was used, with 5 denoting fully agree, 4 denoting agree, 3 denoting not sure, 2 denoting disagree, and 1 denoting fully disagree. The study, considered only those who were knowledgeable about the subject matter of whom 36 questionnaires for heads of departments, 76 questionnaires for TVET trainers of Vocational Training Institutes and Colleges were distributed and returned all. More so, personal observations of 10 participating institutions were considered along with 20 interviews using interview guides was conducted to TVET Experts from the examining body and National curriculum development Center, Principals and Ministry of Education officials. 30 groups of each 12 trainees on average were conducted using focus group discussions.

The responses are presented in this chapter in 5 sections that is Heads of departments, TVET trainers, Heads of institutes, FGDs, Interview guide data and personal observations. Thus, the data was presented in terms of demographic characteristics and

other general considerations in line with the achieving of the study objectives inform of tables and charts.

The responses were presented on the basis of the study objectives across each section. The goals were to learn how real-world project-based learning is implemented for the competence development of trainees in TVET institutions in Uganda, to assess the skills of TVET trainers with regard to the implementation of real-world project-based learning for competence development in Uganda, to establish the role of TVET Managers in the implementation of real-life project-based learning for the competence development of TVET trainees in Uganda.

4.2 Responses from the Heads of Departments

4.2.1 Response Rate

Results for the response rate are presented in table 4.1 below.

Table 4.1: Showing Response Rate

Sample	Questionnaires distributed	Questionnaires returned	Questionnaires fully completed	Response rate (%)
36	36	36	36	100

According to the findings in Table 4.1 above, the research's sample consisted of 36 study participants in total. As a result, the researcher gave 36 questionnaires to each and every one of the chosen study participants, and they were all returned. This 100% response rate prompted the researcher to continue with the study.

4.2.2 Demographic Characteristics of the Respondents

The background information of respondents was regarded important since it considerably influences their capacity to provide adequate information on the research variables.

4.2.3 Gender of the Respondents

Table 4.2: Gender of the Respondents

Gender	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Male	26	72.2	72.2	72.2
Female	10	27.8	27.8	100
Total	36	100	100	

According to Table 4.2; gender of the respondents, the majority of the department heads—26 of them, or 72.2%—were men, while the remaining 10 participants in the study—or 27.8%—were women. This suggests that the majority of the directors of departments at vocational institutions who gave their approval to participate in the study were men since men are more involved in operating vocational institutes than women are, and they also shoulder a greater amount of the duties. This is consistent with a research conducted by Simiyu (2015), who found that the majority of courses in youth programs were ones that were traditionally more popular with male trainees. Furthermore, the study is consistent with one by Kintu et al. (2019), who investigated how trainers perceived the methods for teaching and learning that were used to develop competence in the technical vocational field. Ugandan educational and training institutes. Male trainers made up 72.7% more of the study's participants than did female trainers (27.3%).

4.2.4 Age of Respondents

Table 4.3: Age of Respondents

Age	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
20-30 years	5	13.9	13.9	13.9
31-40 years	19	52.8	52.8	66.7
41-50 years	7	19.4	19.4	86.1
Above 50 years	5	13.9	13.9	100
Total	36	100	100	

The biggest percentage of respondents (19, 52.8%), as shown in Table 4.3, fell within the 31–40 age range. This was followed by 7 (19.4%) people in the 41–50 age range, 5 (13.9%) people in the 20–30 age range, and finally 5 (13.9%) people in the above 50 age range. The majority of heads of departments under TVETs are men and are in their early stages of life, according to the results, which showed that most of them were in the 31–40 year age range. This is the age group where youngsters, especially men, are supposed to have settled to work and build their lives. The results are consistent with a research conducted by Kiplagat (2016) on the factors impacting trainees' completion rate in public vocational training centers in Kenya. The majority of the study participants were in their youth stage, which is defined as being under 35 years of age. Furthermore, the findings was consistent with a study by Kintu et al. (2019), which examined how trainers perceived the teaching and learning strategies used to create competency in Ugandan technical and vocational education and training institutions. It was discovered that 54.5%

of respondents fell between the ages of 31 and 40, 18.2% of respondents were between the ages of 41 and 50, and 25.8% of respondents were beyond the age of 51. This shows that the bulk of the trainers (74.2%) were under the age of 51. This suggested that the trainers were young people.

4.2.5 Academic qualifications of the respondents

Table 4.4: Academic qualifications of the participants

Education level	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Diploma	27	75.0	75.0	75.0
Bachelors	9	25.0	25.0	100
Total	36	100	100	

According to the findings in Table 4.4; academic qualifications of the participants, the biggest percentage of respondents—27 (75.0%)—had completed a diploma-level education. Following closely after were the respondents with a bachelor's degree, with a representation of 9 (25.0%). This suggested that the majority of the research participants were highly qualified graduates with a variety of specializations, and that all 36 (100%) are teachers with formal training. These results are consistent with a study of the variables impacting youth enrollment levels in public youth polytechnics in Mombasa County, Kenya, conducted by Ngumbao (2012). According to the survey, 40.3% of the teachers held a diploma, while 33.3% held a trade certificate. Furthermore, the study is consistent with one by Kintu et al. (2019), who investigated how trainers perceived the approaches to teaching and learning that were used to enhance competency in Ugandan

technical vocational education and training institutions. The survey found that 45.5% of the trainers have diplomas, which is the majority.

4.2.6 Respondents Area of Specialisation

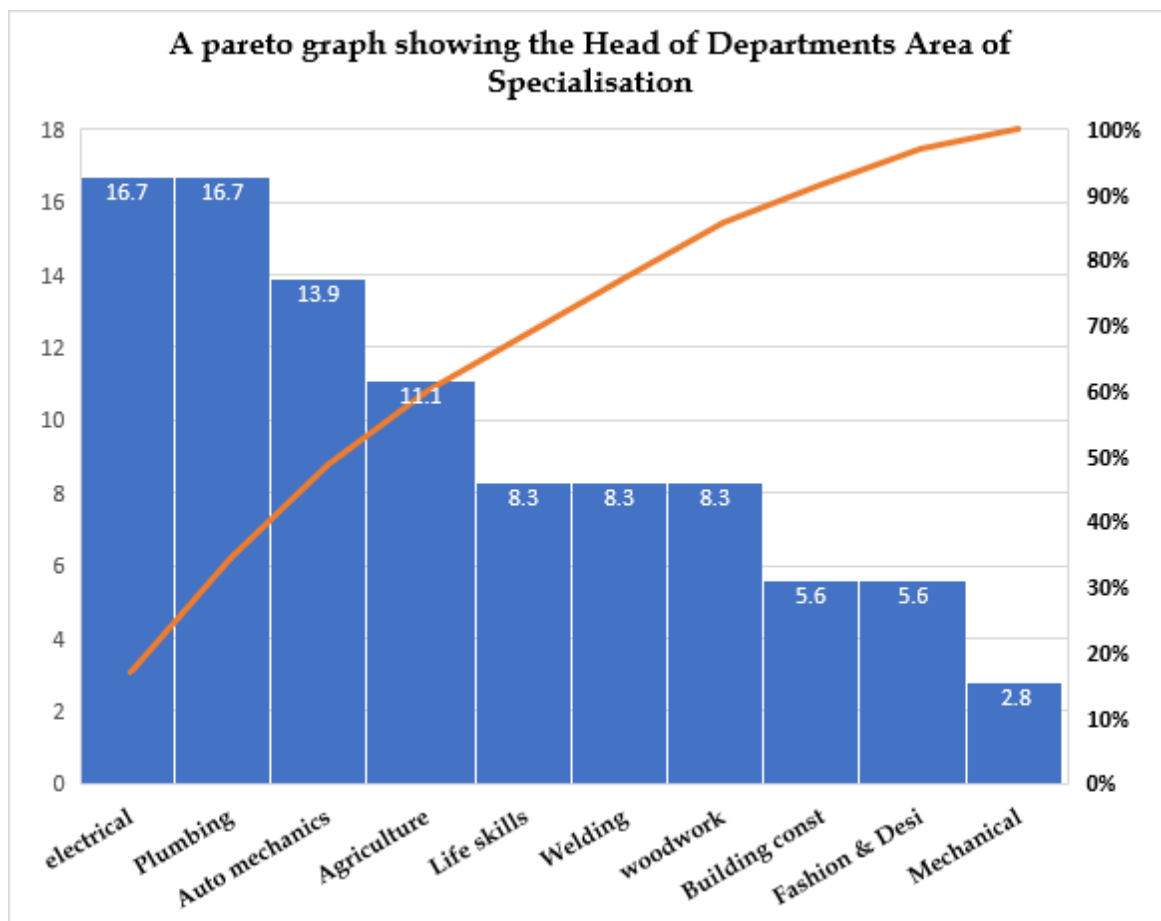


Figure 4.1: Respondents Area of Specialisation

The biggest percentage of research participants, 12 (33.4%) each, had specializations in electrical and plumbing, according to the survey data shown in Figure 4.1 above. Following this were 5 (13.9%) in the auto mechanics industry, 4 (11.1%) in agricultural, 9 (24.9%) in fashion and design, welding, and woodworking, 4 (11.2%) in fashion and design, and one (2.8%) in mechanical. The results are consistent with Junnaina's (2014)

findings about the impact of field specialization variance on Malaysian TVET instructors' understanding of technical pedagogical content.

4.2.7 Duration of respondents working in the industry before becoming a TVET manager

Table 4.5: Duration of respondents working in the industry before becoming a TVET

Duration	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Less than 5 years	27	75.0	75.0	75.0
More than 5 years	9	25.0	25.0	100
Total	36	100	100	

The majority 27 (75.0%) of the study participants spent fewer than 5 years in the sector before becoming TVET managers, as shown by the study results in Table 4.5 above. The results concur with those of Ngure (2013). The instance of Kenyan micro and small businesses in the motor vehicle servicing and repair industry provides insight into how stakeholders see technical, vocational education and training.

4.2.8 Real Life Project Based Learning Implementation (RLPBL) Process

Table 4.6: RLBL Implementation Process

RLPBL Implementation Process	Fully Agree	Agree	Disagree	Total Agreement
Real-life project-based learning is an important instructional approach that enables learners to master employable competencies necessary for the world of work.	15 (41.7%)	21 (58.3%)	-	36 (100%)
Trainees share the ideas/ problem with TVET trainers and present real-life projects by 4th week of the term/semester for approval	24 (66.7%)	11 (30.6%)	1 (2.8%)	35 (97.2%)
Management supplies materials and machines to trainers and trainees in time for real-life projects	24 (66.7%)	7 (19.4%)	5 (13.9%)	29 (87.1%)
TVET trainers have knowledge, skills, and good experience in planning & management of projects and enterprises	23 (63.9%)	13 (36.1%)	-	36 (100%)
Trainers are committed to best practices and provide enough time for RLPBL process	24 (66.7%)	10 (27.8%)	2 (5.6%)	34 (94.5%)
Trainees have enough time for personal reflection	24 (66.7%)	3 (8.3%)	9 (25.0%)	27 (75.0%)
Feedback from continuous assessment is provided on time	27 (75.0%)	9 (25%)	-	36 (100%)
Management have created real-life projects as the school culture	21 (58.3%)	11 (30.6%)	4 (11.1%)	25 (88.9%)
Average	22.7 (54.96%)	10.75 (29.86%)	4 (11.12%)	32.25 (92.84%)

All of the respondents were found to be fully aware of the RLPBL implementation process and in complete agreement with the elements taken into account while applying this learning, as shown by the research results in Table 4.6 above. Based on the aforementioned study's findings, study participants identified real-world project-based learning as a crucial instructional strategy that helps students to grasp marketable competences required for the workplace, By the fourth week of the term or semester, trainees present real-life projects to TVET instructors for approval. TVET trainers have

knowledge, abilities, and considerable expertise in planning and managing projects and businesses, and management provides resources and equipment to trainers and trainees in time for practical tasks. Trainers are dedicated to excellent practices and provide the RLPBL procedure ample time. Trainees have sufficient time for introspection, Finally, management has established real-life initiatives as part of the school culture. Feedback from ongoing evaluation is given promptly. The majority of these factors—36, or 100%—were taken into account. Real-world project-based learning is a crucial instructional strategy that helps students develop the marketable skills required for the workplace. TVET instructors are knowledgeable, skilled, and have considerable expertise in creating and managing projects and businesses. The results are compared to those of Dyer and Osborne (1999), who investigated how different teaching strategies and student learning preferences affected students' short- and long-term memory of subject information.

4.2.8.1 Real-Life Project-Based Learning Initiating Process

Table 4.7: Initiating Phase

Initiating	Strongly Agree	Agree	Strongly disagree	Total Agreements
Managers should ensure that projects are feasible	18 (50%)	18 (50%)	0	36 (100%)
Trainees, trainers, or sponsors are given enough time to identify the project and tasks	24 (66.7%)	12 (33.3%)	0	36 (100%)
Trainers should summarise project scope and secure the authorization to go ahead	12 (33.4%)	13 (36.1%)	11 (30.5%)	25 (69.4%)
There is proper project budget and schedule of activities from first term/semester	0	14 (38.9%)	22 (61.1%)	14 (38.90%)
Trainers should be motivated to attend regularly since projects require extra time	18 (50%)	18 (50%)	0	36 (100%)
Average	21 (58.34%)	15 (41.66%)	36 (100%)	29.4 (81.7%)

From the table 4.7; initiating phase, it was revealed that all the factors highlighted above contribute to the real-life project-based learning initiation process. Thus, the RLPBL initiation process entails managers ensuring that projects are feasible, trainees, trainers, or sponsors are given enough time to identify the project and tasks, trainers summarise project scope and secure the authorization to go ahead, there is proper project budget and schedule of activities from first term/semester and trainers should be motivated to attend regularly since projects require extra time. In conclusion, initiation is a viable stage in

RLPBL process. All the study participants 36 (100%) were in total support of the above highlighted variables under study.

Thus, the findings concerning a research on project-based learning are consistent with those of Dyer (1999) and Rousova (2008).

4.2.8.2 Real Life Project Based Learning Planning Process

Table 4.8: Planning Phase

Planning Phase	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Managers ensure that a detailed project is drafted including drawings, duration, audience, sponsor/client, rationale, learning outcomes, deliverables, personnel, resources, budget, tasks, schedule, risks and constraints, assessment rubrics, and other components.	18 (50%)	18 (50%)	0	0	36 (100%)
Managers ensure that the projects meet curriculum, policy, and assessment body requirements	17 (47.2%)	19 (52.8%)	-	-	36 (100%)
Average Responses	17.5 (48.6%)	18.5 (51.4%)			36 (100%)

All the components mentioned above contribute to the real-life project-based learning planning phase, as shown by table 4.8; planning phase. Consequently, it was determined that managers should make sure a thorough project is written, complete with drawings, duration, audience, sponsor/client, rationale, learning outcomes, deliverables, personnel, resources, budget, tasks, schedule, risks and constraints, assessment rubrics, and other

elements. Managers should also make sure that the projects adhere to the standards set by the curriculum, policies, and evaluation bodies. All 36 study participants (100%) agreed with the study's findings on the variables that were emphasized above. The conclusions are consistent with those of Dyer (1999) and Rousova (2008) on a research on project-based learning.

4.2.8.3 Real Life Project Based Learning Executing and assessing Process

Table 4.9: Executing and assessing

Executing and assessing	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
TVET trainers and technicians are good facilitators of the project planning and implementation process	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
The curriculum content is adequate for learning and learners are given real-life tasks	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Managers monitor good trainer-trainee relationship and documentation process (tracking progress)	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
TVET trainers supervise the trainee's attendance regularly	17 (47.2%)	19 (52.8%)	-	-	36 (100%)
Trainers are disengaged from the reality	24 (66.7%)	12 (33.3%)	-	-	36 (100%)
Trainees are guided to accomplish quality tasks in time	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Real-life projects reflect up to date requirements in the world of work	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
Managers monitor continuous assessment of trainees (evaluation)	22 (61.1%)	14 (38.9%)	-	-	36 (100%)
Trainees are allowed to practice with training equipment and materials	16 (44.4%)	20 (55.6%)	-	-	36 (100%)
Trainers use the Triple-M Cycle which forms the processes of managing, monitoring, and modifying	30 (83.3%)	6 (16.7%)	-	-	36 (100%)
Average	21.2 (58.9%)	14.8 (41.1%)			36 (100%)

All of the components mentioned above contribute to the project-based learning execution and evaluation phase, as shown in table 4.9 above. All of the study participants

who gave their agreement to participate in the study agreed that the aforementioned variables should be taken into account while executing and evaluating the RLPBL procedure.

Thus, the implementation and evaluation phases make sure that: TVET trainers and technicians are good facilitators of the project planning and implementation process, the curriculum content is adequate for learning, and learners are given real-life tasks, Managers monitor good trainer-trainee relationship and documentation process (tracking progress), TVET trainers regularly supervise the trainee's attendance, Trainees are guided to accomplish quality tasks in time, real-life projects All 36 study participants (100%) agreed with the study's findings on the variables that were emphasized above. The findings are in agreement with those of Dyer (1999) and also in line with those of Rousova (2008) about a study on project-based learning.

4.2.8.4 Real Life Project Based Learning Publishing Phase

Table 4.10: Publishing Phase

Publishing	Strongly Agree	Agree	Dis agree	Strongly disagree	Total Agreements
Trainers ensure the dissemination of the final products to the public	30 (83.3%)	6 (16.7%)	-	-	36 (100%)
Consider public feedback for modification and improvement	27 (75%)	9 (25%)	-	-	36 (100%)
Average Responses	28.5 (79.1%)	7.5 (20.8%)			36 (100%)

According to Table 4.10; the publishing phase , there are two key variables that influence the publication phase. These include trainers' efforts to ensure that the final products are distributed to the public and their consideration of public comments for revision and development. In this context institutions should have showrooms to enable the public to purchase these products but more importantly their feedback. The public feedback is also very important for modification and improvement. All 36 study participants (100%) agreed with the study's question on the variables that were emphasized. The results of a research on project-based learning concur with those of Dyer (1999) and are also consistent with those of Rousovam (2008).

4.2.8.5 Real Life Project Based Learning Closing Phase

Table 4.11: Closing Phase

Closing Phase	Fully Agree	Agree	Disagree	Fully Disagree	Total Agreements
Managers provide for summative feedback from management team, examining body, Sponsors if any and secure sign off on the final product	25 (69.4%)	11 (30.6%)	-	-	36 (100%)
Trainers are responsible for the project assets—including the final product, interim deliverables, status reports, and other documents	23 (63.9%)	13 (36.1%)	-	-	36 (100%)
Average Responses	24 (66.7%)	12 (33.3%)			36 (100%)

According to table 4.11; closing phase , which the study participants who gave their consent to participate in the study were able to access, managers secure sign-off on the final product and obtain summative feedback from the management team, examining body, and sponsors, if any, during the closing phase, while trainers are in charge of the project's assets, which include the final product, interim deliverables, status reports, and other documents. All 36 study participants (100%) agreed with the study's findings on the variables that were emphasized above. The conclusions are consistent with those of Dyer (1999) and Rousova (2008) on a research on project-based learning.

In conclusion, the study participants found that the RLPBL process consists of six main steps: initiating, planning phase, executing and assessing, publishing and closing. The results of a research on project-based learning are consistent with those of Dyer (1999) and Rousova (2008).

4.3 RLPBL Trainers ‘Capabilities

4.3.1 Routine Expertise

Table 4.12: Routine Expertise

Routine Expertise	Strongly Agree	Agree	Dis agree	Strongly Dis agree	Total Agreements
Adequate ability to perform skilful activities to a satisfactory standard	22 (61.1%)	14 (38.9%)	-	-	36 (100%)
Adequately use of materials, tools, and abstract concepts	24 (66.7%)	12 (33.3%)	-	-	36 (100%)
Ability to adapt RLPBL strategies to suit individual learners	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
Proper choice of assessment procedures	22 (61.1%)	14 (38.9%)	-	-	36 (100%)
Ability to organize a proper learning environment	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Demonstrate a range of behaviour management strategies for trainees	19 (52.8%)	17 (47.2%)	-	-	36 (100%)
Ability to develop suitable tasks that respond to the needs of trainees, industry, and society	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
Acquiring practical expertise requires time and practice.	18 (50.0%)	18 (50.0%)	-	-	36 (100%)
Average Responses	20.75 (57.65%)	15.25 (42.35%)	-	-	36 (100%)

Table 4.12 showed that the abilities of TVET trainers include the ability to perform skilled activities to a satisfactory standard, the ability to use materials, tools, and abstract concepts appropriately, the ability to adapt RLPBL strategies to suit individual learners, the proper choice of assessment procedures, the ability to organize a proper learning environment, the ability to demonstrate a range of behavior management strategies for trainees, and the ability to develop appropriate tasks that are engaging for trainees. All 36 study participants (100%) agreed completely with these skills. The results therefore concur with those of Educaid, (2016).

4.3.2 Resourcefulness

Table 4.13: Resourcefulness

Resourcefulness	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Ability to apply technical skills to troubleshoot and solve problems in projects	18 (50.0%)	18 (50.0%)	-	-	36 (100%)
Ability to apply knowledge and skills that is applicable to new and unfamiliar contexts	23 (63.9%)	13 (36.1%)	-	-	36 (100%)
Able to apply knowledge in a range of situations which do not closely replicate those already encountered in training	23 (63.9%)	13 (36.1%)	-	-	36 (100%)
Ability to organize work processes	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Ability to adapt to rapid changes in technology	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Initiate and participate in innovations and creativity	17 (47.2%)	19 (52.8%)	-	-	36 (100%)
Average Responses	20.5 (56.9%)	15.5 (43.1%)	-	-	36 (100%)

According to Table 4.13; resourcefulness, all 36 (100%) of the study subjects who voluntarily volunteered to take part in this investigation strongly believed that the ability to be resourceful was one of the qualities of TVET instructors. It requires the following skills: the ability to apply technical knowledge, the ability to troubleshoot and solve issues in real-world projects, the ability to apply knowledge and skills to new and unfamiliar contexts, the ability to apply knowledge in a variety of situations that do not closely resemble those already encountered in training, the ability to organize work processes, the ability to adapt to quick changes in technology, and the ability to initiate and take part in innovations and creativity. The results concur with those from Educaid. (2016).

4.3.3 Craftsmanship

Table 4.14: Craftsmanship

Craftsmanship	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Have the pleasure, pride and patience involved in doing a good job	19 (52.8%)	17 (47.2%)	-	-	36 (100%)
Like working with their hands most of the time	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Identify, work and partner with industry for teaching purposes	23 (63.9%)	13 (36.1%)	-	-	36 (100%)
Ability to analyze labour market requirements	24 (66.7%)	12 (33.3%)	-	-	36 (100%)
Ability to pass on the 'tricks' of the trade	26 (72.2%)	10 (27.8%)	-	-	36 (100%)
Average Responses	22.6 (62.8%)	13.4 (37.2%)	-	-	36 (100%)

According to Table 4.14; craftsmanship, all 36 study participants (100%) who gave their consent to participate in the study agreed wholeheartedly with the elements listed above as the major factors influencing craftsmanship. These factors included the TVET trainers' capacity to identify, work with, and partner with industry for educational purposes, enjoy working with their hands most of the time, have the pleasure, pride, and patience involved in doing a good job, and analyze labor market requirements. The results concur with those from Educaid.be (2016).

4.3.4 Functional Literacies

Table 4.15: Functional Literacies

Functional Literacies	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Ability to utilize ICT, numeracy, and literacy to facilitate teaching and learning	25 (69.4%)	11 (30.6%)	-	-	36 (100%)
Engage in live debates today about how best to teach tomorrow	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
Possess higher order thinking (HOT) skills	23 (63.9%)	13 (36.1%)	-	-	36 (100%)
Average Responses	22.7 (63.0%)	13.3 (37.0%)	-	-	36 (100%)

According to Table 4.1; functional literacies, all 36 (100%) participants who gave their consent to take part in the study agreed wholeheartedly that the previously mentioned elements help TVET trainers develop their functional literacy skills. Functional literacy include the capacity of TVET trainers to use ICT, numeracy, and literacy to enhance training and learning, to participate in live discussions about how to educate tomorrow's

students today, and to have higher order thinking (HOT)skills. As a result, the conclusions concur with those of Educaid (2016).

4.3.5 Business-like attitudes

Table 4.16: Business-like attitudes

Business-like attitudes are essential	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Ability to engage industry in setting up occupational standards	22 (61.1%)	14 (38.9%)	-	-	36 (100%)
Have behaviours such as punctuality, orderliness, willingness to put in extra time and effort,	19 (52.8%)	17 (47.2%)	-	-	36 (100%)
Ability to connect trainees for industrial training opportunities	20 (55.6%)	16 (44.4%)	-	-	36 (100%)
Possess marketing and customer care skills	24 (66.7%)	12 (33.3%)	-	-	36 (100%)
Ability to engage industry in setting up occupational standards	24 (66.7%)	12 (33.3%)	-	-	36 (100%)
Average Responses	21.8 (60.6%)	14.2 (39.4%)	-	-	36 (100%)

According to Table 4.16; business-like attitudes, all 36 (100%) of the respondents who gave their consent to participate in the survey agreed that the elements mentioned above contribute to the capacity of functional literacy in TVET trainers. These included the

ability of TVET trainers to connect trainees for industrial training opportunities, to have behaviors like punctuality, orderliness, and willingness to put in extra time and effort, to engage industry in setting occupational standards, to possess marketing and customer service skills. The conclusions concur with those of Educaid (2016).

4.3.6 Wider Skills

Table 4.17: Wider Skills

Wider Skills	Strongly Agree	Agree	Disagree	Strongly Disagree	Total Agreements
Have good negotiating skills	21 (58.3%)	15 (41.7%)	-	-	36 (100%)
Have good problem-solving, team-working, resilience, and entrepreneurialism skills	18 (50%)	17 (47.2%)	-	-	35 (97.2%)
Ability to manage projects	17 (47.2%)	19 (52.8%)	-	-	36 (100%)
Average Responses	18.7 (51.8%)	17 (47.2%)			36 (100%)

According to Table 4.17; wider skills, almost 35 (99%) of the respondents who agreed to take part in the survey strongly agreed that the characteristic of wider skills help TVET educators develop a wider range of abilities. Wider skills include the capacity to manage projects and have strong negotiation abilities as well as strong problem-solving, teamwork, resilience, and entrepreneurial capabilities. The results concur with those from Educaid (2016).

4.4 Trainers' attendance of refresher courses in industry or conferences/seminars

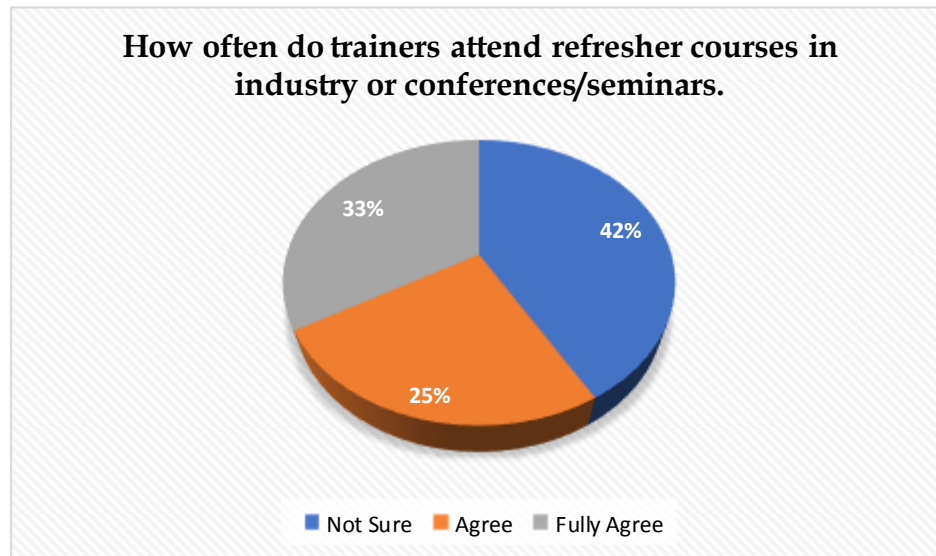


Figure 4.2: Trainers' attendance of refresher courses in industry or conferences/seminars

According to Majority 21 (58.3%) of the study participants who gave their agreement to participate in the study, they frequently take refresher courses, which they do at seminars, conferences, and industry events. The results are consistent with a research by Eline (2019) regarding the factors influencing attendance-work-based training that is still effective.

4.4.1 Actions which TVET Managers have instituted to support the implementation of real-life project-based learning approach

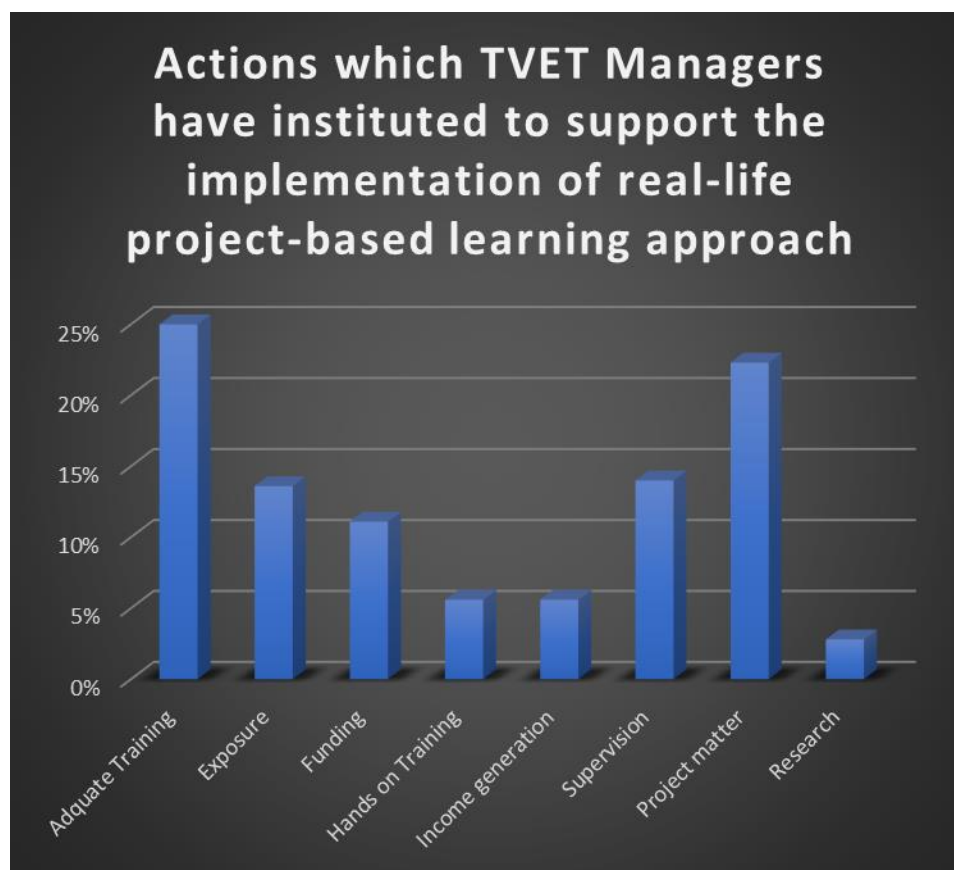


Figure 4.3: Actions which TVET Managers have instituted to support the implementation of real-life project-based learning approach

Participants in the research reported that TVET Managers made steps during the implementation of real-world project-based learning, as shown in Figure 4.3 above. These include exposure, finance, hands-on training, revenue creation, supervision, project subject, and research in addition to sufficient training and exposure. The majority of responders, 9 (25%) stated that getting proper training is what gets done the most, followed by 8 (22.3%) project matter. The results are consistent with research done by

Nilsook (2008) on the project-based learning management system for technical and vocational education.

4.4.2 Actions should TVET institutions take in order to improve the employability of their graduates

According to the study's participants, several steps should be implemented to increase the employability of their graduates. The survey participants said that they included financial assistance, supplying them with necessary supplies, creating favorable working circumstances, offering bursaries, and funding among other things.

4.4.3 Actions to be taken by Government, UBTEB and NCDC to improve real-life projects in TVET Institutions

The government of Uganda should increase on the funding of vocational studies to encourage more students to join the industry. UBTEB should provide guidelines and train assessors on competence based assessment. Whereas NCDC should review the TVET curriculum to cope up with the current workforce needs.

4.5 Challenges met in implementing real-life project-based learning

Table 4.18: Challenges met in implementing real-life project-based learning

Challenges met in implementing Real-Life Project-Based Learning	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Total Agreements
Time to implement	12 (33.3%)	24 (66.7%)	-	-	-	36 (100%)
Implementing the project within the school's schedule	12 (33.3%)	24 (66.7%)	-	-	-	36 (100%)
Fitting all the standards	8 (22.2%)	28 (77.8%)	-	-	-	36 (100%)
Designing the project	7 (19.4%)	29 (80.6%)	-	-	-	36 (100%)
Meeting all the testing requirements and presentations	8 (22.2%)	28 (77.8%)	-	-	-	36 (100%)
Absence of established rubric for assessing student skills makes it difficult to assess real-life project-based learning	7 (19.4%)	29 (80.6%)	-	-	-	36 (100%)
Shifting from directing the instruction to facilitating group	9 (25%)	27 (75%)	-	-	-	36 (100%)
Lack of knowledge, skills, and enterprise experience of trainers in managing projects is a major issue	11 (30.6%)	25 (69.4%)	-	-	-	36 (100%)
TVET Trainers are disconnected from reality	8 (22.2%)	28 (77.8%)	-	-	-	36 (100%)
Average Responses	9 (25.3%)	27 (74.7%)	-	-	-	36 (100%)

From Table 4.18; Challenges met in implementing real-life project-based learning, the study participants reported that the major 36 (100%) challenges in implementing real-life project-based learning include not having enough time, the nature of the institution where implementation in schools is a little challenging, designing the project, meeting all testing requirements and presentations, the lack of a set rubric for evaluating student skills makes it difficult to assess real-life project-based learning, and switching from directing to facilitating learning and team training/cooperation with others. The results are consistent with those of McCathy (2019), who examined the prevalent issues and solutions associated with project-based learning (PBL).

4.6 Responses from TVET Trainers

4.6.1 Response rate

Results for the response rate are presented in table 4.1 below.

Table 4.19: Showing Response Rate

Sample	Questionnaires distributed	Questionnaires returned	Questionnaires fully completed	Response rate (%)
76	76	76	76	100

Referring to Table 4.19 showing response rate, the findings show that 76 study participants made up the sample for the study. As a result, the researcher gave out 76 questionnaires to each and every one of the chosen study participants, and they were all returned. This 100% response rate prompted the researcher to continue with the study.

4.6.2 Demographic Characteristics of the Respondents

The background information of respondents was deemed necessary because the ability of the respondents to give satisfactory information on the study variables greatly depends on their background.

4.6.3 Gender of the Respondents

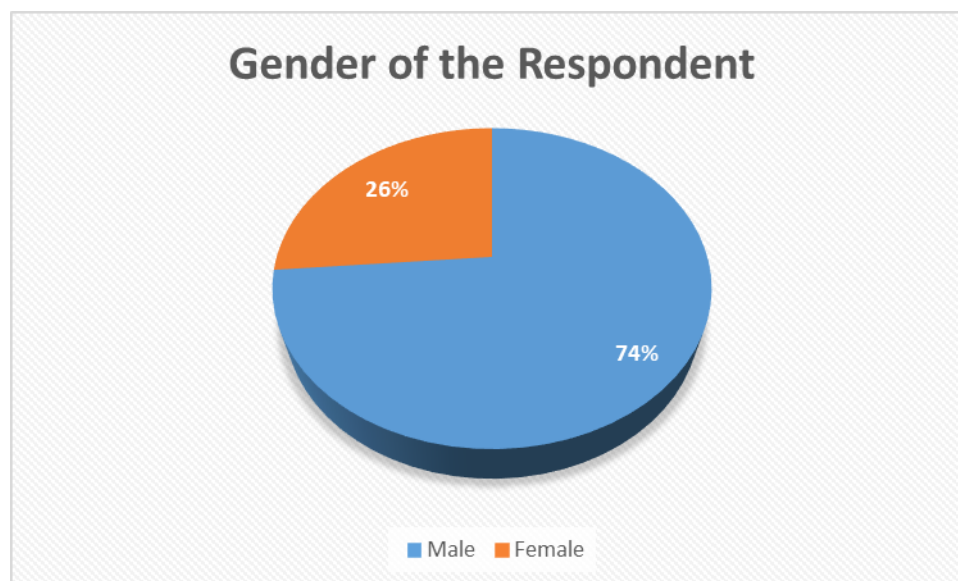


Figure 4.4: Gender of the Respondents

According to Figure 4.4; gender of the respondents, there were 20 (26.0%) more female study participants than male study participants, with 56 (74.0%) of the TVET trainers being male. Therefore, it follows that the majority of TVET instructors working for vocational schools who agreed to take part in the study were men. This is because men are more involved in operating vocational schools than women are, and they also shoulder a greater amount of the responsibility. The results are consistent with those of Zinn (2019), who conducted a study to assess the training needs of TVET teachers in

South Africa. In that study, a representative sample of 64 participants included 20.7% female participants, 78% male participants, and four participants who did not indicate their gender.

The results are consistent with those of Kintu (2019), whose study examined how trainers in Uganda's technical vocational education and training institutions perceived the approaches to teaching and learning used to develop competence. The study included more male trainers (72.7%) than female trainers (27.3%).

4.6.4 Age of respondents

Table 4.20: Age of respondents

Age	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Bellow 30 years	20	26.3	26.3	26.3
Above 31 Years	56	73.7	73.7	100
Total	76	100	100	

According to Table 4.20, the bulk of respondents, 56 (73.7%), were above the age of 31, while only 20, or 26.3 percent, were under 30. The findings showed that most TVET instructors were older than 31. According to studies, this is the age group when young people, particularly men, are supposed to have settled down to work and build their life. In this context, the majority of TVET trainers are males who are still in their early stages of development. In conclusion, the majority of TVET instructors are between the ages of

31 and beyond. These results are consistent with those of Kintu et al. (2019), who examined how trainers perceived the approaches to teaching and learning used for competency development in technical and vocational education and training institutions in Uganda. In that study, the majority of respondents were under the age of 40 years.

4.6.5 Academic qualifications of the respondents

Table 4.21: Academic qualifications of the respondents

Education level	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Advanced certificate	17	22.4	22.4	22.4
Diploma	32	42.1	42.1	64.5
Higher Diploma	16	21.1	21.1	85.5
Bachelor's degree	11	14.5	14.5	100
Total	76	100	100	

According to the findings in Table 4.21 above, the biggest percentage of respondents—32 (42.1%)—had completed a diploma-level education. Following respondents with advanced certificates were 17 (22.4%), 16 (21.1%), and 11 (14.5%) respondents with bachelor's degrees. This suggested that the majority of the study's participants were diploma-level graduates with a variety of specializations, and that all 36 (100%) of the study's teachers were qualified professionals.

4.6.6 Experience as a TVET trainer

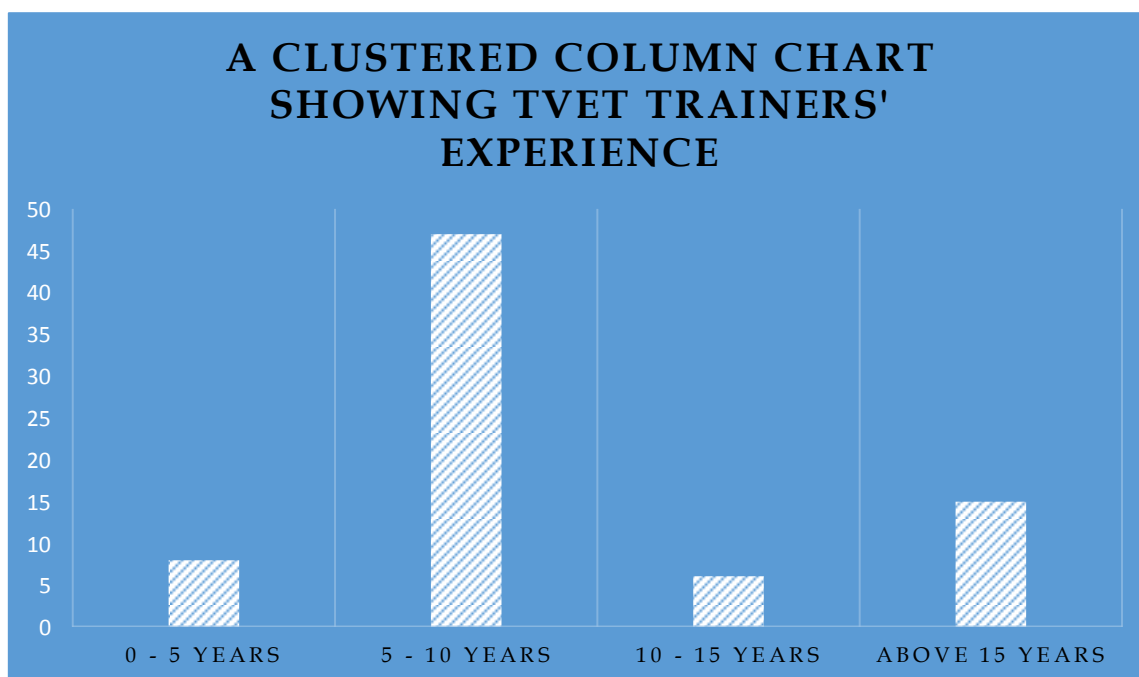


Figure 4.5: Experience as a TVET trainer

According to figure 4.5; experience of TVET trainers, the majority of TVET trainers' experience, or 47 (61.8%), is between five and ten years. This is followed by experience of more than fifteen years (19.7%), eight (10.5%) between zero and five years, and finally six (7.9%) between ten and fifteen years. In conclusion, the majority of TVET trainers have a minimum of five years of relevant experience. These results are consistent with Kintu's (2019) findings about trainers' perceptions of the teaching and learning approaches used for competency development in Ugandan technical vocational education and training institutions, where the majority of respondents have a level of experience between five and ten years.

4.6.7 TVET Trainers' Area of Specialisation

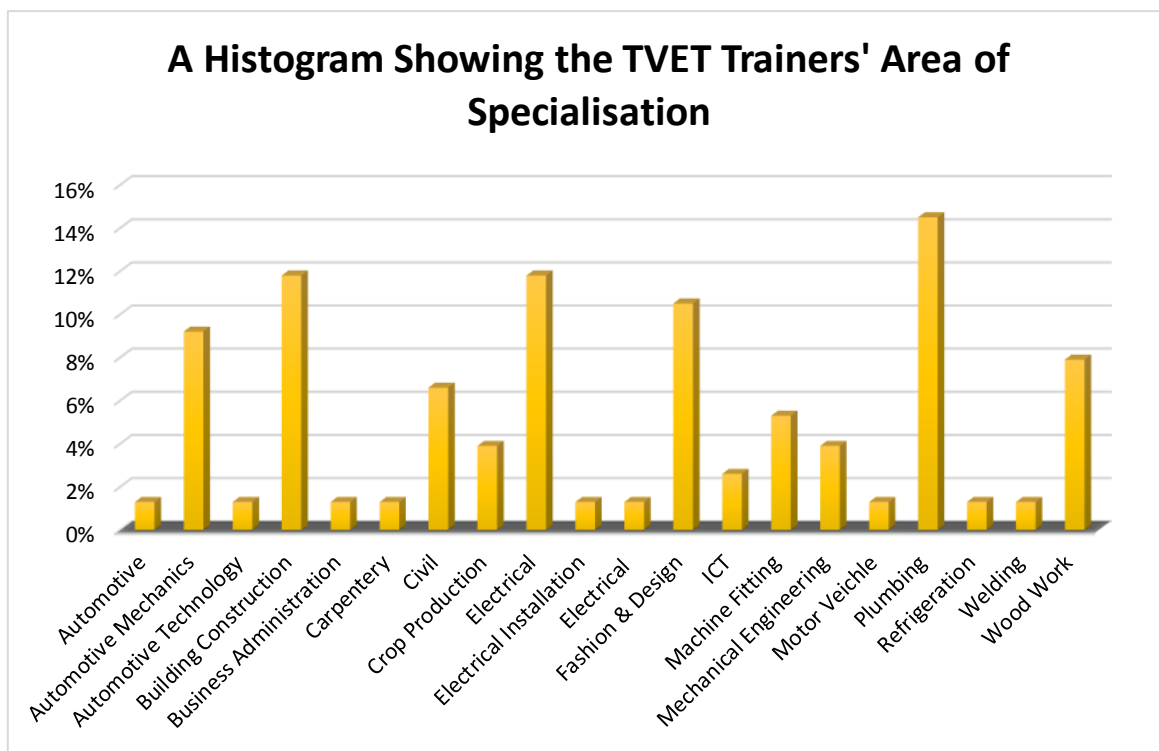


Figure 4.6: TVET Trainers' Area of Specialisation

According to Figure 4.6, the majority of those who agreed to take part in the survey had a specialty in plumbing, with 11 (14.5%), followed by 9 (11.8%) in electrical and 9 (11.8%) in building construction, as well as 8 (10.5%), 7 (9.2%), 6 (7.9%), 5 (6.6%), and others 21 (27.4%). Basically, TVET instructors might specialize in a variety of fields. Furthermore, it was discovered that each TVET trainer has a certain subject that they teach, and these are different for each trainer. These topics are under the trainers' area of expertise. The results support Ketter's (2018) case study on the impact of partnerships on the caliber of technical vocational education and training (TVET).

4.6.8 The timetable allows adequate time for project-based learning

Table 4.22: The timetable allows adequate time for project-based learning

Timetable	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Agree	36	47.4	47.4	47.4
Fully Agree	24	31.6	31.6	78.9
Disagree	13	17.1	17.1	96.1
Fully Disagree	3	3.9	3.9	100
Total	76	100	100	

According to table 4.22 above, 36 respondents, or 47.4%, agreed that the schedule allots enough time for project-based learning. This was followed by 24 respondents, or 31.6%, who disagreed, and three respondents, or 3.9%, who completely disagreed. Finally, 80% of respondents thought that the schedule allots enough time for project-based learning.

4.7 Factors considered in implementing RLPBL for competencies development of TVET trainees

Project management, public product, reflection, intellectual challenge and accomplishment, authenticity, and teamwork are aspects taken into account while implementing RLPBL skills development for TVET trainees. The following is a list of the research participants' reactions to these criteria.

4.7.1 Project Management skills

Table 4.23: Project Management

Project Management	Strongly Agree	Agree	Dis agree	strongly Disagree	Total Agreements
The timetable allows adequate time for project-based learning	24 (31.6%)	36 (47.4%)	13 (17.1%)	3 (3.9%)	60 (61%)
Management provides required materials for projects in time	24 (31.6%)	36 (47.4%)	13 (17.1%)	3 (3.9%)	60 (61%)
The institution has minimum machines/equipment to facilitate real-life projects	20 (26.3%)	26 (34.2%)	23 (30.3%)	7 (9.2%)	46 (60.5%)
Trainees are engaged in the initial problem identification, solution identification, design, and presentation as they own projects?	22 (28.9%)	36 (47.4%)	17 (22.4%)	1 (1.3%)	58 (51.3%)
TVET trainers have sufficient knowledge and skills to facilitate real-life projects efficiently?	30 (39.5%)	42 (55.3%)	3 (3.9%)	1 (1.3%)	72 (94.8%)
Project-based learning approach is a culture here and is supported by top management	24 (31.6%)	38 (50%)	11 (14.5%)	3 (3.9%)	62 (81.5%)
Real-life Projects based learning is one of the best approaches for skills training	19 (25%)	48 (63.2%)	8 (10.5%)	1 (1.3%)	67 (88.2%)
TVET trainers have good experience in project planning & management	49 (64.5%)	26 (34.2%)	0	1 (1.3%)	75 (98.7%)
TVET trainers have good experience in managing enterprises	20 (26.3%)	48 (63.2%)	7 (9.2%)	0	68 (89.5%)
The institute provides learners with ample opportunities to learn through hands-on activities	16 (21.1%)	52 (68.4%)	7 (9.2%)	1 (1.3%)	68 (89.5%)
The training methods utilized are based on dialogue, problem-solving, and self-learning	25 (32.9%)	42 (55.3%)	9 (11.8%)	-	67 (88.2%)

The institution supplies various opportunities for trainees to acquire intellectual and social skills	21 (27.6%)	49 (64.3%)	6 (7.9%)	-	70 (91.9%)
Training provides trainees with adequate activities to practice learning through real-life projects	26 (34.2%)	44 (57.9%)	6 (7.9%)	-	70 (92.1%)
Education in technical institutions helps trainees express their opinions and make decisions	30 (39.5%)	42 (55.3%)	4 (5.3%)	-	74 (94.8%)
The training polishes the trainees, and help them become disciplined and good citizens	30 (39.5%)	44 (57.9%)	1 (1.3%)	1 (1.3%)	74 (97.4%)
The training provides each learner with different opportunities to become an active person who has certain roles and is not a passive	32 (42.1%)	43 (56.6%)	1 (1.3%)	-	75 (98.7%)
The institutions are concerned with having the trainer becoming a guide to learners' learning rather than the source of knowledge	31 (40.8%)	41 (53.9%)	3 (3.9%)	1 (1.3%)	72 (94.7%)
The institutions view themselves as Workshops/laboratories rather than lecture rooms	50 (65.8%)	24 (31.6%)	2 (2.6%)	-	74 (97.4%)
The institutions' management are concerned with making the educational and training process a reflection of the reality outside	25 (32.9%)	45 (59.2%)	5 (6.6%)	1 (1.3%)	70 (92.1)
Average Responses	27 (35.9%)	40 (52.8%)	7 (9.6%)	2 (1.7%)	67 (88.7%)

From the Table 4.23; project management, the respondents were in agreement 67 (88.7%) with the above factors to be contributing to project management, thus it is considered under implementation of RLPBL competencies development of TVET trainees.

4.7.2 Public Product

Table 4.24: Public Product

Public Product	Fully Agree	Agree	Disagree	Fully Agree	Total Agreements
Trainers are always available to guide learners on their work-in-progress and provide timely feedback	33 (43.4%)	39 (51.3%)	3 (3.9%)	1 (1.3%)	72 (94.7%)
Learners exhibit their products and describe their learning to peers and people beyond the institution	40 (52.6%)	33 (43.4%)	3 (3.9%)	-	73 (96%)
Learners receive feedback and/or engage in dialogue with their audiences	17 (22.4%)	50 (65.8%)	9 (11.8%)	-	67 (88.2%)
There is continuous assessment of trainees' competence with evidence/records	15 (19.7%)	53 (69.7%)	7 (9.2%)	1 (1.3%)	68 (89.4%)
The community/industry is involved in the real-life project process	40 (52.6%)	32 (42.1%)	4 (5.3%)	-	72 (94.7%)
The completed projects have solved problems at the institution or community	28 (36.8%)	28 (36.8%)	9 (11.8%)	-	56 (73.6%)
Average Responses	34 (45.8%)	34 (45.8%)	5 (5.8%)	3 (2.6%)	68 (89.4%)

From Table 4.24; public product, 68 respondents (89.4%) agreed that the aforementioned variables contributed to the public good; as a result, it is regarded to be part of the execution of RLPBL skills development for TVET trainees.

4.7.3 Reflection

Table 4.25: Reflection

Reflection	strongly Agree	Agree	Disagree	Strongly disagree	Total Agreements
Learners Learn to assess their peers and suggest improvements in their own and other learners' work?	38 (50%)	30 (39.5%)	7 (9.2%)	1 (1.3%)	68 (89.5%)
Learners reflect on, write about, and discuss the academic content, concepts, and success skills they are learning	14 (18.4%)	57 (75%)	5 (6.6%)	-	71 (93.4%)
Learners use reflection as a tool to increase their own personal understanding	22 (28.9%)	52 (68.4%)	2 (2.6%)	-	74 (97.3%)
Learners provide feedback of what has been learnt through portfolio of evidence (PoE)	25 (32.9%)	45 (59.2%)	6 (7.9%)		70 (92.1%)
The tasks and assignments are reviewed often to reflect what is required in the world of work	12 (15.8%)	52 (68.4%)	10 (13.2%)	2 (2.6%)	64 (84.2%)
Average Responses	22 (29.2%)	47 (62.1%)	6 (7.9%)	1 (0.8%)	69 (91.3%)

From Table 4.25; reflection, 69 (91.3%) of the respondents agreed that the aforementioned variables contributed to reflection; as a result, it is deemed to be part of the execution of RLPBL competencies development for TVET trainees.

4.7.4 Intellectual Challenge and Accomplishment

Table 4.26: Intellectual Challenge and Accomplishment

Intellectual Challenge and Accomplishment	Strongly Agree	Agree	Disagree	Strongly disagree	Total Agreements
Learners investigate challenging problems, questions, and issues over an extended period?	38 (50%)	30 (39.5%)	7 (9.2%)	1 (1.3%)	68 (89.5%)
Learners focus on concepts, knowledge, and skills central to the curriculum	14 (18.4%)	57 (75%)	5 (6.6%)	-	71 (93.4%)
Learners experience research-based instruction and support as needed for learning and project success?	22 (28.9%)	52 (68.4%)	2 (2.6%)	-	74 (97.3%)
Real-life projects meet trainee expectations	25 (32.9%)	45 (59.2%)	6 (7.9%)	-	70 (92.1%)
Learners commit themselves to completing projects/products timely with the highest quality	12 (15.8%)	52 (68.4%)	10 (13.2%)	2 (2.6%)	64 (84.2%)
Average Responses	22 (29.2%)	47 (62.1%)	6 (7.9%)	1 (0.8%)	91.3%

From the above Table 4. 26; intellectual challenge and accomplishment, the respondents agreed 69 (91.3%) with the above factors to be contributing to intellectual challenge and accomplishment, thus it is considered under implementation of RLPBL competencies development of TVET trainees.

4.7.5 Authenticity

Table 4.27: Authenticity

Authenticity	Strongly Agree	Agree	Dis agree	Strongly disagree	Total Agreements
Learners engage in work that makes an impact on or otherwise connects to the world beyond the Institute, and to their personal interests and concerns?	41 (53.9%)	32 (42.1%)	3 (3.9%)	-	73 (96%)
Learners use the tools, techniques, and/or digital technologies employed in the world beyond school	27 (35.5%)	45 (59.2%)	4 (5.3%)	-	72 (94.7%)
Trainees make choices regarding project topics, activities, and/ or products	25 (32.9%)	45 (59.2%)	5 (6.6%)	1 (1.3%)	70 (92.1%)
Real-life Projects inspire, influence, and develop learners to become professionals	23 (30.3%)	45 (59.2%)	8 (10.5%)	-	68 (89.5%)
Average Responses	29 (38.2%)	41 (55.3%)	5 (6%)	1 (0.5%)	70.6 (93.1%)

From the above Table 4. 27; authenticity; the respondents agreed 71 (93.1%) with the above factors to be contributing to Authenticity, thus it is considered under implementation of RLPBL competencies development of TVET trainees.

4.7.6 Collaboration

Table 4.28: Collaboration

Collaboration	Strongly Agree	Agree	Disagree	strongly Agree	Total Agreements
Learners work in teams to complete complex tasks	41 (53.9%)	32 (42.1%)	3 (3.9%)	-	73 (96%)
Learners Learn to become effective team members and leaders	27 (35.5%)	45 (59.2%)	4 (5.3%)	-	72 (94.7%)
External examiners (UBTEB) influence the quality of real-life projects	25 (32.9%)	45 (59.2%)	5 (6.6%)	1 (1.3%)	70 (92.1%)
Education standards agency/ District inspectors often monitor the projects	23 (30.3%)	45 (59.2%)	8 (10.5%)	-	68 (89.5%)
Average Responses	28.8 (38.2%)	40.7 (55.3%)	4.7 (6%)	0.9 (0.5%)	71 (93%)

From the above Table 4.28; collaborations, the respondents agreed 71 (93%) with the above factors to be contributing to collaboration, thus it is considered under implementation of RLPBL competencies development of TVET trainees.

4.8 Challenges met during implementation of real-life projects

The respondents mentioned below challenges met during the implementation of real-life project based learning among others.

- Lack of safety ware, adherence to healthy safety and environment policies and preparing assessment rubric for real-life projects
- Poor material storage facilities, poor communication skills, risk mitigating management, material shortages

- Inability of administration to approve real-life projects, timely provision of training Materials and guidelines to produce for sale
- Limited time on timetables, Industrial training charges to trainees
- Lack of facilitation for Trainers to link up with industries especially for industrial training, exposure, tracer studies and importantly employment opportunities
- Limited funds to finance the Real-life projects and the little funds are received late, the number of trainees in some courses is overwhelming to the trainers
- Insufficient training equipment, machines and tools to produce quality products, weak report writing, limited exposure to industry thus disconnected to the world of work thus inadequate use of tools, techniques, and/or digital technologies employed in the world beyond the school.

4.9 Responses from Heads of Institutions and Ministry of Education officials

4.9.1 Response rate

Results for the response rate are presented in table 4.1 below.

Table 4.29: Showing Response Rate

Sample	Questionnaires distributed	Questionnaires returned	Questionnaires fully completed	Response rate (%)
20	20	20	20	100

Referring to Table 4.1; response rate, the findings show that a total of 20 study participants made up the sample for the study. As a result, the researcher conducted interviews with 20 participants who accepted from the MoES headquarters (3), UBTEB (3), UNCCDC (2), and Head of Institutions (12). The fact that there was a 100% response rate prompted the researcher to carry on with the study. The results are consistent with Kintu's (2018) findings about the impact of partnerships on the caliber of technical vocational education and training (TVET).

4.9.2 Demographic Characteristics of the Respondents

The background information of respondents was regarded important since it considerably influences their capacity to provide adequate information on the research variables.

4.9.3 Gender of the Respondents

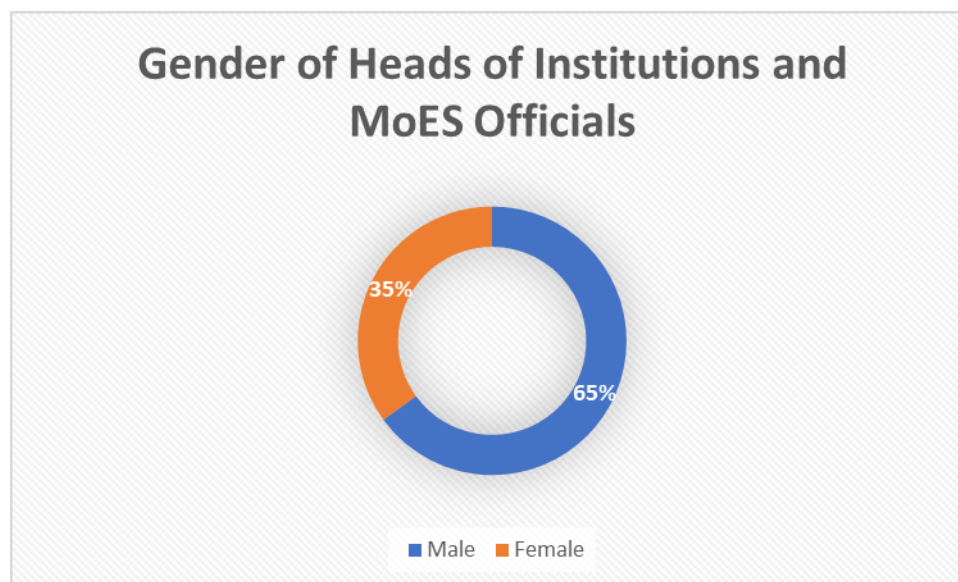


Figure 4.7: Gender of the Respondents

According to Figure 4.5; gender of respondents, 7 research participants (or 35.0% of them) were female, and the remaining 13 (65.0%) of the TVET Experts were male. This suggests that the majority of the heads of institutions and Ministry of Education officials working in TVET are male because they make up a much larger proportion of TVET institutions' operations and management than female counterparts. This also means that males dominate the larger proportion of leadership positions than do women. However, its also a good trend as it indicates great improvement of female leadership in TVET. The results are consistent with those of Okello (2011), who found that of the 20 lecturers, none were female and 100% were male.

4.9.4 Age of respondents

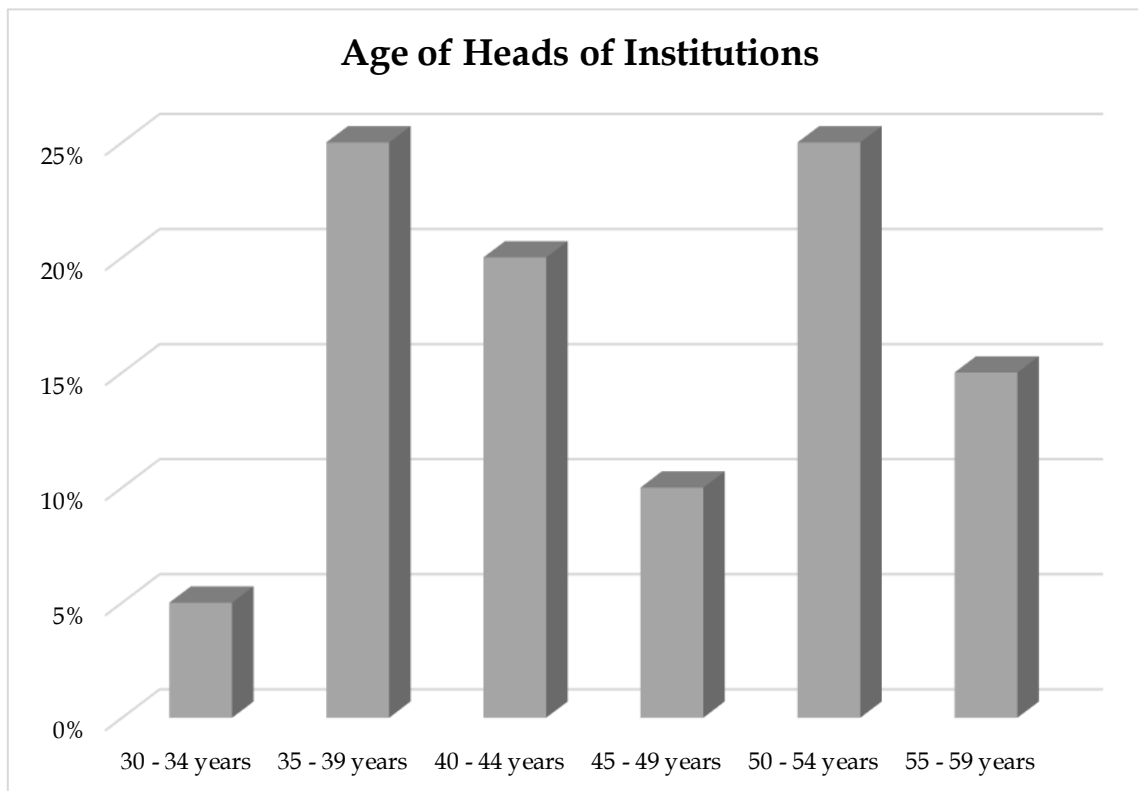


Figure 4.8: Age of the Respondents

Figure 4.7; age of respondents from TVET Managers; shows that the bulk of respondents (19, or 95%) were over 50, while just seven percent were under 49. This suggests that the majority of the TVET managers are elderly individuals with extensive experience in the field. The results concur with those of Okello (2011).

4.9.5 Academic qualifications of the Heads of Institutions

Table 4.30: Academic qualifications of the respondents

Education level	Frequency	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
PhD	2	10	10	10
Master's Degree	8	40	40	50
Bachelor's Degree	10	50	50	100
Total	20	100	100	

According to the findings in Table 4.30 academic qualifications of respondents, the largest percentage of respondents (10) held a Bachelor's degree in a related field of study. Respondents who had Master's degree in relevant education and training followed with a representation of 8 (40%) and lastly only 2 (10%) with PhD in relevant training. This therefore implied that most of the heads of institutions and ministry of Education officials were degree graduates who specialized in different trades and all 20 (100%) are professionally trained trainers. The findings are in line with those of Edward (2014) about the Stakeholders' Roles in Prioritizing Technical Vocational Education and Training in Post conflict Liberia.

4.9.6 Experience in TVET

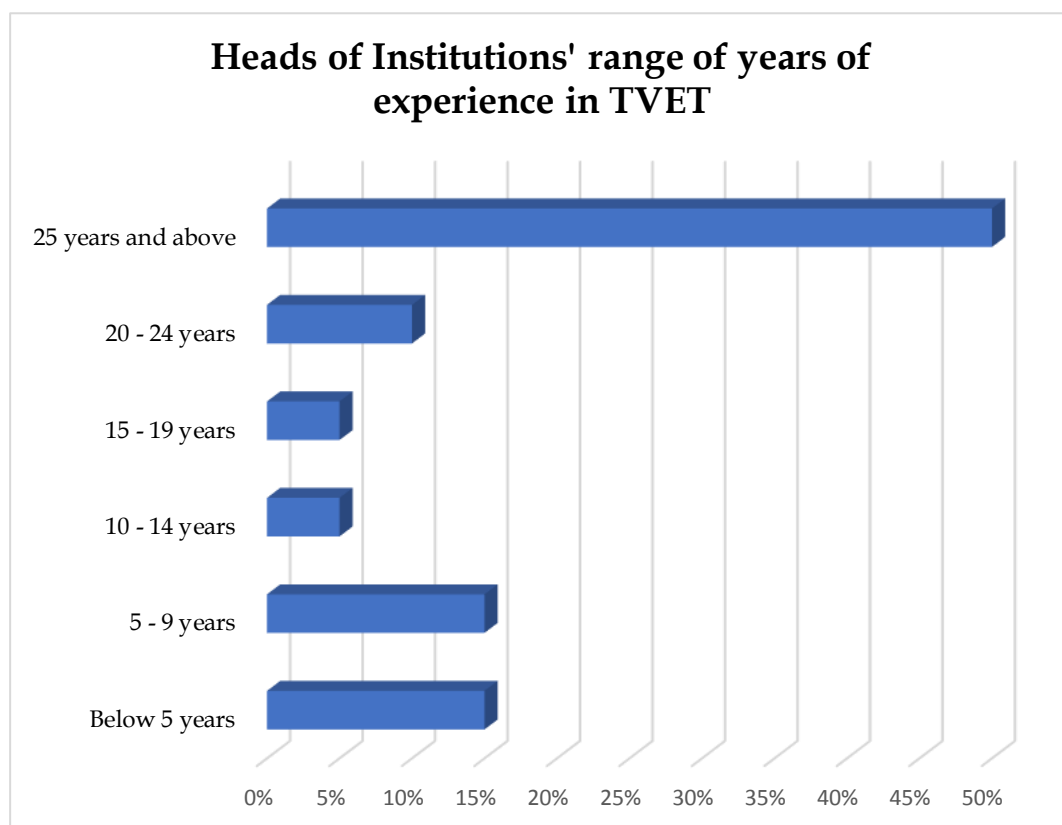


Figure 4.9: Experience in TVET

From the figure 4.8 experience in TVET, it was revealed that the highest proportion 10 (50%) of the heads of institutions and Ministry of Education officials have experience in TVET of 25 years and above, followed by 3 (15%) below 5 years, 3 (15%) between 5 to 9 years and others as highlighted above. In conclusion, most of the TVET Managers have attached some reasonable level of experience. The findings are in line with those of Edward (2014) about the Stakeholders' Roles in Prioritizing Technical Vocational Education and Training in Post conflict Liberia.

4.9.7 Responses from the Focus Group Discussions

From the 30 focus group discussions conducted each consisting of 12 trainees and in total discussion with 356 trainees, it was revealed that;

- The study participants who attended the group discussions were not satisfied with the time and quality of the real-life training from their trainers. They further responded that their trainers provide them with less time for practical, scarcity of trainers at the institute/s, their trainers are giving them less time especially in the morning hours. They also recommended that at least their trainers should give them 70% of the time for practice and leave the other time for hands on training.
- The study participants informed the researcher about how many hours in a week allocated to real-life projects and these are 6 out 36 hours per week set aside for real-life projects hence contributing to only 16.6% of the weekly time for studies.
- The study participants also responded when they were asked to discuss how many real-life projects they had done so far ever since they joined their respective institutes, and it was concluded on average that these are not adequate since they averagely had only 2 real-life projects for second year students and only one for first year trainees were noted
- The study participants responded when they were asked about how they identify real-life projects and how they implement them. It was noticed that most of the projects were initiated by trainees in consultation with the trainers. For example, trainees of one institution narrated an example of how they realized that at their institution there was water shortage especially during the dry season. They

discussed with the trainer and proposed a solution of repairing the borehole in the school compound which had taken over 5 years while faulty, they wrote up the project introduction, description, justification, drawings and bills of quantities including the specifications which they presented in power point to a panel of administration including the Principal and it was accepted thus funded. The trainer invited other two people from the community who had good experience in the repair of boreholes, the needed spares including pump rods, stainless steel pipes, upper and lower valves pump cylinder and others were procured, installed and tested. This was done by these trainees including writing reports and now the institute has access to enough water.

- The study participants also reported that the real-life projects are sometimes identified by TVET trainers or managers. However, majority of the real-life projects' being undertaken were initiated and identified by the learners themselves.
- It was also worth noting that the study participants agreed that many trainees had work plans or budgets, bills of quantities but with no trace of portfolio of evidence. The researcher drew a conclusion after the discussion that majority of the real-life projects possess all these elements.
- The study participants reported that many of the trainers have capabilities to help them come out with the best quality of real-life projects, however some were not. They further highlighted on what should be the roles of a TVET manager in the implementation of real-life projects and these included overall supervision,

monitoring and evaluation, directing and guiding trainers, lobbying for funds and carrying out advisory support to trainers and learners.

- They also reported some of the challenges they meet while implementing real-life projects and some included insufficient tools to use, inadequate supervision by trainer-they confessed that trainers give them materials and leave them to figure out the procedures by themselves, limited time for practice before actual real-life projects, limited monitoring and spot assessment. The UBTEB officials assess the process and progress only 2 times a year instead of at least 3 times. They also reported that the rate of drop out of their friends was alarming and this was mainly due to lack of fees especially for private students. This was exacerbated by the recent COVID19 pandemic in the country.
- They also accepted that most of the products produced were not up to the quality needed in the world of work this was due to lack of adequate time and materials to practice and the poor quality of trainers.
- The respondents feel confidence and capability to execute similar projects to good quality in the World of work.
- The study participants hinted on what should be done to improve on real-life projects in TVET institutions in order to enhance trainees' skills for transition to the World of work and these include; more funding, more tools to be availed, more trainers to cater for large numbers of students, adequate time to be allocated to real-life since it is more practical, increase government to support the institutions capacity building of the trainers, be more digital and updated always and others.

4.9.8 Responses from Personal Observations

An observation checklist was used to record the observations from 10 study institutions.

The observations were grouped under a scale developed to reflect availability as presented in the table below.

Table 4.31: Personal Observation checklist

Observations	Availability (Responses)				Conclusion
	Adequate	Inadequate	Not available	Alternative	
Availability of equipped workshops, tools and equipment for the courses offered	04 (40%)	6 (60%)	-	-	Personal Judgement Inadequate
Availability of workshop Technicians, products for sale	04 (40%)	06 (60%)	-	-	Inadequate
Availability of plans for general improvement (site plan)	03 (30%)	02 (50%)	05	-	Not available
Availability of lab/workshop attendance lists mark sheets and registers	07 (70%)	-	03 (30%)	-	Adequate
Availability of Trainers, timetable & schemes of work, lesson plans	08 (80%)	02 (20%)	-	-	Adequate
Availability of a list of qualified TVET Trainers capabilities, department meeting Minutes	06 (60%)	02 (20%)	02 (20%)	-	Adequate
Availability of training materials for projects	03 (30%)	-	03 (30%)	4 (40%)	Inadequate
Availability of policies, rules & regulations	3 (30%)	-	7 (70%)	-	Inadequate
Availability of NCDC Curriculum	8 (80%)	02 (20%)	-	-	Adequate
Availability of list of real-life projects challenges and how you have addressed them for courses implemented	4 (60%)	2 (20%)	04 (40%)	-	inadequate
Availability of drawings, BoQs, work plan schedules for projects	06 (100%)	-	04 (40%)	-	Adequate
Availability of a study library	06 (60%)	02 (20%)	02 (20%)	-	Adequate
Availability of internet facilities	2 (80%)	02 (20%)	06 (60%)	-	Not available

Availability of reference materials/books/audio, videos, power point, photos	03 (30%)	02 (20%)	05 (50%)	-	inadequate
Availability of training & examination timetables	08 (80%)	2 (20%)		-	Adequate
Activities of departments/sections minutes	06 (60%)	-	04 (40%)	-	Adequate
Industrial training linkages – evidence	04 (40%)	02 (20%)	04 (40%)	-	Inadequate
Availability of Covid-19 committee and SOPs being adhered too – evidence	07 (70%)	03 (30%)	-	-	Adequate
Government support supervision– evidence	06 (60%)	-	04 (40%)	-	Adequate
Availability of RLPBL groups and Minutes	06 (60%)	-	04 (40%)	-	Adequate
Availability of MoU for collaboration	04 (100%)	02 (20%)	04 (40%)	-	Inadequate
Availability of functioning Board of Governors/ Councils	6 (60%)		04 (40%)	-	Adequate
Availability of modern & serviceable equipment	4 (40%)	2 (20%)	-	04 (40%)	Adequate
Availability of the well-marked past real-life projects	03(30%))	-	07 (70%)	-	Inadequate
Availability of well-maintained talking compound	8 (80%)	02 (20%)	-	-	Adequate
Availability of well-stalked show room	-	-	08 (80%)	02 (20%)	Inadequate
Availability of well-equipped computer rooms	06 (60%)	04(40%)	-		Adequate
Evidence of Project presentations and written feed back	2 (20%)	01 (10%)	07 (70%)	-	Not available
Observance of healthy safety such as nose masks, earmuffs, helmets, overall, safety shoes etc.	4 (80%)	02 (20%)		04 (40%)	Inadequate
Number of learners in a training session	07 (70%)	-	30 (30%)	-	Adequate
Availability of strategic plan	06 (60%)	-	04 (40%)	-	Adequate
Evidence of exhibitions and community involvement in the projects	03 (100%)	-	07 (70%)	-	Inadequate
Availability of internal quality assurance mechanisms (internal verifiers)	02 (20%)	-	08 (80%)	-	Unavailable

Evidence of TVET Trainers continuous professional development policy	04 (40%)	02 (20%)	04 (40%)	-	Inadequate
Evidence of approved budgets for projects	03 (30%)	02 (20%)	-	05 (50%)	Inadequate

From the Table 4.31 personal observation checklist, it was observed that most of the factors identified for real-life projects, were inadequate as exercised by the respondents. Most affected were the lack of materials, equipment and budgets for real-life project as evidence of proper RLPBL implementation. Also the lack of internal quality assurance mechanisms, lack of evidence of continuous professional development and lack of showrooms. Thus, in conclusion, the respondents are compliant to the factors as presented in the table above basing on the scores attached which is an average of adequate (53%). It was found that on the issue of evidence of TVET trainer's continuous professional development policy, both government and board of governors were not showing emphasis on it yet according Spottl (2015) the concept of "skilled worker" is one of the best principles for quality vocational training. Additionally, the increasing complexity and rapid high-tech advancement occurrences have to be addressed by continuous professional training (Loose & Spottl, 2015).

However, as revealed by Getachew (2016) in Ethiopia, trainers in Uganda were found not prepared enough to deliver quality real-life projects because there was no evidence of continuous professional development plan and policy, internal quality assurance mechanisms such as Deming wheel which describe plan, do, check and act. Evidence of exhibitions and community involvement in the projects, observance of health and safety, Project presentations and written feedback and evidence of approved budgets were found

inadequate in all institutions studied. Some of the products of real-life projects include windows, doors, plumb bobs, bricks and blocks



REAL-life PROJECT- DOORS



Real-Life Project -PLUMB BOB



Real-life Project BRICKS & BLOCKS PROJECT



Real-Life Project -WINDOWS

Activate Windows
Go to Settings to activate Windows.

4.9.9 Responses from interview guides

The researcher conducted 20 interviews from Ministry of Education, UBTEB and NCDC officials and heads of training Institutions using an interview guide and the responses from many of them are presented as below according to the order of questions under the interview guide.

4.9.10 Responses to question one of the interview guides

Question 1: what is the status of the implementation process of the real-life project-based learning for competence development of TVET trainees in Uganda?

This intended to ask respondents whether they think that Real-life Project-based learning is well implemented for delivering and assessing TVET trainee's skills for employment and competitiveness in the world of work and implementing CBET? If yes/no give reasons

Responses

- The implementation of Real-life project is not well implemented because of lack of training materials, inadequate time allocated for the project. The number of students is too big in most courses like electrical installation, automotive mechanics, plumbing and others compared to the volume of real-life project being undertaken thereby making each student to learn very little.
- It's a course requirement for national certificate students and is an examination paper. Students identify possible projects within the institute or from the community, discuss with trainers and trainers discuss with management for approval to be sure of the availability of funds for materials. UBTEB comes only twice for monitoring and supervision of real-life projects- mainly checking the progress and during the second time when they mark the products. Learners write project reports individually or groups at the end of the projects. Learners mostly do projects in groups, but each learner has particular tasks e.g. in electrical wiring of a house cannot be done by an individual, but courses like fashion and design each student makes his/her project e.g a dress, shirt, trouser, painting/ printing etc. Learners make presentations in groups and those to present can be selected at random.

- No- it is not well implemented; many institutional administrators do not value real life project based learning as of great contribution to skilling and as a result they see it as taking a lot of resources and expensive hence limiting the funding toward real life project based learning.
- No- because it lacks funding, no proper mechanism/roadmap for assessment, monitoring and supervision. The curriculum gives little time and was implement without retooling instructors to get the necessary practical competencies including project management
- NO- Marketing of the products is a challenge and the students get discouraged to produce for no market. –students don't get any sales and income to support their effort
- NO- Due to lack for sensitization and awareness, because learners think it's only for passing examinations.

Question 2: What are the capabilities of TVET trainers regarding the implementation of real-life project-based learning for competence development in Uganda?

Responses

- TVET Trainers should undergo first of all professional and practical and pedagogical/andragogic training. Hands-on skills, Soft skills like communication, computer, entrepreneurship skills, 'Positive attitude and passion for skill
- Innovative, creative and life-long learners
- More still, technical teacher training Colleges do not provide hands on practical training models to instructors during their training. The instructors qualifying from such Colleges lack practical experience and thus cannot provide quality training to the TVET trainees.
- TVET Trainers do not have the skills demanded in the world of work and as a result, they have very limited skills to transfer to trainees during real life project execution. TVET trainers themselves have negative attitudes towards work and safety promotion, so promoting it is practically not possible due to such limitations, as such the training is supply driven not demand driven.

Question 3: What is the role of TVET Managers in the implementation of real-life project-based learning for competence development of TVET trainees in Uganda?

Responses

- TVET managers initiate mobilization of resources: personnel, funds, training materials, directing and coordinating the implementation of real-life project.
- Practical experience, able to do things, able to manage teams, skills in guiding report writing.

- Guiding trainers on the best real life training strategies. Motivating the trainers morally and materially in implementing real life project. Standing in the gap as role models in project-based learning thru one off physical participation in project work execution. Feeding the labour information management system with required data of trainee graduates, do tracer studies to reveal where the TVET graduates are and what they are doing. Additionally, TVET manager's role is to offer Curriculum implementation support in terms budget and continuous professional development, Monitoring and support supervision of Real-life projects. Facilitate in terms of motivation of the staff and students who are undertaking real-life projects, Public awareness about the need for real life projects, Acting as role models, advocate for better policy frameworks and coordinate collaborations, synergies' and networking for real-life projects

Question 4: What are the challenges met during the implementation of Real-life Project based learning in TVET institutions in Uganda?

- Lack of materials, low quality of skills on the side of trainers, limited time for real life hand-on work, institution's inability to introduce vast areas of coverage on real life project.
- The supervision and monitoring, approve projects, provide necessary funds, have project management teams, guide the projects, seek partnerships with the community to provide materials where they can do projects that benefit them. However, that has been a challenge coupled with limited skills of trainers, limited training materials, lack of training equipment, lack of integrity among trainers and

mangers where they use even the little money for their own good and there is little morale.

1. Question 5: In your opinion, do you think employers are satisfied with the quality of the TVET graduates? If not, why?

Responses

- Employers are not satisfied with the quality of TVET graduates. This is because TVET graduates are not readily employed employers still take TVET graduates for further training. In some instances, employers prefer TEVT graduates from other countries.
- Projects are expensive and are not funded by government and they don't charge students extra charges. Lack of necessary practical skills by trainers as such most products are of poor quality. There is no specific road map for UBTEB assessment. Limited time for implementing projects due to tight curriculum- they combine the time for workshop practice to achieve at least 6 hours. Most projects in courses like electrical, plumbing, automotive are inadequate and sometimes not relevant. Trainers should be paid extra hours taught to motivate them to do more otherwise they leave learners to struggle for themselves to do what they are able to do alone. As such poor-quality real-life products from real-life projects is evident in almost all courses.
- No because the graduates are semi-skilled and have negative work attitudes. Many graduates are not having abilities to innovate and create new work methods or designs that add value to the enterprises.

Question 6: Respondents suggestions on what should be done to improve on implementation of real-life projects based learning to enhance TVET graduates transition to the world of work.

Responses

- Training Institutions to have very strong linkages with industry. Regular returns to industry by Instructors to learn new demanded skills in the world of work. Increase on the duration of real-life projects to cover one complete full semester.
- Employers are not satisfied due to the fact that many of our graduates are unemployed because employers say that they don't meet their needs
- Parents: Government and employers should share the costs towards the procurement of materials needed for training and the cost of real-life projects in general. Compulsory retooling of all TVET trainers should be implemented for at least attaching trainers in industry for the December holiday, retooling about project management, patent and utility model rights, intellectual property, commercializing of products, value addition and export trade
- TVET trainers should be practically taken to the workplaces for workplace based training for at least six weeks. The promotional structure in public service for TVET trainers should be reconciled to advantage both technical teachers, instructors, and others.

Question 7: What can be done to improve adequacy of materials & machines for real-life projects and the quality of TVET Trainer in Uganda?

Responses

- The Government should increase on the capitation grant so that adequate materials and machines are bought. Employers should also contribute some money towards skills development fund. For the case of the quality of TVET trainers regular return to industry should be emphasized.
- Curriculum review especially the time allocated for real- projects should urgently be done. UBTEB should provide a better mechanism for monitoring and supervision for example by introducing assessors/ internal verifiers and external verifiers to provide support, documentation/ marks regularly / progressively. Portfolio of evidence (PoE) should be introduced to provide evidence of learners' creativity, progress and trainers' support. They can introduce an automated reporting system for real-life training system. Trainers majorly concentrate on the outcome/ products and forget soft skills which are important in the world of like, teamwork, ethics, collaboration and corporation, communication, ICT etc. Innovation and creativity in real –life projects competitions and exhibitions at institutional level, regional and national level.
- Regrouping/specialization of institutional courses offered based on the regions and the facilities that they have rather than spreading every institute to have the same courses, yet the facilities are not adequate.

4.10. Summary

This chapter involved data presentation, analysis, interpretation and discussion of this study and is summarized as follows;

The study identified the real-life implementation phases which include initiating phase, planning phase, execution phase, publishing phase and closing phase. Furthermore, it was agreed that the following are the most needed capabilities of TVET trainers who should be involved in real-life project-based learning; routine expertise, resourcefulness, craftsmanship, functional literacy and wider skills. Additionally, the factors to be considered while implementing real-life projects include; project management skills, public product, reflection, authenticity and collaboration. Despite the fact that males were dominating TVET management, it was observed that there was improvement in the involvement at all levels, it was established that 35% of female were involved in TVET leadership at both Ministry of Education and sports and heads of institutions.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter includes a summary of the results, conclusions, and suggestions that were made in light of the objectives and findings found in chapter four of this study.

5.2 Summary of the findings

The researcher concentrated on the application of project-based learning in real-world settings for TVET trainees in Uganda. As can be seen from each objective below, it was determined that the quality of competence development of TVET trainees was below expectations.

5.2.1 To find out the status of the implementation process of the real-life project-based learning for competence development of trainees in TVET Institutions in Uganda.

Under this objective, the study sought to find out the status of the implementation process of the real-life project-based learning in selected TVET institutions in Uganda. The study revealed that the process was not being followed as expected because they didn't know about them. The study discovered that presentations were not being done much as it was among the guidelines given by Uganda Business and Technical Examinations Board (UBTEB). Also UBTEB monitored real-life project-based learning only twice instead of the three times planned. Furthermore, Quality assurance mechanisms were missing as such the quality of the products were not up to the required standard. Additionally, the study

established that there was inadequate training of trainers at the start of the new curriculum. This led to failure to understand the implementation process of the real-life project-based learning. Furthermore, the study confirmed that for a successful implementation process of the real-life project-based learning approach, there should be six phases namely; initiating phase, planning phase, executing and assessing phase, publishing phase and then the closing phase. It was established by all the trainers who consented to participate in the study that for a successful real-life project-based learning the six stages should be followed to the dot. However, it was observed that trainers didn't follow the stages as expected. Therefore, to this objective, real-life project-based learning was not implemented as planned. For example, there was scanty evidence from all institutions to whether presentations of real-life projects took place and conducted by a constituted panel as required in the curriculum. It is recommended that at the beginning of a new curriculum, Training of trainers (ToT) are effectively conducted.

5.2.2 To determine the abilities of TVET trainers' regarding the implementation of real-life project-based learning for competence development in Uganda

The major objective of this study was to assess the practical project-based learning implementation abilities of TVET trainers in Uganda in order to support TVET trainees in developing their competence. The study discovered that the majority of TVET teachers lacked the requisite abilities to implement project-based learning in the actual world since they switched from being students to instructors. According to the poll, the vast majority of them had less than five years of experience in the field.

It was found that trainers possessed a variety of skills, including the theoretical knowledge necessary to modify RLPBL tactics to fit specific learners, the ability to make an appropriate selection of assessment methods, and the capacity to set up an effective learning environment. However, they lacked the necessary skills to accomplish complex tasks to a high level and yet according Spottl (2015) the concept of “skilled worker” is one of the best principles for quality vocational training. Other skills they lacked were craftsmanship or handiwork, businesslike attitudes, routine expertise (being skilled), and resourcefulness (to deal with the non-routine). Most trainers are unable to employ local resources, tools, and abstract ideas effectively. The study also showed that TVET instructors could not exhibit a variety of multi-media training methodologies for students to enjoy learning or the capacity to create appropriate projects that address students', industry's, and society's demands. Last but not least, the TVET trainer lacked the practical knowledge necessary to deliver high-quality work. Surprisingly, every research participant agreed wholeheartedly with the abilities listed above.

In general, the study showed that TVET instructors lacked the skills needed to conduct project-based learning that was grounded in real-world situations. This was due to the fact that the majority of them moved directly from school to training without first working in the field. Additionally, the training materials were not readily available in all of the TVET institutions that took part in this study. Additionally, it was noted that the majority of trainees' items were of poor quality and could only be used to make trash sales. Additionally, the manner instructors handled real-world projects left the trainees unsatisfied since after assigning them work, they vanished without providing any guidance. This indicated that the TVET graduates' quality was below par. Before getting

hired, TVET instructors are advised to have at least five years of relevant work experience. The findings concur with those from Educaid. (2016) who studied towards a better alignment of training and employment: nine factors for success. The Belgian platform for education and development.

5.2.3 To establish the role of TVET Managers in the implementation of real-life project-based learning for competence development of TVET trainees in Uganda

In order to achieve this goal, the study set out to define the function of TVET Managers in Uganda's project-based learning implementation of real-world situations. The study's participants found that they performed a little bit well in their tasks, which included starting the mobilization of resources including personnel, money, and training materials as well as planning, directing, and coordinating the execution of actual projects. advising teachers on the most effective real-world training techniques and encouraging them financially and ethically to use real-world project-based learning. However, the research found that they fell short in the following areas: making sure that the labour information management system is updated with the necessary information on TVET graduates' employability; and conducting tracer studies to determine where and what the TVET graduates are doing. The findings are in line with those of Edward (2014) about the Stakeholders' Roles in Prioritizing Technical Vocational Education and Training in Post conflict Liberia.

Additionally, it was discovered that TVET administrators did not efficiently obtain project supplies in a timely manner, and that all TVET institutions did not successfully earn cash from real-life projects or training with production.

5.2.4 To identify the challenges met in implementing real-life project-based learning for competence development of TVET trainees in Uganda

This study's goal was to determine the difficulties in integrating project-based learning in the real world for TVET trainees in Uganda. The study identified the following issues: a lack of sufficient and timely project materials and a lack of enough time to conduct project-based learning in the actual world. In addition, there is a shortage of expertise in making presentations, planning real-world projects, and fulfilling testing criteria. lack of a defined criterion for evaluating students' skills, conversion of instruction to group facilitation. Trainers are detached from reality and lack enterprise project management expertise as well as awareness of the industry's current competencies. Trainers are advised to participate in what is known as a "back to industry program" for at least two months each year.

5.3 Conclusion of the Study Findings

The conclusions were drawn in accordance with the study's findings summary. The study's results were developed in accordance with the aforementioned goals.

5.3.1 To find out implemented process of the real-life project-based learning for competence development TVET trainees in Uganda

From the summary of the findings, it was revealed that the implementation process of the real-life project-based learning was not followed as expected because most of the TVET trainers lacked the required skills to effectively deliver real-life project-based learning. For example there was no presentations in almost all institutions. Quality assurance and standards were deficient. Additionally, there was inadequate and timely availability of

training materials across all TVET institutions that participated in this study. Also it was observed that most of the products produced by trainees were of poor quality and could not be sold. Secondly, the trainees were not happy with the way trainers conducted real-life projects because trainers left them immediately after giving them tasks. Thirdly, it was established that TVET funding was still too low to implement real-life project-based learning successfully. Therefore, real-life project-based learning was not implemented as planned. The impact was that the quality of the TVET graduates was below the expectation.

5.3.2 To determine the abilities of TVET trainers' regarding the implementation of real-life project-based learning for competence development in Uganda

Basing on the findings, most TVET trainers lacked the pre-requisite abilities such as routine expertise, resourcefulness, craftsmanship, functional literacies, business like attitude and wider skills. This was mainly because most of them transited from school to being trainers without practicing in industry.

5.3.3 To establish the role of TVET Managers in the implementation of real-life project-based learning for competence development of TVET trainees in Uganda

Generally, the study established that TVET managers reasonably performed their roles as expected. Their roles included initiating mobilization of resources such as personnel, funds and training materials. More so, they performed the role of planning, directing, and coordinating the implementation of real-life project, guiding trainers on the best real life training strategies. They motivated the trainers both morally and materially during the implementation of the real-life project. However, the aspects of labour information

management systems, tracer studies to reveal where the TVET graduates are and what they are doing was very scanty so to say.

In order to achieve this goal, TVET managers in Uganda acted fairly in accordance with their duties during the implementation of real-world project-based learning for TVET trainees. TVET managers are advised to look into additional funding options, such as training in production and starting an institutional business arm.

5.3.4 To identify the challenges met in implementing real-life project-based learning for competence development of TVET trainees in Uganda

According to the study's findings, the biggest obstacles were a lack of sufficient and timely project materials and a short implementation period. Lack of expertise in satisfying all testing standards, planning real-world projects, and giving presentations. Lack of a set criterion for evaluating students' abilities, a change in the role of the instructor to that of facilitator, ignorance of the market and of current capabilities, and a lack of enterprise experience among trainers in managing projects and TVET are all contributing factors. Trainers are not grounded in reality. The findings are consistent with those of McCathy (2019), who examined the prevalent issues and solutions associated with project-based learning (PBL).

5.4 Recommendations

Basing on the study findings, the researcher clearly made the following recommendations to TVET institutions and stakeholders.

1. Continuous professional development; TVET trainers should be retooled especially on the implementation process of the real-life project-based learning.

Board of governors and Governing councils should provide sufficient budget for retooling annually.

2. The assessment body should digitalize the RLPBL process to enable monitoring, assessment, publishing the products and the progress of real-life projects. Additionally, real-life projects should be assessed by the sector skills experts in collaboration with external verifiers.
3. The TVET Providers should recruit trainers with atleast five years of proven industrial experience after assessment of the capabilities of a TVET trainer. However, the current TVET trainers should urgently return to industry to improve their capabilities. Additionally, TVET managers should establish quality assurance mechanisms, internal assessors, internal and external verifiers to oversee portfolio of evidence at all levels of training in order to manage the quality of delivery.
4. TVET managers should develop and implement labour information management systems for anticipating and addressing the needs of the labor market. Ensure that TVET trainers have appropriate capabilities to facilitate the real-life project based learning to the expected quality and standard. TVET managers should strive for the regional, and international employment markets through international certification. Given that we are in a globalized society, preparing TVET graduates for employment internationally will catalyze benchmarking and the continuous improvement culture for high-quality training delivery. Additionally, TVET managers should pursue alternative funding opportunities such as training with

production and initiating institutional business arm, pursuing fellowships and research grants, international donations, tax breaks for the acquisition of pricey cutting-edge instructional equipment and materials and establish show rooms to show-case the good quality products and market them for sale.

5. The government should fast-track the TVET reforms, develop policies, frameworks and guidelines for implementing real-life project-based learning approach and address the issue of lack of the real-life project materials. TVET Fund should be implemented to improve the financing of TVET hence reduce the challenges of real-life project-based learning. Involve private sector in the implementation of real-life project-based learning programme.
6. Additionally, TVET managers should pursue alternative funding opportunities such as training with production and initiating institutional business arm, pursuing fellowships and research grants, international donations, tax breaks for the acquisition of pricey cutting-edge instructional equipment and materials.

5.5 Suggestions for Further Research

Further study should be undertaken in the following areas;

1. Examine the effective strategies for using industry practitioners as assessors of real-life projects of TVET trainees in Uganda
2. Establish the effective approaches for implementing the training with production method in TVET in Uganda.

3. Establish the application of internal assessors, verifiers and external verifiers for quality assurance of TVET in Uganda

6.6 Chapter Summary

The summary of findings, conclusions and recommendations simply bring out the major output of this study. Arising from the findings of the study, it was concluded that the quality of the TVET trainees was below the expectation and their products were of poor quality. It was recommended that the government should fast-track the implementation of the new TVET reforms including the back to industry program for the TVET trainers and the provision of adequate materials for real-life project-based learning and establish showrooms for sale of products but also feedback from the public. Additionally, the assessment bodies should involve industry practitioners but not only trainers to conduct the competence based assessment of trainees

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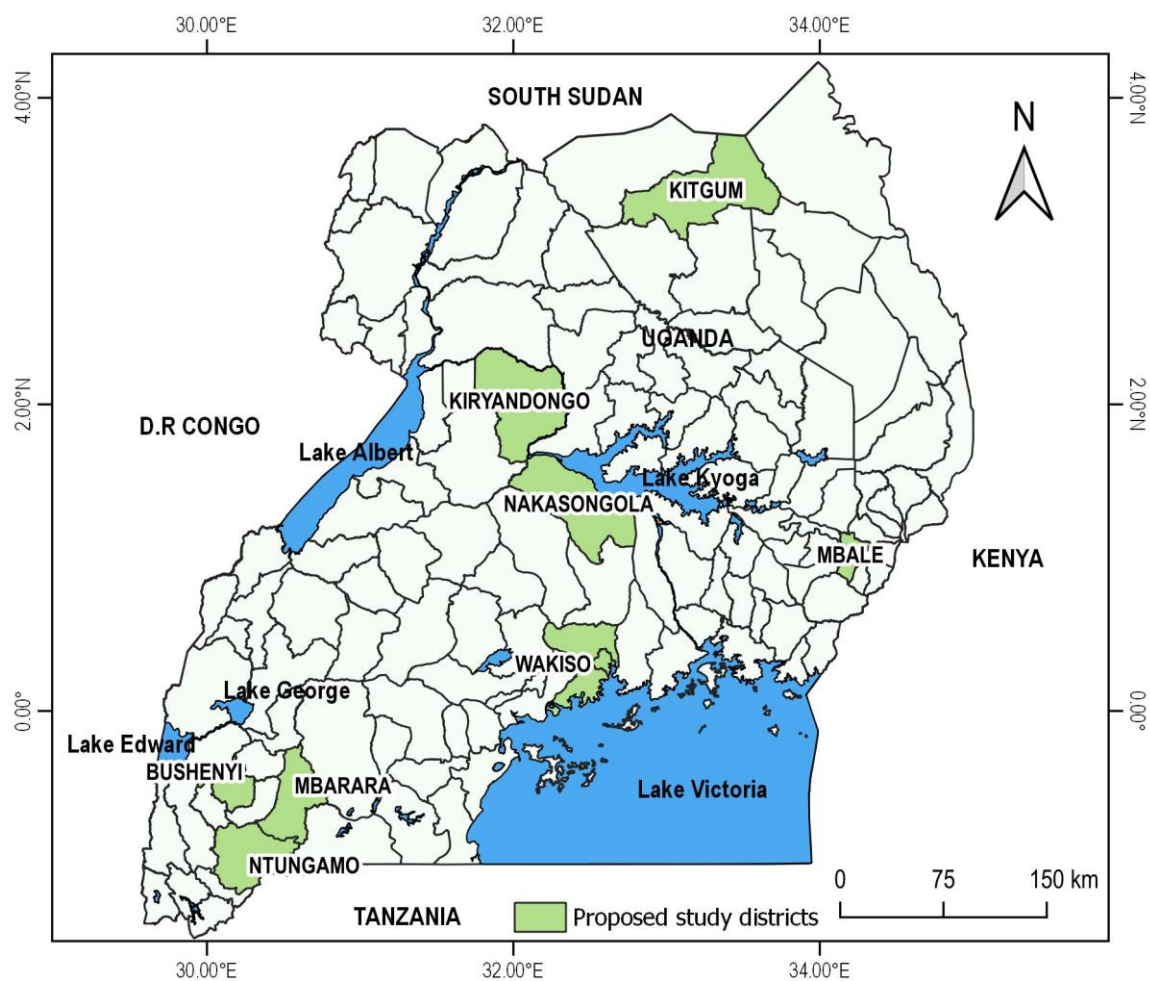
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APPENDICES

Appendix I: Map of Uganda showing the districts of the study area



(Source: Author, 2021)

Appendix II: Research Permit



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

Our Ref: UOE/B/TED/PGR/061

DATE: 10th February, 2022

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

**RE: RESEARCH PERMIT FOR TURYATEMBA BAINGANA EDDY -
SEDU/TED/P/006/19**

This is to confirm that the above named PhD student has completed course work of his Doctor of Philosophy in Technology Education (TVET Option).

He is currently preparing for his field research work on his thesis entitled: *“Review of Real-Life Project-Based Learning for Competence Development of TVET Trainees in Uganda”*. 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

University of Eldoret is ISO 9001: 2015 Certified



Appendix III: Research Ethics Committee Approval



MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY

RESEARCH ETHICS COMMITTEE

E-mail: rec@mbarara.ac.ug

To: Eddy TURYATEMBA

0772415003

Type: Initial Review



20/07/2022

Re: MUST-2022-402: REVIEW OF REAL-LIFE PROJECT-BASED LEARNING FOR COMPETENCE DEVELOPMENT OF TVET TRAINEES IN UGANDA, ,

I am pleased to inform you that at the 142nd convened meeting on 07/04/2022, the MUST Research Ethics Committee, committee meeting, etc voted to approve the above referenced application. Approval of the research is for the period of 20/07/2022 to 20/07/2023.

As Principal Investigator of the research, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval prior to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of 20/07/2023 in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by MUST Research Ethics Committee:

No.	Document Title	Language	Version Number	Version Date
1	Informed consent for trainees	English	2	2022-06-20
2	Informed consent for Trainers	English	2	2022-06-20
3	Informed Consent for Heads of Institutions	English	2	2022-06-20
4	Informed Consent for Head of Departments	English	2	2022-06-20
5	Protocol clean copy	English	2	2022-06-20
6	Data collection tools	English	2022	2022-03-06

Yours Sincerely

Bajunirwe Francis

For: MUST Research Ethics Committee



Appendix IV: National Council for Science and Technology Approval



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

Our Ref: SS1384ES

15 August 2022

Eddy TURYATEMBA
Ministry of Education and Sports
Kampala

Re: Research Approval: REVIEW OF REAL-LIFE PROJECT-BASED LEARNING FOR COMPETENCE DEVELOPMENT OF TVET TRAINEES IN UGANDA

I am pleased to inform you that on **15/08/2022**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **15/08/2022** to **15/08/2023**.

Your research registration number with the UNCST is **SS1384ES**. Please, cite this number in all your future correspondences

Please note that this approval includes all study related tools submitted as part of the application as shown below:

No.	Document Title	Language	Version Number	Version Date
1	Informed Consent forms	English	2022	06 March 2022
2	Data collection tools	English	2022	06 March 2022
3	Project Proposal	English	2022	
4	Approval Letter	English		
5	Administrative Clearance	English		
5	Observation checklist	English	2022	09 August 2022
6	Focus group discussion	English	2022	09 August 2022
7	Interview guide	English	2022	09 August 2022
8	Informed consent for trainees	English	2022	20 July 2022

Yours sincerely,

Hellen Opolot

For: Executive Secretary

UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Appendix V: Letter of introduction from Permanent Secretary MoES

Telegram: "EDUCATION"
 Telephone: 256-41-234451 - 3
 E-mail: permasec@education.go.ug
 Fax: 256-41-234920
 In any correspondence on
 this subject please quote: ADM/85157/01



Ministry of Education and Sports
 Embassy House
 P.O. Box 7063
 Kampala, Uganda

14th April 2022

Mr. Turyatamba Baingana Eddy
 PhD Student, Principle researcher, +256 772415003.

PERMISSION TO CONDUCT RESEARCH IN TVET INSTITUTIONS IN UGANDA

Reference is made to your request dated 17th March 2022 on the above captioned subject.

I note that you are investigating a study titled; "Review of Real-life project based learning for competence development of TVET Trainees in Uganda whose purpose is to find out how TVET Trainers implement the real –life project based learning while implementing competence-based curriculum in TVET Institutions in Uganda.

This is a good case of study and we hope the results will be used to enhance TVET trainees' capabilities for decent employment and entrepreneurship.

Permission is hereby granted for you to undertake the study in TVET Institutions in Uganda.

Please share your findings with Ministry of Education and Sports when you finalize your research.

A handwritten signature in black ink, appearing to read 'Irumba Roger Kaija', written over a circular stamp or seal.

Irumba Roger Kaija

For: PERMANENT SECRETARY

Copy to: Director, Higher Technical Vocational Education and Training
 Commissioner, TVET Operations & Management

Appendix VI: Informed Consent

Title of the Study: The status of implementation of the Real-Life Project-Based Learning for Competence Development of TVET Trainees in Uganda

Researcher: Turyatempa Baingana Eddy,
Technology Education Department, University of Eldoret, Kenya

Mob: 0772 415 003, **Email:** eddyturyatempa@gmail.com

Dear Sir/Madam,

I hereby invite you to take part in this research study. Before you decide to take part, it is important that you understand why the research is being conducted and what it will involve. Kindly read and understand the information carefully. You may ask the researcher whose name and address are indicated above if there is anything that is not clear or if you need additional information.

The purpose of the study is to review Real-life Project-Based Learning for Competence Development of TVET Trainees in Uganda.

There are no risks foreseen from your participation in this study. You may decline to answer any or all questions and you may terminate your involvement at any time if you decide so. You may choose not to take part in the study and leave your responses blank, or you may read quietly at your desk of table.

It is expected that the findings of the study will improve various aspects of TVET implementation, policy formulation and Curriculum review.

Please do not write any information that may identify you such as your name or initials on the questionnaire. Your responses will be anonymous. Should you have any questions about the research or any related matters, please contact the researcher at the mobile number and the email address provided above.

CONSENT

By signing this consent form, I confirm that I have read and understood the information and I have had the opportunity to ask questions. I understand that my participation is

voluntary and that I am free to withdraw at any time, without giving any reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily accept to take part in this study.

Respondent's Signature: **Date:**

Researcher's Signature: **Date:**

Appendix VII: Questionnaire for TVET Trainers

Preamble

You are invited to participate in a study entitled: Review of Real-life Project-Based Learning for Competence Development of TVET Trainees in Uganda

Real-life projects involve problem identification, solution identification, project planning and designing, project implementation and presentation (UBTEB, 2021)

This study seeks to review real-life project-based learning for competence development of trainees in TVET institutions. You have been carefully selected as a key stakeholder; in this aspect your participation is entirely voluntary. Kindly spare a little time to complete the questionnaire. Information obtained will be used for academic purposes only and your identity will not be disclosed. In case you wish to have a summary of the results, please send your e-mail address to the researcher. I appreciate your participation in the study and thank you for your time.

Turyatempa Baingana Eddy

PhD Student

University of Eldoret, Kenya

E-mail: eddyturyatempa@gmail.com, Tel: +256772415003

SECTION 1: BIOGRAPHICAL DATA

1. Gender: (Tick what is appropriate below)
Male Female
2. Age range in years: (Tick what is appropriate below)
a). 18-30 years b). 31-40 years c). 41-50yrs d). 51-60 years
3. Highest Qualification: (Tick what is appropriate below)
a) master's degree , b) Bachelor's degree c) Higher diploma b) Diploma c) Advanced certificate
4. Indicate your experience as a TVET Trainer
a) 0-5years b) 5- years c) 10-15 years d) Above 15 years
5. What is your specialization?

6. Which subjects do you train?

SECTION 2: REAL-LIFE PROJECT-BASED LEARNING IN TVET

How do you rate your agreement on each of the following in implementing RLPBL competencies development of TVET trainees? (Tick what is appropriate below)

NO.	ITEMS	Fully Agree	Agree	Not sure	Disagree	Fully Disagree
A.	Project Management					
1	The timetable allows adequate time for project-based learning					
2	Management provides required materials for projects in time.					
3	The institution has minimum machines/equipment to facilitate real-life projects					
4	Trainees are engaged in the initial problem identification, solution identification, design, and presentation as they own projects?					
5	TVET trainers have sufficient knowledge and skills to facilitate real-life projects efficiently?					
6	Project-based learning approach is a culture here and is supported by top management					
7	Real-life Projects based learning is one of the best approaches for skills training					
8	TVET trainers have good experience in project planning & management					

9	TVET trainers have good experience in managing enterprises					
10	The institute provides learners with ample opportunities to learn through hands-on activities.					
11	The training methods utilized are based on dialogue, problem-solving, and self-learning.					
12	The institution supplies various opportunities for trainees to acquire intellectual and social skills.					
13	Training provides trainees with adequate activities to practice learning through real-life projects					
14	Education in technical institutions helps trainees express their opinions and make decisions					
15	The training polishes the trainees, and help them become disciplined and good citizens					
16	The training provides each learner with different opportunities to become an active person who has certain roles and is not a passive.					
17	The institutions are concerned with having the trainer becoming a guide to learners' learning rather than the source of knowledge.					
18	The main goal of the trainer is to help trainees discover knowledge, skills and values through reflection and					

	practical					
19	The institutions view themselves as Workshops/laboratories rather than lecture rooms.					
20	The institutions' management are concerned with making the educational and training process a reflection of the reality outside.					
B.	Public Product					
1	Trainers are always available to guide learners on their work-in-progress and provide timely feedback					
2	Learners exhibit their products and describe their learning to peers and people beyond the institution					
3	Learners receive feedback and/or engage in dialogue with their audiences					
4	There is continuous assessment of trainees' competence with evidence/records					
5	The community/industry is involved in the real-life project process					
6	The completed projects have solved problems at the institution or community					
C.	Reflection					
1	Learners Learn to assess their peers and suggest improvements in their own and other learners' work?					

2	Learners reflect on, write about, and discuss the academic content, concepts, and success skills they are learning.					
3	Learners use reflection as a tool to increase their own personal understanding					
4	Learners provide feedback of what has been learnt through portfolio of evidence (PoE)					
5	The tasks and assignments are reviewed often to reflect what is required in the world of work					

D.	Intellectual Challenge and Accomplishment					
1	Learners investigate challenging problems, questions, and issues over an extended period of time?					
2	Learners focus on concepts, knowledge, and skills central to the curriculum					
3	Learners experience research-based instruction and support as needed for learning and project success?					
4	Real-life projects meet trainee expectations					
5	Learners commit themselves to completing projects/products timely with the highest quality					
E.	Authenticity:					
1	Learners engage in work that makes an impact on or otherwise connects to the					

	world beyond the Institute, and to their personal interests and concerns?					
2	Learners use the tools, techniques, and/or digital technologies employed in the world beyond school					
3	Trainees make choices regarding project topics, activities, and/ or products					
4	Real-life Projects inspire, influence and develop learners to become professionals					
F	Collaboration:					
1	Learners work in teams to complete complex tasks					
2	Learners Learn to become effective team members and leaders					
3	External examiners (UBTEB) influence the quality of real-life projects					
4	Education standards agency/ District inspectors often monitor the projects					

Please provide any additional comments below:

.....

What challenges do you meet in the implementation of real-life projects?

- i).....
- ii).....
- iii).....

In your view what actions should TVET institutions take in order to improve the employability of their graduates?

- i).....
- ii).....
- iii).....

THANK YOU VERY MUCH

Appendix VIII: Questionnaire for Heads of department

Preamble

You are judiciously invited to participate in a study entitled: Review of Real-life Project-Based Learning for Competence Development of TVET Trainees in Uganda. Real-life projects involve problem identification, solution identification, project planning and designing, project implementation and presentation (UBTEB,2021). This study seeks to review these competence development issues from the perspectives of real-life projects.

You have been carefully selected as major stakeholder in this endeavor. In this respect your participation is entirely voluntary. Kindly spare small amount of your valuable time to complete this questionnaire. Information obtained will be used for purely academic purposes and your identity will not be disclosed. In case you wish to have a summary of the results, please send your e-mail address to the researcher. I appreciate your participation in the study and thank you for your time.

Turyatempa Baingana Eddy

PhD Student

University of Eldoret, Kenya

E-mail: eddyturyatempa@gmail.com,

Mobile phone: +256772415003

SECTION 1: BIOGRAPHICAL DATA

1. Sex: (Tick what is appropriate below) Male [] Female []

2. Age range in years: (Tick what is appropriate below)

a). 20-30 years [] b). 31-40 years [] c). 41-50years [] d). 51years and above []

3. Academic qualifications: (Tick what is appropriate below)

a) PhD degree [] b) master's degree [] c) bachelor's degree [] c) Diploma [] d) Certificate []

4. Are you a professionally trained instructor?

5. What is your area of specialization?

.....

1. How long did you work in industry before you became a TVET Manager?.....
2. What is your title.....

SECTION 2: RLPBL IMPLEMENTATION PROCESS

According to Hutchison (2016), there are seven project phases that help to support project-based learning implementation. How do you rate your agreement on each of the following in developing skills and competencies during the RLPBL process? (Tick what is appropriate below)

NO.	ITEMS	Fully Agree	Agree	Disagree	Fully Disagree
A.					
1.	Real-life project-based learning is an important instructional approach that enables learners to master employable competencies necessary for the world of work.				
2	Trainees share the ideas/ problem with TVET trainers and present real-life projects by 4 th week of the term/semester for approval				
3.	Management supplies materials and machines to trainers and trainees in time for real-life projects				
4	TVET trainers have knowledge, skills and good experience in planning & management of projects and enterprises				
5.	Trainers are committed to best practices and provide enough time				

	for RLPBL process				
6.	Trainees have enough time for personal reflection				
7.	Feedback from continuous assessment is provided on time				
8	Management have created real-life projects as the school culture				
B.					
1.	Managers should ensure that projects are feasible				
2.	Trainees, trainers or sponsors are given enough time to identify the project and tasks				
3.	Trainers summarise project scope and secure the authorization to go ahead				
4.	There is proper project budget and schedule of activities from first term/semester				
5.	Trainers should be motivated to attend regularly since projects require extra time				
C.					
1.	Managers ensure that a detailed project is drafted including drawings, duration, audience, sponsor/client, rationale, learning outcomes, deliverables, personnel, resources, budget, tasks, schedule, risks and constraints, assessment				

	rubrics, and other components.				
2.	Managers ensure that the projects meet curriculum, policy and assessment body requirements				
D.					
1.	TVET trainers and technicians are good facilitators of the project planning and implementation process				
2.	The curriculum content is adequate for learning and learners are given real-life tasks				
3.	Managers monitor good trainer-trainee relationship and documentation process (tracking progress)				
4.	TVET trainers supervise the trainee's attendance regularly				
5.	Trainers are disengaged from the reality				
6.	Trainees are guided to accomplish quality tasks in time				
7.	Real-life projects reflect up to date requirements in the world of work				
8.	Managers monitor continuous assessment of trainees (evaluation)				
9.	Trainees are allowed to practice with training equipment and materials				
10	Trainers use the Triple-M Cycle				

	which forms the processes of managing, monitoring, and modifying				
E	Publishing				
1.	Trainers ensure the dissemination of the final products to the public				
2.	Consider public feedback for modification and improvement				
F	Closing				
1.	Managers provide for summative feedback from management team, examining body, Sponsors if any and secure sign off on the final product				
2.	Trainers are responsible for the project assets—including the final product, interim deliverables, status reports, and other documents				

SECTION 3: RLPBL TRAINERS' CAPABILITIES

2.5. As a TVET Manager in Uganda, do you agree that TVET Trainers possess the following capabilities regarding project-based learning for competence development in Uganda? (Please tick the appropriate box)

NO	COMPETENCIES OF TVET TRAINERS	Strongly agree	Agree	Disagree	Strong Disagree
A.					
1.	Adequate ability to perform skillful activities to a satisfactory standard				
2.	Adequately use of materials, tools and abstract concepts				
3.	Ability to adapt RLPBL strategies to suit individual learners				
4.	Proper choice of assessment procedures				
5.	Ability to organize a proper learning environment				
6.	Demonstrate a range of behavior management strategies for trainees				
7.	Ability to develop suitable tasks that respond to the needs of trainees, industry and society				
8	Acquiring practical expertise requires time and practice.				
B.					
1.	Ability to apply technical skills to troubleshoot and solve problems in projects				
2	Ability to apply knowledge and skills that is applicable to new and unfamiliar contexts.				
3	Able to apply knowledge in a range of situations which do not closely replicate those already encountered in training.				

4.	Ability to organize work processes				
5.	Ability to adapt to rapid changes in technology				
6.	Initiate and participate in innovations and creativity				
C.					
1.	Have the pleasure, pride and patience involved in doing a good job				
2	Like working with their hands most of the time				
3.	Identify, work and partner with industry for teaching purposes				
4.	Ability to analyze labour market requirements				
5.	Ability to pass on the ‘tricks’ of the trade				
D	Functional Literacies				
1.	Ability to utilize ICT, numeracy and literacy to facilitate teaching and learning				
2.	Engage in live debates today about how best to teach tomorrow				
3	Possess Higher order thinking (HOT) Skills				
E	Business-like attitudes are essential				
1.	Ability to connect trainees for employment opportunities				
2.	Have behaviors such as punctuality, orderliness, willingness to put in extra time and effort,				
3.	Ability to connect trainees for industrial training opportunities				
4.	Possess marketing and customer care skills				
5.	Ability to engage industry in setting up occupational standards				
F	Wider skills				
1	Have good negotiating skills				
2	Have good problem-solving, team-working,				

	resilience and entrepreneurialism skills				
3	Ability to manage projects				

SECTION 4: RLPBL TVET MANAGERS SUPPORT

4.1 How often do trainers attend refresher courses in industry or conferences/seminars?

(Tick what is appropriate below)

Quarterly []: Annually []: Sometimes []: Never []:

4.2. Which actions has TVET Managers instituted to support the implementation of real-life project-based learning approach.....

.....

4.3 Which actions should TVET institutions take in order to improve the employability of their graduates?

.....

.....

4.4 What actions can the following institutions do to improve real-life projects in TVET Institutions

Government.....

.....

UBTEB.....

.....

NCDC.....

.....

a) TrainingInstitutions.....

.....

b) Other stakeholders like Industries, NG.....

.....

SECTION 5: Real Life Project Based Learning Challenges

5.1 What are the main challenges met while implementing real-life projects

.....

5.2. Which of the following resources is the biggest challenge while implementing real-life project-based learning?

(a) Materials []: (b) Machines []: (c) Motivated Manpower []: (d) All []:

(e) None of them []:

5.3. The following are some of the challenges met in implementing real-life project-based learning. In your view tick the appropriate box

NO.	ITEMS	Fully Agree	Agree	Disagree	Fully Disagree
1	Time to implement				
2	Implementing the project within the school's schedule				
3	Fitting all the standards				
4	Designing the project				
5	Meeting all the testing requirements and presentations				
6	Absence of established rubric for assessing student skills makes it difficult to assess real-life project-based learning				
7	Shifting from directing the instruction to facilitating group work, and Managing student groups				
8	lack of knowledge, skills and enterprise experience of trainers in managing projects is a major issue				
9	TVET Trainers are disconnected from reality				

THANK YOU VERY MUCH

Appendix IX: Interview Schedule for Heads of Institutions and MOES Officials

1. Do you think that Real-life Project-based learning is well implemented for delivering and assessing TVET trainee's skills for employment and competitiveness in the world of work and implementing CBET? If yes/no give reasons
2. In your opinion what are the capabilities of TVET trainers in regard to the implementation of real-life project-based learning for competence development in Uganda
3. What is the role of TVET Managers in the implementation of real-life project-based learning for competence development of TVET trainees in Uganda?
4. What are the challenges met during the implementation of Real-life Project based learning in TVET institutions in Uganda?
5. In your opinion, do you think employers are satisfied with the quality of the TVET graduates? If not, why?
6. What do you suggest that should be done to improve on implementation of real-life projects based learning to enhance TVET graduates transition to the world of work?
7. What do you think can be done to improve adequacy of materials & machines for real-life projects and the quality of TVET Trainer in Uganda?

THANK YOU FOR PARTICIPATING

Appendix X: Focus group discussion guide for TVET Trainee

Name of the

Institution.....Date.....

1. Are you satisfied with the time and quality of the real-life training from your trainers? If not, why?
2. How many hours in a week is allocated to real-life projects? What is the percentage compared to other subjects?
3. How many real-life projects have you done so far since you started your studies at this institution? Do you think they are enough or not?
4. How did you identify the real-life project? How are you implementing it, do you have any formal process?
5. Who identified the real-life project you are doing? Is it Learners, TVET trainers or Managers or the Community?
6. Do you have project drawings, budget, schedule/work plan, presentations, group/personnel, bills of quantities (BOQ) and portfolio of evidence (PoE)
7. In your opinion do your trainers have the capabilities to help you come out with the best quality real-life project? If not, what capabilities would you need from the trainer?
8. In your opinion what should be the role of the TVET Manager in implementing real-life project.
9. What are some of the challenges do you meet while implementing real-life projects?
10. Do you feel confident and capable of executing similar projects to good quality in the world of work? If not state, why
11. Mention what should be done to improve on real-life project in TVET institutions to enhance trainee's skills for transition to the world of work?

THANK YOU FOR PARTICIPATING

Appendix XI: Personal Observation Checklist

Name of Institute/ College: Date:

Below is a list of infrastructural facilities, documents, human resource and various operations or activities that the Vocational Training institutions are expected to have. The inadequacies of the items listed are likely to affect the trainee low competence development.

No	Observations	Availability			
		Adequate	Inadequate	Not available	Alternative
1	Availability of equipped workshops, tools and equipment for the courses offered				
2	Availability of workshop Technicians, products for sale				
3	Availability of plans for general improvement (site plan)				
4	Availability of lab/workshop attendance lists mark sheets and registers				
5	Availability of Trainers, timetable & schemes of work, lesson plans				
6	Availability of a list of qualified TVET Trainers capabilities, department meeting Minutes				
7	Availability of training				

	materials for projects				
8	Availability of policies, rules & regulations				
9	Availability of NCDC Curriculum				
10	Availability of list of real-life projects challenges and how you have addressed them for courses implemented				
11	Availability of drawings, BoQs, work plan schedules for projects				
12	Availability of a study library				
13	Availability of internet facilities				
14	Availability of reference materials/books/audio, videos, power point, photos				
15	Availability of training & examination timetables				
16	Activities of departments/sections minutes				
17	Industrial training linkages – evidence				
18	Availability of Covid-19 committee and SOPs being adhered too – evidence				
19	Government support				

	supervision– evidence				
20	Availability of RLPBL groups and Minutes				
21	Availability of MoU for collaboration				
22	Availability of functioning Board of Governors/ Councils				
23	Availability of modern & serviceable equipment				
24	Availability of the well-marked past real-life projects				
25	Availability of well-maintained talking compound				
28	Availability of well-stalked show room				
29	Availability of well-equipped computer rooms				
30	Evidence of Project presentations and written feed back				
31	Observance of healthy safety such as nose masks, earmuffs, helmets, overall, safety shoes etc.				
32	Number of learners in a training session				
33	Availability of strategic plan				

34	Evidence of exhibitions and community involvement in the projects				
35	Availability of internal quality assurance mechanisms (internal verifiers)				
36	Evidence of TVET Trainers continuous professional development policy				
37	Evidence of approved budgets for projects				

Appendix XII: Table for determining sample size

TABLE I
Table for Determining Sample Size from a Given Population

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.—*N* is population size.
S is sample size.

SOURCE: KREJCIE & MORGAN (1970)

Appendix XIII: Similarity Report



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