Makerere  University

East African School of Higher Education Studies and Development

The State of Technical, Vocational Education and Training (TVET) Related Programmes in Public Universities in Uganda: Application of Systems Theory

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Monday January 26, 2026

Declaration

Ojulun, hereby declare that this dissertation titled: "The Sate of Technical, Vocational and Training (TVET) Related Programmes in Public Universities in Uganda: of Systems Theory," is my original work and has never been presented to any for any award.

Date ....Tuesday January 27, 2026

Joreme Ojulun

Approval

This is to certify that this dissertation titled, "The State of Technical, Vocational Education and Training (TVET) Related Programmes in Public Universities in Uganda: Application of Systems Theory," has been carried out by Joreme Ojulun under my supervision. The dissertation is being submitted to the Directorate of Graduate Training, Makerere University for examination under my approval

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Dedication

To my parents, Papa Victor Okot (RIP) and Toto Norberita.Icumar Ino. Papa Victor, although you left us still very young, the stories I got about your humble and obedient personality have been my benchmark in life. Please smile in heaven! You have a son! To my wife Jane Frances Akiteng and my twin children, Emmanuela Joy Apio and John Paul Odongo; Victor Opio and Victoria Mercy Acen. You are the reason for my toil. I sincerely love you!

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Table of Contents

Declaration i

Approval ii

Dedication iii

Acknowledgement iv

Table of Contents v

List of Tables ix

List of Figures x

List of Abbreviations and/or Acronyms xi

Abstract xiii

Chapter One 1

Introduction 1

1.1 Background 1

1.2 Statement of the Problem 13

1.3 Objectives 16

1.4 Research Questions 17

1.5 Scope 17

1.6 Significance 18

Chapter Two 20

Literature Review 20

2.0 Introduction 20

2.1 Theoretical Review 20

2.2 Theoretical Framework 23

2.3 Related Literature 25

Chapter Three 94

Methodology 94

3.0 Introduction 94

3.1 Research Paradigm 94

3.2 Research Design 95

3.3 Study Participants 95

3.4 Methods of Data Collection 98

3.5 Instruments for Data Collection 99

3.6 Data Quality Control 100

3.7 Research Procedure 103

3.8 Data Management 104

3.9 Ethical Considerations 107

Chapter Four 109

Data Presentation, Analysis and Interpretation 109

4.0 Introduction 109

4.1 Profile and Coding of the Participants 109

4.2 Presentation of Findings 110

4.3 Inputs to TVET Related Programmes in Universities 110

4.4 Transformation Mechanisms of TVET Related Programmes in Universities 126

4.5 Outputs From TVET Related Programmes in Universities 134

4.6 Environment in Which TVET related programmes Operate in Universities 140

Chapter Five 155

Discussion, Conclusions and Recommendations 155

5.0 Introduction 155

5.1 Discussion of Findings 155

5.2 Conclusions 166

5.3 Recommendations 170

5.4 Contributions 172

5.5 Limitations of the Study and Suggested Areas for Further Research 174

List of References 175

Appendices 187

Appendix A 187

Appendix B 190

Appendix C 192

Appendix D 200

Appendix E 208

Appendix F 210

Appendix G 211

Appendix H 213

Appendix I 218

Appendix J 221

Appendix K 245

Appendix L 254

Appendix M 255

Appendix N 256

List of Tables

Table 2.1: Summary of Conceptual Studies on TVET 26

Table 2.3: Summary of Empirical Studies in Relation to inputs to TVET 50

Table 2.4: Summary of Empirical Studies in Relation to the Transformation Mechanisms of TVET 60

Table 2.5: Summary of Empirical Studies in Relation to the Outputs of TVET 68

Table 2.6: Summary of Empirical Studies in Relation to the Environment in Which TVET Operates 82

List of Figures

Figure 1.1: Systems Theory 7

Figure 1.2: Systems Theory as Applied to TVET in Universities 10

Figure 2.1: Theoretical Framework Operationalizing TVET in Public Universities.....23

List of Abbreviations and/or Acronyms

AET	Agricultural Education and Training
AI	Artificial Intelligence
AU	African Union
CA	Capability Approach
COVID-19	Coronavirus Disease 2019
CBET	Competency Based Education and Training
DGT	Directorate of Graduate Training
DIT	Directorate of Industrial Training
DRGT	Directorate of Research and Graduate Training
EPRC	Education Policy Review Commission
EASHESD	East African School of Higher Education Studies and Development
FGD	Focus Group Discussion
HEC	Higher Education Certificate
ICT	Information, Communication Technology
ILO	International Labour Organisation
KyU	Kyambogo University
MoES	Ministry of Education and Sports
NCHE	National Council for Higher Education
NDPIV	Fourth National Development Plan
NGO	Non-Governmental Organisation
NPA	National Planning Authority
MAU	Mid-Atlantic University

MoFPED	Ministry of Finance Planning and Economic Development
MUST	Mbarara University of Science and Technology
PESTLE	Political, Economic, Social, Technological, Legal, Ethical
PhD	Doctor of Philosophy
SDG	Sustainable Development Goals
TSA	Treasury Single Account
TTE	Technical Teacher Education
TVET	Technical, Vocational Education and Training
TVSD	Technical and Vocational Skills Development
UBOS	Uganda Bureau of Statistics
UBTEB	Uganda Business and Technical Examinations Board
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UOTIA	Universities and Other Tertiary Institutions Act

Abstract

Knowledge on the state of technical vocational education and training (TVET) related programmes in universities is important in guiding university managers and policy makers in effectively steering the programmes. However, in Uganda there is scanty literature on TVET and no literature gives a comprehensive account of TVET related programmes in universities, yet the scope of the existing policy is both silent and excludes TVET related programmes in universities. Such a scenario renders policy makers and managers of public universities vulnerable to making uninformed policies and decisions in regard to the TVET related programmes. In this study, I examined TVET related programmes in public universities based on systems theory (i.e., inputs, transformation mechanisms, outputs and the environment). I employed a qualitative research approach and a case study design. I purposively selected TVET related programme coordinators and students as sources of data. I employed thematic analysis based on the framework method of qualitative data analysis by Gale et al. (2013) to analyse the data. The study findings revealed that; universities had few senior lecturers and professors; students chose to study TVET related programmes due to the promise of employment; universities had insufficient educational facilities for the teaching of TVET related programmes; government grants to universities were inadequate and were affected by budget cuts and delays; there was no specific policy on TVET related programmes in universities. Key recommendations included; the Ministry of Education and Sports (MoES) should put in place a policy to guide the provision of TVET related programmes in universities; MoES should strengthen career guidance on TVET related programmes in high schools. University managements should recruit senior lecturers and professors in faculties holding TVET related programmes. Government should revise the grants to the universities offering TVET related programmes.

Chapter One

Introduction

1.1 Background

1.1.1 Historical Perspective. Technical, vocational education and training (TVET) has been evolving over the years worldwide. Various terms have been used to describe what is now conceived as comprising TVET. These include "apprenticeship training, vocational education, industrial arts, technical education, technical/vocational education, occupational education, vocational education and training, career and technical education" (Maclean & Lai, 2011, p. 2). According to Maclean & Lai (2011) the preferred term in Europe was vocational education and training, while in the United States it was career and technical education. At the second International Congress on TVET, held in the Republic of Korea in 1999, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) with the International Labour Organisation (ILO) jointly adopted the term *technical and vocational education and training* (UNESCO, 1999). This term has now become internationally accepted.

In Africa, TVET came to prominence in the 1920s as the effort to adapt the existing colonial educational provision to the African cultural realities and economic possibilities, resulted in the development of industrial schools. However, by the time of the transition period between colonialism and independence in the late 1950s and 1960s (in most of Africa), ‘’the vocational schooling argument had dramatically lost ground, as the dominant discourse of educational policy then became expansion of academic schooling’’ (McGrath, 2011, p. 37). In the 2000s, TVET was repositioned across Africa by the Bureau of the Conference of education ministers for the African Union as a strategy to ‘’promote skills acquisition through competency-based training with proficiency testing for employment, sustainable livelihoods and responsible citizenship’’ (African Union [AU], 2007, p.37). The reality on the ground, however,

portrayed a contrary picture in much of the Sub Saharan Africa (SSA) as supported by studies. Lolwana (2017) for, example, revealed that ‘’besides being small, the TVET sector in most Sub-Saharan countries [was] characterised by a significant lack of practical relevance and responsiveness to labour market needs, insufficient infrastructure and equipment and extremely low throughputs’’ (p. 11).

Based on TVET”s role in facilitating skills development for the socio-economic and technological development of countries globally, a group of twenty countries (G-20) training strategy, prepared by the ILO in the 1990”s, emphasised TVET education that matched skills supply to future market demands and enabled workers to adjust to changes in technology. In 2007, the African Union (AU) drafted a similar strategy to revitalize TVET in Africa with emphasis on quality TVET, graduates” employability, and promotion of life-long learning across its member countries (Kintu et al. 2019).

In Uganda, TVET is the term used (Ministry of Education and Sports [MoES], 2019). From the earliest years of British Protectorate (i.e., mid 1890s) until 1925 when a government department of education was set up, Uganda’s formal education (inclusive of TVET) was “entirely in the hands of voluntary agencies, mainly Christian missionaries who founded [educational institutions] in many parts of the country” (Education Policy Review Commission [EPRC], 1989, p. 1). However, good educational facilities during the pre-independence Uganda were available only to a small elite group, and oriented towards white collar jobs, while the masses remained largely illiterate or poorly educated. The products of education were mainly clerical and administrative personnel required by the Church and colonial administration (Okinyal, 2012). The TVET subsector was very small at the time and was designed to produce manual workers who were predominantly drawn from the underprivileged sections of society. This marked the beginning of social stigmatization of TVET in Uganda (Okinyal, 2012; Okware

& Ngaka, 2017). According to Odaet (1990) the independence of Uganda in 1962 ushered in rapid changes including the immediate availability of posts for Ugandans in government employment and the expansion of educational opportunities. The structure of education in Uganda too was developed, "though the system laid great emphasis on formal education from the primary level through to university" (Odaet, 1990, p. 3). After Uganda's independence in 1962, the government established the Uganda Education Commission in 1963 (often called the Castle Commission). This was the first major post-colonial policy guidance for education in Uganda that, to a small extent formally recognized the need for TVET alongside general education. There was still no focused policy to specifically guide the development of the TVET as the sector remained largely informal and shaped by colonial-era laws and practices. In fact, the expansion of both primary and technical education was restricted in favour of secondary education (Okinyal, 2012).

Nonetheless, from the time of pre-independence (1894) to date, some little and slow growth of the TVET subsector has been experienced. For example, on its website, Makerere University highlights its historical establishment as a technical school in 1922. In the same year, it opened its doors to the first 14-day students who began studying carpentry, building and mechanics (https://www.mak.ac.ug/about-makerere/historical-background). Sicherman (2005) provides the chronological growth of TVET in the Uganda Technical College then (now Makerere University). In 1923 a certificate in surveying started. In 1924, engineering and agricultural programmes began. In 1937, Makerere became a higher college of East Africa (a centre for higher education), offering post-school certificates in agriculture and engineering among other programs. In 1970, Makerere became an independent national university of Uganda, awarding its own undergraduate and postgraduate degrees. Under the Faculty of

Technology, Makerere University started what in this study, are referred to as TVET related programmes (i.e., Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering and Bachelor of Science in Mechanical Engineering). In the late 1980s, Makerere University established other TVET related programmes, such as a degree programme in surveying.

The Government of Uganda, has since late 1980s put in place a number of development initiatives with a TVET component. Examples of such initiatives include, the enactment of the Business, Technical and Vocational Education and Training (BTVET) Act (2008); the institution of "Skilling Uganda: BTVET Strategic Plan, 2011-2020" (MoES, 2011); the "Technical Vocational Education and Training (TVET) Policy" (MoES, 2019) and the Technical, Vocational Education and Training (TVET) Act (2025). However, the scope for these policy frameworks, is stringent on how public universities in Uganda conduct TVET. For example, the TVET Act (2025), Sections 30(1-e) and 31 (1-b) formerly recognise only a National Technical University as a provider for the upper Level of TVET termed as Technical Education and Training. Meanwhile Section 31(4) of the same act bars other degree awarding or tertiary institutions established under the Universities and Other Tertiary Institutions [UOTIA] Act (2001) from offering a TVET program leading to an award of a National Higher Diploma, Degree or postgraduate qualification, hence excluding public universities from providing TVET. Despite the exclusion, a number of universities established under the UOTIA Act (2001) have since their establishment been offering TVET related programmes, which are a subject of this study.

Based on its importance, studies have been carried out on TVET as exemplified by reviews. For example, Tripney et al. (2013) reviewed literature on the effects of TVET

interventions for young people in developing countries and found out that the effects of the interventions on young people had been positive in terms of paid employment, formal employment and self-earnings and had been negative on self-employment earnings. Tripney and Hombrados (2013) reviewed literature on the impact of 20 different TVET interventions for young people in low-income and middle-income countries, three of which were technical education, vocational education and vocational training. They found out that the overall mean effects of TVET interventions on overall paid employment, formal employment, and monthly earnings for the young people had been "small, positive, and significant" (p. 1). Kluve et al. (2017) reviewed literature on the impact of youth employment interventions on the labour market outcomes of young people and their business performance, one of which interventions was TVET oriented "training and skills development" (p. 27). Kluve et al. (2017) found out that overall, youth employment interventions had "increased the employment and earnings of those youths" (p. 13) who had participated in them.

The three reviews, all published between 2013 and 2017, highlighted a number of gaps from studies they reviewed for the attention of researchers. Notably, two of the reviews (Tripney et al., 2013; Tripney & Hombrados, 2013) pointed out on the overall scarcity of robust researched evidence in various aspects of TVET. Tripney et al. (2013) pointed out a gap that only a very small proportion of the many TVET interventions then in operation in developing countries had been rigorously evaluated. Tripney and Hombrados (2013) and Kluve et al. (2017) highlighted that the studies they reviewed had methodological shortcomings and had not provided high quality evidence to help answer their review questions. Kluve et al. (2017) revealed a gap on inadequate reporting standards and that the studies they reviewed had concentrated on small-scale, NGO-implemented interventions and lacked evidence for larger,

nationwide governmental programmes. The reviews also provided pertinent key recommendations worth the attention of researchers. For example, all of them recommended carrying out more studies on TVET.

In addition to the aforementioned reviews published from 2013 to 2017, there have been individual studies carried out on various aspects of TVET after 2017. For example, at the international level Matenda (2019) investigated the role of TVET in empowering women. Using the case of one college in South Africa, she found out that TVET institutions had made strides in empowering women by increasing access for them to predominantly male fields (e.g., engineering). She, however, reported that women still found it "difficult to navigate the education system owing to challenges, such as male dominance in the learning environment, which [led] to feelings of alienation" (p. 248). Matenda (2019) pointed out a major limitation on her study worth the attention of researchers that, her case study was in one college in South Africa, meaning that her findings could not, therefore, be generalised.

At the local level, several studies have been carried out on TVET in general, which also give a pointer to the subject of this study; the TVET related programmes in universities. For example, Jjuuko et al. (2019) carried out a case study in an agricultural college in Uganda. Using students" voices, they examined what they termed as "methodological dilemmas of agricultural education and training" (p. 238). They found out that in general, there was "limited evidence to suggest effective preparation of students for the agricultural world of work" (p. 247). Lecture, was the most common teaching-learning method used by the lecturers as opposed to the demonstration and farm practice method which integrated both theory and practice. Although Jjuuko et al. (2019) did not point out limitations on their study, I note that their case study was a

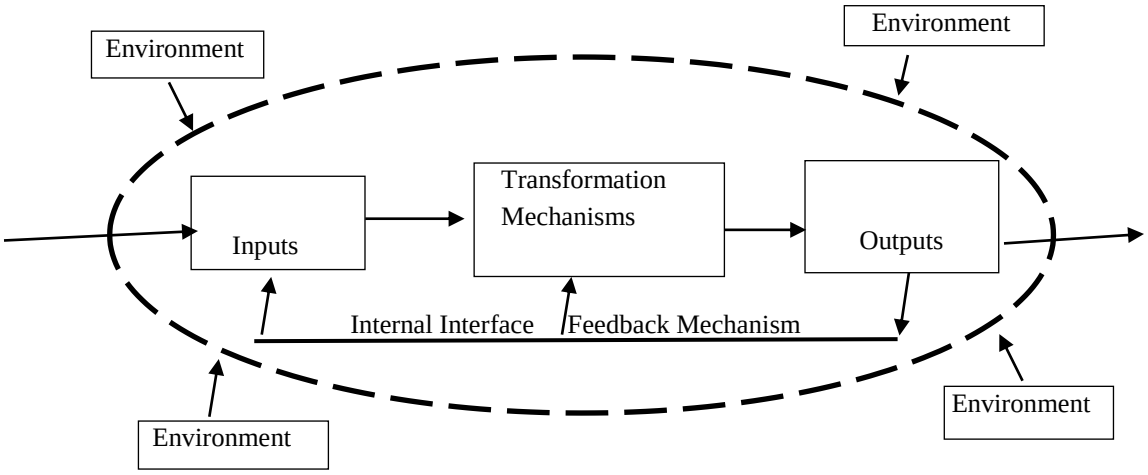
tertiary college. Their findings, therefore, fell short of peculiarities of the TVET related programmes in a university setting.

Wamala (2023) examined the relationship between TVET education attainment, employment and poverty in Uganda and found out that TVET education attainment was a key determinant of employment outcome for the Ugandan labour. Although Wamala (2023) did not point out limitations in his study, I note that he solely focused on the causal relationship between TVET, employment and poverty. The state of TVET related programmes in public universities in Uganda remains a gap. In summary, the gaps highlighted in the above reviews and individual studies are an indication of the need for more studies on the state of TVET related programmes in universities, hence this study.

1.1.2 Theoretical Perspective. I applied systems theory (Figure 1.1) to examine TVET related programmes in public universities:

Figure 1.1

Systems Theory



Note. Sourced from French & Bell (1990). Organisation development: Behavioural science interventions for organisation improvement (p. 53, Figure 5-1).

According to von Bertalanffy (1968) a system is "complexes of elements standing in interaction with the environment" (p. 33). He made three important assumptions of systems theory. First, systems exist within an environment; secondly systems have boundaries, but they are open and thirdly, feedback is essential for system regulation and adaptation. Therefore, a change in one part affects other parts and the system as a whole. Accordingly, von Bertalanffy (1968) viewed a system as a linkage of inputs, a transforming mechanism (process) and flows of outputs located in an environment. French and Bell (1990) building on von Bertalanffy (1968) posit that every organisation maintains itself in a continuous inflow (of inputs) and outflow (of outputs), through a building up and breaking down of components (transformation mechanisms) located in an environment. Therefore, "each of the four components (inputs, transformation mechanisms, outputs and environment) needs to be effectively managed and linked if there is to be a healthy organisation" (French & Bell, 1990, p. 53). In this study, I considered TVET related programmes in universities as a system made up of inputs, transformation mechanisms and outputs located in a university environment, hence the application of systems theory.

1.1.3 Conceptual Perspective. The key concept in this study is technical vocational education and training (TVET) related programmes in universities. United Nations Educational, Scientific and Cultural Organisation (UNESCO) and International Labour Organisation (ILO) (2003) define TVET as:

> those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes,

> understanding and knowledge relating to occupations in various sectors of economic and social life (p. 12).

In Uganda, the Ministry of Education and Sports (MoES, 2019) defines TVET as, "non-academic technical education and practical training that develops the skills and knowledge of apprentices (learners of trades or crafts) working in different sectors of industry and trainees/students trained in different TVET institutions (TVET institutes, centres & schools)" (p. 57). I note that by scope, the conceptualisation of TVET in Uganda as per the TVET Policy (MoES, 2019) is both silent and excludes the TVET related programmes offered in universities in Uganda.

In this study TVET related programmes in universities are conceptualised as the degree-level programmes that integrate academic knowledge with practical and industry-oriented training to develop technical competencies, applied skills, and professional attitudes relevant to national development and labour market needs. TVET related programmes extend beyond traditional vocational training by integrating applied sciences, innovation, and research (Agole et al., 2022). Examples of TVET related programmes in universities in Uganda include; Bachelor of Science in Petroleum, Geoscience and Production attainable at Makerere University; and Bachelor of Medical Engineering attainable at Mbarara University of Science and Technology (MoES, 2023)

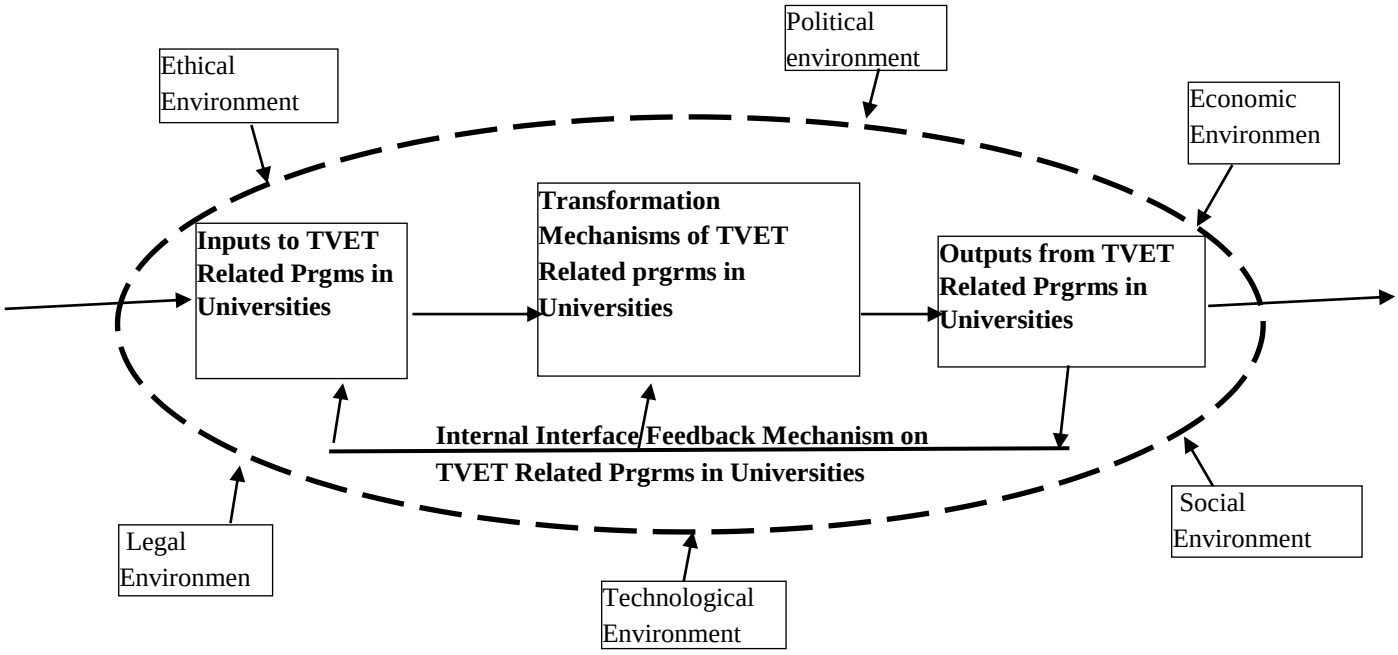
In line with the conceptualisation of TVET and the National TVET Qualifications Framework articulated in Uganda's TVET Policy (Ministry of Education and Sports [MoES], 2019), this study positions TVET-related programmes offered in universities as complementary academic programmes that perform functions analogous to those of the formal TVET system in Uganda. Specifically, these programmes integrate applied, skills-oriented training within a

university context, thereby contributing to the same national objectives of skills development, employability, and workforce competitiveness. They (TVET related programmes) similarly promote employability, innovation, progression pathways from vocational and technical education into higher (university) education, thereby supporting skills development, industrialization, and socio-economic transformation of Uganda.

Therefore, based on the systems theory, I operationalised TVET related programmes in universities in this study in terms of the four components of a system (i.e., inputs to TVET related programmes, transformation mechanisms of TVET related programmes, outputs from TVET related programmes and the environment in which TVET related programmes in universities operates) as illustrated in Figure 1.2:

Figure 1.2

Systems Theory as Applied to TVET related programmes in Universities



Note. Adapted from Figure 1.1

von Bertalanffy (1968) defined each of the four components of a system, which I have operationalised in regard to TVET related programmes in universities (Refer to Figure 1.2). First von Bertalanffy (1968) defined *inputs* as the raw materials to a system for conversion. In this study, inputs to TVET related programmes denote students (National Council for Higher Education [NCHE], 2007), academic staff, finances and educational facilities (NCHE, 2001). Secondly, von Bertalanffy (1968) defined *transformation mechanisms* as the processes or conversion aspects of a system. Transformation mechanisms receive various inputs, convert them and export outputs. In this study, the transformation mechanisms refer to academic staff/student contact hours (NCHE, 2001) and the learning process (Kirkpatrick & Kirkpatrick, 2019). Thirdly von Bertalanffy (1968) defined *outputs* as the system products or outcomes. In this study outputs from TVET related programmes in universities refer to the behaviour of graduates measured in terms of knowledge, skills and attitudes (Kirkpatrick & Kirkpatrick, 2019). Fourthly, von Bertalanffy (1968) defined *environment* as a surrounding that influences the functioning of the other three components. Buye (2021) discoursed that the environment around organisations and/or systems exists in the form of political, economic, social, technological, legal and ethical (PESTLE) aspects. In this study therefore environment denotes the PESTLE atmosphere around TVET related programmes in universities.

1.1.4 Contextual Perspective. The context for this study is public universities in Uganda that offer TVET related programmes. Examples of public universities in Uganda that offer TVET related programmes are; Makerere, Mbarara University of Science and Technology (MUST), Kyambogo, Busitema, Gulu and Soroti. According to its website (https://www.mak.ac.ug/about-

makerere/historical-background), Makerere is the oldest university in Uganda, first established in 1922 as a technical school. In January of the same year the school opened its doors to the first 14-day students who began studying carpentry, building and mechanics. To date, Makerere University has ten operational colleges. Among those that offer TVET related programmes is the College of Engineering, Design, Art and Technology.

According to its strategic plan (Mbarara University of Science and Technology [MUST], 2020), MUST is a public university located in South Western Uganda and established on October 28, 1989 under the Mbarara University of Science and Technology Statute (1989). MUST has since grown from a single medical and health sciences faculty university to two institutes and six faculties. Among those that offer TVET related programmes is the Faculty of Applied Sciences and Technology (https://www.must.ac.ug/). Kyambogo University was established as a public university under Statutory Instrument Supplement No. 37 (2003). As of December 2023 Kyambogo University constituted five faculties. Among those that offer TVET related programmes is the Faculty of Engineering (www.kyu.ac.ug).

Busitema University is a multi-campus public university located in Eastern Uganda with its main campus at Busitema Sub County in Busia District. Its other campuses are at Nagongera in Nagongera Sub County, Tororo District; Namasagali in Nmasagali Town Council, Kamuli District; Arapai Campus in Aloet Ward, Soroti City. Others are Mbale Campus in Mbale City; Pallisa Campus in Pallisa Municipal Council and Kaliro Campus in Kaliro Town Council, Kaliro District. Established by Statutory Instrument Supplement No. 22 (2007), the university has grown from two faculties to six faculties. Among those that offer TVET related programmes is the Faculty of Engineering and Technology (https://busitema.ac.ug). Gulu University was established as a multi-campus public university under Statutory Instrument Supplement No. 31

(2003), with its main campus located in Gulu City and other campuses in Kitgum and Hoima Districts. As of July 2023, the university constituted six faculties. Among those that offer TVET related programmes is the Faculty of Environmental Science (https://gu.ac.ug). Soroti University, by Statutory Instrument Supplement No. 34 (2015) became a fully-fledged public university. The university is located in Soroti City, seven kilometres north east of Soroti City along Moroto Road. Soroti University has since expanded into three schools. Among those that offer TVET related programmes is the School of Engineering and Technology (www.sun.ac.ug). However, in Uganda gaps indicating TVET as ineffective exist; which are also pointers to the state of TVET related programmes in universities. For example, studies such as Jjuuko et al. (2019); Okumu and Bbaale (2018); Wamala (2023) reported poor pedagogical practices by lecturers; poor quality equipment; under and ill trained staff; limited adoption of a competence-based education and training curriculum; supervision inadequacies of TVET institutions and limited participation by the private sector. Okinyal (2012) in his analysis of the BTVET sector in a paper he presented to the Uganda Vice Chancellors" Forum highlighted that the TVET sub-sector faced a myriad of challenges such as; poor infrastructure, negative attitudes towards TVET, irrelevant courses from TVET institutions and low levels of entrepreneurship skills among TVET graduates. The gaps raised above on TVET are pointers to the need for studies to be undertaken on TVET related programmes in universities.

1.2 Statement of the Problem

UNESCO (2001) outlines the importance of TVET as:

> (a) an integral part of general education, (b) a means of preparing for occupational fields and for effective participation in the world of work, (c) an aspect of lifelong learning and

> a preparation for responsible citizenship, (d) an instrument for promoting environmentally sound sustainable development and (e) a method of facilitating poverty alleviation (p. 7).

Uganda's vision on TVET is "a coordinated, labour-market responsive TVET system, producing a skilled, high-quality, competent workforce that is employable and responsive to the national needs and is globally competitive to support Uganda's sustainable economic, social and environmental development" (MoES, 2019, p. 9). The TVET Policy (2019) further prioritizes competencies that meet employer needs rather than certificates (MoES, 2019).

TVET-related programmes in universities are the degree-level programmes that integrate academic knowledge with practical and industry-oriented training to develop technical competencies, applied skills, and professional attitudes relevant to national development and labour market needs. (Agole, 2022). In Uganda, the TVET related programmes in universities exist in the areas of engineering and technology; industrial and applied sciences; agricultural and biosystems fields; ICT and digital technologies; construction and built environment. The TVET-related programmes offered within Ugandan universities play a significant role in national development by producing graduates equipped with practical, labour market–relevant skills that enhance employability and economic productivity (African Development Bank Group, 2018). Accordingly, generating systematic evidence on the state of TVET-related programmes in universities is essential for informing university management and policymakers in the effective planning, governance, and strategic direction of these programmes.

However, the state of TVET related programmes in universities in Uganda is on the contrary as highlighted by studies. In terms of inputs to TVET and outputs from TVET, Okinyal (2012); Okumu and Bbaaale (2018) highlighted existence of poor infrastructure; negative

attitudes towards TVET; low levels of entrepreneurship skills among TVET graduates; poor quality equipment and under/ill trained staff. In terms of the transformation mechanisms of TVET, Jjuuko et al. (2019); Okinyal (2012); Okumu and Bbaaale (2018) reported poor pedagogical practices by lecturers, irrelevant courses from TVET institutions, limited adoption of a competence-based education and training curriculum and supervision inadequacies of TVET institutions. In terms of the environment in which TVET operates, Wamala (2023) reported limited participation by the private sector. Furthermore, the above literature focused on isolated aspects of TVET. For example, Jjuuko et al. (2019) and Okinyal (2012) concentrated more on the transformation mechanisms and outputs of TVET. Whereas Okumu and Bbaaale, (2018) diagnosed the TVET sub-sector as a whole, their findings concentrated on the problems affecting the sector, with no specific mention of the state of TVET related programmes in universities. Wamala (2023) focused more on TVET education attainment, employment and poverty in Uganda and nothing on TVET related programmes in universities.

Therefore, no literature, gave a comprehensive account covering all the four aspects (i.e., inputs, transformation mechanisms, outputs and environment) on TVET related programmes in universities, rendering their state (TVET related programmes) unclear. Moreover, the existing policy was equally silent and actually excludes TVET related programmes in universities. Continued limited empirical knowledge on the current state of these programmes constrained effective policy implementation, institutional planning, and informed decision-making by university managers and policymakers. In this study, guided by systems theory, I examined the state of TVET related programmes in public universities, based on the four components of a system (i.e., inputs, transformation mechanisms, outputs and the environment).

1.3 Objectives

The general objective of this study was to examine the state of TVET related programmes in public universities in Uganda as guided by systems theory in terms of its inputs, transformation mechanisms, outputs and the environment. Hence the following specific objectives:

i. To examine the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda
ii. To examine the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda
iii. To examine the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda
iv. To examine the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda.

1.4 Research Questions

i. What is the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda?

ii. What is the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda?

iii. What is the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda?

iv. What is the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda?

1.5 Scope

1.5.1 Geographical Scope. Geographically, I undertook this study on five public universities of Busitema, Kyambogo, Gulu, MUST and Soroti. Busitema University lies approximately 186 kilometres east of Kampala City on the Jinja-Tororo highway. Gulu University is located in the northern part of Uganda. It is 333 kilometres from Kampala City and five kilometres from Gulu City Centre along Gulu Kitgum highway. Kyambogo University is located eight kilometres from Kampala City Centre along Kampala-Jinja high way. MUST is located in the southwest of Uganda and approximately 270 kilometres from Kampala City. Soroti University is found in Soroti City in eastern Uganda. It is 296 kilometres from Kampala City and seven kilometres along Soroti- Moroto highway.

1.5.2 Sample Scope. My sample composed of stakeholders of TVET related programmes, but with lead roles in the management and/or benefited from a TVET related programme. Programme coordinators represented stakeholders in the line of programme management, while students represented beneficiaries of a programme.

1.5.3 Content Scope. In terms of content, I assessed TVET related programmes in universities based on the interractability of the four aspects of a system (Refer to Figure 2.1). For inputs, I examined the state of students (NCHE, 2007), academic staff, finances and educational facilities (NCHE, 2001). For the transformation mechanisms, I examined the state of academic staff/students contact hours (NCHE, 2001) and the learning process (Kirkpatrick & Kirkpatrick, 2019). For outputs, I examined the state of the behaviour of graduates in terms of knowledge, skills and attitudes (Kirkpatrick & Kirkpatrick, 2019). For environment, I assessed the state of the environment in which TVET related programmes in public universities in Uganda operated (Buye, 2021).

1.6 Significance

1.6.1 Theoretical Significance. My study has made a number of contributions to the growth of systems theory. It has provided a platform for exposure of systems theory to readers of my work, hence wider adoption and use by future researchers in other fields. I also identified constructs in TVET related programmes and incorporated them into systems theory which I examined in universities, hence operationalizing systems theory (Refer to Figures 1.2 & 2.1) and making it effective for assessing TVET related programmes in universities. This provides as a sample frame for adoption by future researchers in assessing other organisational systems. I designed two data collection instruments (Refer to Appendices C & D) based on the four aspects

of systems theory which could be tailored by future researchers in other areas other than TVET related programmes in universities, hence popularizing systems theory.

1.6.2 Policy Significance. My study made a number of contributions in regard to policies. Findings of this study enriches Uganda's effort to respond to a number of international conventions. For example sustainable development goal (SDG) number four seeks to ensure quality education by 2030 by substantially increasing the number of youths and adults who have relevant skills, including technical and vocational skills (United Nations [UN], 2015). Aspiration number six of the African Union Commission (AUC) in its "Agenda 2063" (AUC, 2015) seeks "an Africa whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children" (p. 6).

Nationally, the study contributes to the systematic and integrated planning, investment and provision of TVET related programmes in universities which recognises the interractability of the four aspects (i.e., inputs, transformation mechanisms, outputs and the environment). The study also contributes to the attainment of some of the government's development programmes such as those contained in the "Fourth National Development Plan (NDPIV), 2025/26-2029/30" (NPA, 2024). For example objective number two of the human capital development programme seeks to "produce a knowledgeable, skilled, and ethical labour force" (NPA, 2024, p. 204). With respect to the TVET Act (2025) and the TVET Policy (MoES, 2019), which are stringent and exclusive of TVET related programmes in in public universities, the study is of benefit in informing MoES in the design of better and inclusive TVET policies which encompass TVET related programmes, especially in the public universities established under the Universities and Other Tertiary Institutions Act (2001).

Chapter Two

Literature Review

2.0 Introduction

In this chapter I present the theoretical review, the theoretical framework and related literature of empirical studies done by previous researchers, highlighting existing knowledge gaps in TVET related programmes in universities:

2.1 Theoretical Review

Systems theory was founded by Professor Karl Ludwig von Bertalanffy (1901-1972), an Austrian biologist, also known as the father of general systems theory. Philosophers at the time (e.g., Gustav Theodor Fechner, 1801-1887) believed in a popular notion that the universe was a living system existing at a higher level than humans, they believed that the three principles of causality, stability and repetition governed biological and psychological phenomena (Weckowicz, 2000). von Bertalanffy did not believe that this notion provided an explanatory framework for basic life processes. In 1926, von Bertallanffy wrote his PhD thesis in the University of Vienna, titled; “Fechner und das Problem der Integration höherer Ordnung” translated as; “Fechner and the Problem of Higher-Order Integration” (Weckowicz, 2000), in which he contradicted the popular notion. In 1930”s von Bertallanfy developed a theory of open systems through a number of publications such as “Theoretische Biologie [Theory of Biology]” (von Bertallanffy, 1932) which earned him Professorship of Theoretical Biology at the University of Vienna (1934-1948), as well as worldwide recognition as one of the leading biologists. Subsequently, he defined a system as, "complexes of elements [inputs, process, outputs] standing in interaction with the environment” (von Bertalanffy, 1968, p. 33).

Later, von Bertallanfy went beyond biology and postulated that the general systems theory of biology provided the needed conceptual framework for the basic unity of human knowledge and the unity of natural sciences and humanities (Weckowicz, 2000). He believed that just as an organism was a system of complex biochemical reactions, a society was a system of communication patterns and institutions, while a culture was a system of symbols. Systems theory was, therefore, applicable to physiological, psychological and sociological phenomena. Gradually, many developments accrued on the systems concept thereafter. For example, Johnson et al. (1964) building on the foundation of von Bertalanffy, extended the systems concept into management and business. According to them, a business organization was made of people which had a dynamic interplay with its environment (i.e., customers, competitors, labour organizations, suppliers, government, and many other agencies). By the 1970s, systems theory had been embraced by organizational researchers partly due to the "realization that classical models were inadequate in accounting for complex organizational behaviours" (Chih-Hui & Sapphire, 2017, p. 2). For example, Featherston and Doolan (2012) used the conventional understanding of the systems paradigm to critique literature that had critiqued system dynamics. They found out two common criticisms labeled against systems theory. First, the systems theory had often been misapplied. Secondly, that some researchers had often been misinformed of the goals, expected outcomes and limitations of the systems theory.

Cox and Paley (2003) reviewed researches that had applied systems models for understanding families. They found out that researches underpinned by the systems models led social scientists in new and important directions in understanding the social and emotional development of children in their families. Cox and Paley (2003) made an observation worth the attention of researchers, that an investigation that applied the systems models should not look for

effects at any one level of the system without considering the contexts of the other levels, thus proving von Bertalanffy's (1972) definition of a system (i.e., complexes of elements [inputs, process, outputs] standing in interaction with the environment).

In addition to reviews, which publications ranged up to 2012, there are individual studies in which researchers applied systems theory after this period. For example, Bridgen (2017) used systems theory as a framework to examine the function, purpose, and identity of a university advising system in a satellite campus which they disguised with a pseudo name (i.e., Mid-Atlantic University [MAU]) as a case. He collected and triangulated data obtained through review of documents, interview and focus group discussions. Using an inductive approach enhanced with Nvivo 10 software (QSR International, 2014) for data analysis, he made two major findings. First he found out that there was disharmony between the way the MAU advising system functioned as documented in policies and the way it was reported by the participants. Secondly, although advising scholars and practitioners at MAU generally agreed on the superiority of a developmental or learning-centred advising model over prescriptive paradigm, the satellite campus, predominantly used the prescriptive advising model. Hence, Bridgen (2017) proved MAU to be "an excellent example of the mismatch between policy and practice" (p. 19).

Bridgen (2017) highlighted major limitations to his study worth the attention of researchers. Because of the qualitative nature of his study, the results were not generalizable. There was also difficulty in identifying specific causal relationships within the university advising system due its complex and interconnected nature, hence needing extensive data collection. Bridgen highlighted this as a crucial factor for consideration by researchers who apply systems theory.

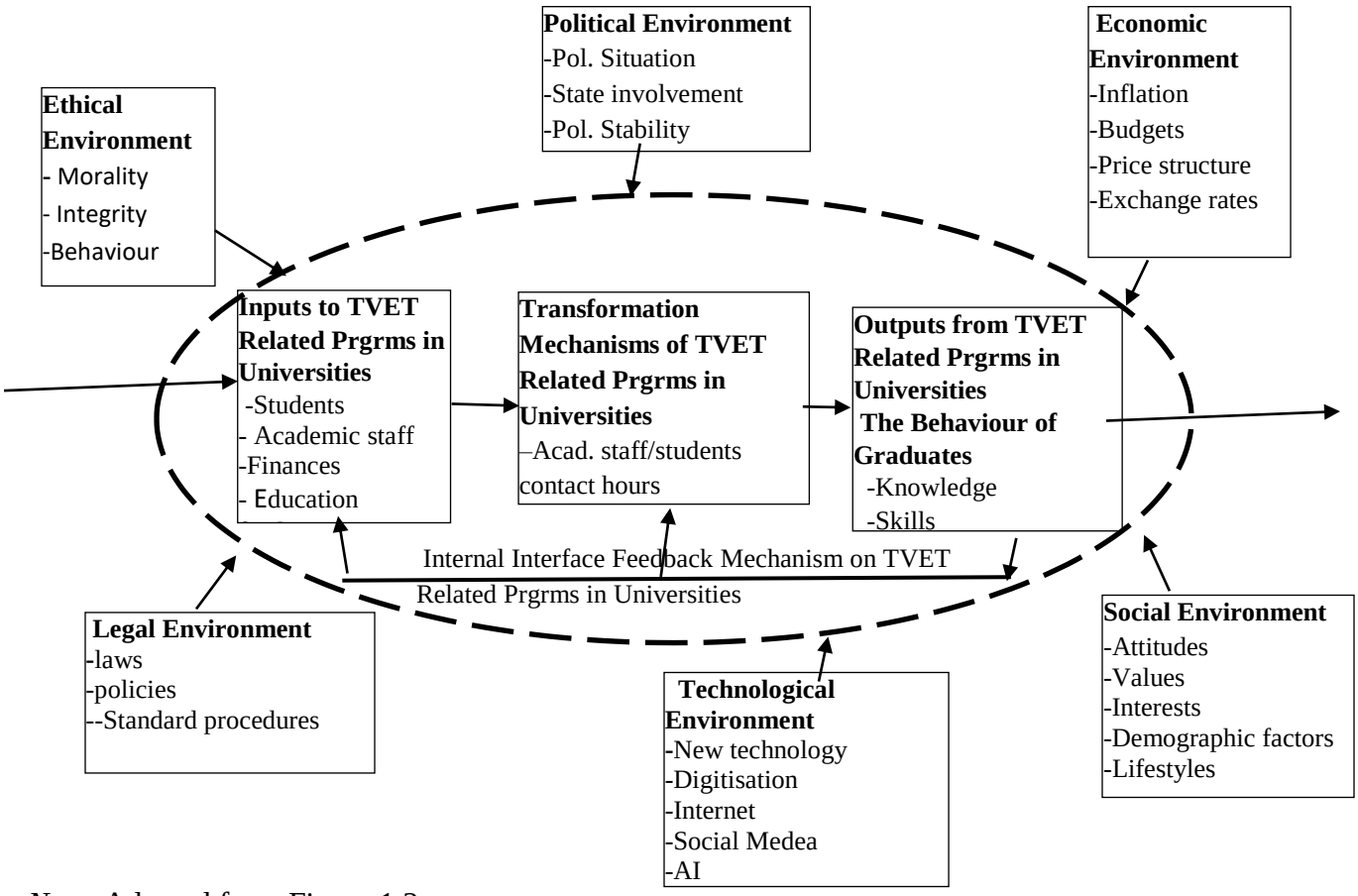
In summary, the aforementioned literature was a demonstration that systems theory had been embraced and applied by other researchers in various fields (e.g., communication, management and family), hence its acceptability and use in the field of research. I therefore, postulated that systems theory is a formal theory that had long been tested, a basis I relied on for selecting it as a guiding theory for this study.

2.2 Theoretical Framework

The theoretical framework which guided this study is as in Figure 2.1:

Figure 2.1

Theoretical Framework Operationalizing TVET Related Programmes in Public Universities



Note. Adapted from Figure 1.2

In Figure 2.1, I operationalised inputs to TVET related programmes in public universities as students which I extracted from the "Minimum Entry Requirements for Admission to Universities" (National Council for Higher Education [NCHE], 2007, p. 845) and as academic staff, finances and the education facilities, which I extracted from the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, pp. 877-878). I operationalised the transformation mechanisms of TVET related programmes as staff/students contact hours which I extracted from the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, p. 877); and as the learning process, which I extracted from level two of Kirkpatrick's training evaluation model, titled *learning* (Kirkpatrick & Kirkpatrick, 2019, p. 4), which measures the degree to which learners acquire the intended knowledge, skills, and attitudes. I operationalised outputs from TVET related programmes as the behaviour of graduates (measured in terms of knowledge, skills & attitudes) which I extracted from Kirkpatrick's training evaluation model level three titled, behaviour which measures "the degree to which participants [graduates] apply what they learned during training" (Kirkpatrick & Kirkpatrick, 2019, p. 4). In this case, I assessed how the TVET related programmes' graduates were applying what they learnt. Finally, I operationalised the environment in which TVET related programmes in universities operated as political, economic, social, technological, legal and ethical (PESTLE) which I extracted from Buye (2021, pp. 3-9). According to Buye (2021) environment provides both facilitating and inhibiting influences on organizational performance. He demonstrated PESTLE analysis as an effective technique for analyzing the influence of environment on organizations, hence its selection for use in this study.

2.3 Related Literature

In this section, I reviewed existing literature relevant to this study that had interrogated parts of TVET related programmes in relation to the four research questions (Refer to Section 1.4) of this study. The purpose was to find out, what other researchers had done and the strengths and weaknesses they identified in their studies. The section, focuses on conceptual papers, literature review papers and empirical studies on TVET as a whole with the aim of isolating existing gaps on TVET related programmes from literature, hence making a justification for this study.

2.3.1 Conceptual Papers on TVET.

Different authors (e.g., Afeti & Adubra, [nd]; Oludolapo et al., 2020; Oviawe et al., 2017; Agole et al., 2022) have provided their conceptualisations about TVET. In Table 1 is a summary of some of the conceptual papers:

Table 2.1

Summary of Conceptual Papers on TVET

Authors (Year) & Title	Aim	Results
Afeti & Adubra (nd). Skilling Africa: The paradigm shift to technical and vocational skills development.	'The objective of this ADEA issues publication is not only to bring conceptual clarification to the paradigm shift from formal, school-based TVET to a holistic and inclusive Technical and Vocational Skills Development [TVSD] but also to highlight the experiences of countries that have begun the process of achieving a coordinated and flexible system of skills acquisition that addresses the key issues that are closely linked to the change of paradigm" (p. 10, 1st sentence under Conclusion). ADEA is the Association for the Development of Education in Africa	"Technical and vocational skills may also therefore be classified in terms of core competencies and knowledge that promote employability, employment, productivity, and lifelong learning" (p. 3, 2nd sentence of Para. 2 under Sub Section 4.1, titled; Conceptual Context, Rationale and Justification). "The concept of skills is multi-dimensional, e.g. cognitive skills, critical skills, core skills, soft skills, etc" (p. 3, 2nd sentence of Para. 1 under Sub Section 4.1, titled; Conceptual Context, Rationale and Justification).
Oludolapo, Maria, Chiso, & Yinusa (2020). Entrepreneurial soft skills and attitude of TVET students for wealth and job creation.	"The paper looked at the meaning of entrepreneurship education, technical vocational education and training, TVET learners' entrepreneurship attitudes and entrepreneurial soft skills" (p. 181, 1st sentence under Abstract).	"TVET training is an avenue to empower the youth to be self-employable, to have employable skills and to boost economic development" (p. 181, 3rd sentence under Abstract). "The paper concluded that the success of entrepreneurship education is the responsibility of TVET teachers as the need for synergy in the planning, implementation, and the evaluation of learning that emphasizes on contextual and holistic approaches" (p.184, sentence 3 under conclusion). Recommendations: "Technical Vocational Education and Training educators should re-think their approaches and strategies of training, and possibly consider adopting the competency based mode of educational delivery. The government should support TVET institutions in hiring of more trained teachers to curb inadequacy of teachers…. Government should spearhead curriculum changes in order to make the curriculum flexible and

		work-oriented" (p. 184, under recommendations).
Oviawe, Uwameiye, & Uddin (2017). Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st Century.	"This paper therefore examines best practices in TVET school-workplace collaboration: bridging the skill gap to meet manpower needs of the 21st century workplace." (p. 7, sentences 4, under Abstract). "This paper discusses concept of workplace training in TVET, concept of workplace-school collaboration, need for workplace-school collaboration in TVET, best practices to workplace-school collaboration" (p. 7, last sentences, under Abstract).	"In order to meet the demand of the 21st century workplace for skilled manpower and also to produce individuals that will be equipped with saleable skills for employment and self-reliance…. TVET educational institutions must collaborate with the industry towards bridging the skill gap" (p. 7). They also define workplace training as "a form of training that takes place in a workplace based on the principle of learning by doing and includes demonstrations by a more experienced employee, performance under supervision, and coaching, job rotation and participation in specific projects" (p. 8, sentence 2, under section 2, titled Concept of Workplace Training in Technical Vocational Education and Training).
Agole, P., Kerre, B. W., Ochieng, D., & Okaka, W. (2022). Challenges confronting technical and vocational education and training in developing countries: A case of Uganda.	This paper presents the major institutional, community, national, and regional challenges of promoting effective Technical Vocational Education and Training(TVET) training system in line with the 2030 SDG 4 with a focus on Uganda (p. 215, 1st sentence of the Abstruct	Conceptualise TVET within higher education as a strategic response to labour market demands, industrialisation, and youth unemployment. Their analysis highlights that university-based TVET programmes extend beyond traditional vocational training by integrating applied sciences, innovation, and research. However, the authors note that the effectiveness of such programmes is constrained by inadequate funding, limited industry engagement, and weak policy coordination. This perspective situates TVET-related programmes in universities as hybrid systems that combine academic rigour with vocational relevance, necessitating deliberate institutional and policy support.

From Table 2.1 Afeti and Adubra (nd) clarified on the paradigm shift from formal, school-based TVET to a holistic and inclusive technical and vocational skills development (TVSD). They revealed that technical and vocational skills may be classified in terms of "core competencies and knowledge that promote employability, employment, productivity, and lifelong learning" (p.

3). They however emphasised that the concept of skills should be “multi-dimensional, e.g. cognitive skills, critical skills, core skills, soft skills, etc” (p. 3).

Oludolapo et al. (2020) wrote on the different facets of TVET, that is, entrepreneurship education, technical vocational education and training, TVET learner’s entrepreneurship attitudes and entrepreneurial soft skills. They described TVET as “an avenue to empower the youth to be self-employable, to have employable skills and to boost economic development” (p. 181). Oludolapo et al. (2020) concluded that the success of entrepreneurship education is the responsibility of TVET teachers. Governments should therefore support TVET institutions in hiring more trained teachers and also “spearhead curriculum changes in order to make the curriculum flexible and work-oriented” (p. 184).

Oviawe et al. (2017) discussed the concept of TVET and workplace training. Their aim was to highlight how best practices in TVET school-workplace collaboration bridge the skill gap to meet manpower needs of the 21st century workplace. They highlighted workplace training as a critical learning approach for TVET which is based on “the principle of learning by doing and includes demonstrations by a more experienced employee, performance under supervision,… and participation in specific projects” (p. 8). In order to meet the demand of the 21st century workplace, Oviawe et al. (2017) emphasise that “TVET educational institutions must collaborate with the industry towards bridging the skill gap” (p. 7). The above conceptualisation by (Afeti & Adubra [nd]; Oludolapo et al., 2020; Oviawe et al., 2017) provided more clarity to the concept of TVET and facilitated in grounding the operational ceonceptaulisation of TVET in this study.

Agole et al. (2022) discussed major challenges confronting technical and vocational education and training in developing countries using Uganda as a case. They conceptualised TVET related programmes in universities as the degree-level programmes attainable at

universities that integrated academic knowledge with practical and industry-oriented training to develop technical competencies, applied skills, and professional attitudes relevant to national development and labour market needs. They further highlighted that TVET related programmes extended beyond traditional vocational training by integrating applied sciences, innovation, and research.

In summary, the reviewed conceptual papers provided a comprehensive and evolving understanding of technical and vocational education and training (TVET), highlighting its transformation from a narrowly defined, institution-based training model to a holistic, skills-oriented system aligned with labour market demands, national development priorities, and lifelong learning. The conceptual papers converged on the view of TVET as a dynamic, multidimensional, and development-oriented system that transcends traditional vocational training. Collectively, these conceptualisations provided a foundation for the present study by clarifying the scope, purpose, and key attributes of TVET and hence TVET related programmes in universities. They also highlighted the operational conceptualisation adopted in this study, which positions university based TVET related programmes as complementary academic pathways that integrate practical skills, applied knowledge, and industry engagement in support of Uganda's national development and labour market objectives.

2.3.2 Literature Review Papers on TVET. In Table 2.2 this subsection gives summaries of results from previous literature review studies carried out on TVET.

Table 2.2

Summary of Literature Review Papers on TVET

Authors (Year) & Title	Aim	Methodology: Samples, their Sources & Analysis	Results	Gaps and Recommendations
Chinedu, Wan-Mohamed, & Ajah (2018). A systematic review on education for sustainable development: Enhancing TVE teacher training programme.	"Using a systematic literature review, this paper critically examines the extant literature on education for sustainable development and provides a synthesis of the literature in identifying the shared message that SD and ESD models attempt to represent" (p. 109, sentences 6, under Abstract).	"…we chose to utilise… Web of Science (WoS), JSTOR and Eric." (p. 112, 1st sentence of text under Article Sources). "…we were exploring ESD from a niche area…within Technical and Vocational Education as well as…between the ESD literature, social well-being and community development" (p. 112, 2nd sentence of text under Article Sources). "…a total of 19 publications were retained for full review and synthesis." (p. 112, last sentence in the text under Article Selection and Screening). "Articles… were consolidated to produce a synthesis of evidence-based conclusions…These were… discussed vis-a-vis a direct comparison with the submissions of the authors in the selected research	**The three-pillar basic model** This model is represented in Figure 2, p. 114). "The model simply takes the dimensions of "environmental, social and economic resources" and labels them as requirements or preconditions for sustainable development…sustainable development is achieved when all dimensions work in unison and in synergy" (p. 113, sentence 5). **The egg of sustainability Model** This model is represented in Figure 2, p.115). "[In this model] a society is said to be sustainable if the interactions between the ecosystem and the people are both balanced and interdependent" (p. 114, sentence 5, under sub section 3.1.2, titled The Egg of Sustainability). "…a society is deemed well and sustainable only if people and the ecosystem are well and healthy" (p. 114, sentence 7, under sub section 3.1.2, titled, The Egg of Sustainability). Atkisson"s Pyramid Model "…constitute a strategy for SD and its five hierarchical level**s** include; Level 1:	Gaps from Studies Reviewed I saw none Gaps on their Own Review I saw none Recommendations "The real quest then begins with further exploring ways to advance the integration of ESD in TVET institutions practically and not just admitting their importance in reports and research documents and policies" (P. 122, sentence 3 of para 6 under section 3.5, titled; Can ESD Integration into Technical and Vocational Education Programs Foster Societal Wellbeing and Community Development?). "Experts have

		papers" (p. 112, text under Analysing the Articles).	Indicators… Level 2: Systems… Level 3: Innovations… Level 4: Strategies… Level 5: Agreements" (p. 115, sentence 4 of sub section 3.1.3, titled Atkisson"s Pyramid Model). "The model depicts a group decision-making process… Moving up the ladder, groups then practice cross-sectoral teamwork, make linkages and generate a pool of new ideas and work towards reaching a consensus- indicating a set of actions they have agreed upon to incorporate into the real world" (p. 115, sentence 5&6 of sub section 3.1.3, titled Atkisson"s Pyramid Model). "One key message that can be depicted from these [above] models is that three broad dimensions of economic, social and environmental factors must interact in some way to achieve sustainable development" (p. 116, 2nd last sentence of para 1). "… TVET is supposed to play a role in transitioning the world towards sustainable development [because] a sustainable percentage of the total distribution of workers come from TVET backgrounds" (pp. 122-123, sentence 4 of para 2, under Conclusion).	recommended that for ESD to become effective and the purpose with which it is meant to serve, it must be holistically integrated into the curriculum and institutional practices" (p. 123, last sentence under Conclusion).
Dogara, Saud, Kamin & Jwasshaka (2018). Meta-analysis on	"The aim of this review…, is to synthesize the available evidences in	"An online database of Educational Resources Information Centre (ERIC) was used to	Instructional Methods Employed for the Acquisition of Practical Skills in Order of predominance:	Gaps from Studies Reviewed I saw none

instructional methods employed and challenges at technical colleges in Nigeria.	the literatures [sic] about instructional methods employed for the acquisition of skills and the challenges of effective instructional delivery at technical colleges in Nigeria" (p. 45, sentence 3, under Abstract).	search for relevant published articles… web based service providers were Science Direct, Wiley Online Library, Springer Link and Google Scholar" (p. 46, sentence 2 of para 1, under Methodology). "… only articles that were published between 2012 and 2018 [were studied]" (p. 47, sentence 5 of the under Methodology). "… the number of articles to about 16 which fulfilled the criteria" (p. 47, 2nd last sentence of text under Methodology). "The papers were analysed qualitatively…" (p. 47, last sentence of text under Methodology). "The study adopted a systematic review of related published journal articles …" (p. 51, 2nd sentence of para 1, under Conclusion and Recommendation).	"Demonstration, Lecture, Discussion, Assignment, Multi Media Instruction, Project-based Learning and Field Trip" ((P. 47 adopted from Table 1). Challenges of Instructional Delivery at Technical Colleges in order of predominance: "Inadequate Infrastructural facilities, poor funding, dearth of qualified technical teachers, inadequate instructional materials, poor admin/supervision, poor staff development, poor assessment, poor ICT compliance, poor remuneration and poor teaching methods" (p. 48, adopted from Table 2) "… it is evident that the effective 21st century pedagogical approaches are rarely employed at the TVET institutions for the acquisition of adequate relevant skills by the students" (p. 50, para 5, under Question 1 What are the instructional methods employed …?).	Gaps on their Own Review I saw none Recommendations "The reviewers therefore recommended that government should provide the enabling environment for the appropriate implementation of the modern pedagogical approaches for adequate acquisition of practical skills at Technical Colleges" (p. 51, sentence 4 of para 1, under Conclusion and Recommendation).
Kluve, Puerto, Robalino, Romero, Rother, Stöterau, Weidenkaff &	"This Campbell systematic review examines the impact of youth	"… searched for studies published up to January 2015" (p. 14, 1st sentence under, How up-to-date is this	"The included interventions are training and skills development, entrepreneurship promotion, employment services and subsidized employment.	Gaps on the Studies Reviewed "Existing research is spread unevenly across

Witte (2017). Interventions to improve the labour market outcomes of youth: A systematic review.	employment interventions on the labour market outcomes of young people and business Performance" (p. 12, under, What is the Aim of this Review?)	Review?). "A total of 113 eligible impact evaluations were identified… " (p. 15, 1st sentence under Results). "Meta-analysis methods were employed to synthesize the evidence… " (p. 15, 2nd sentence, under Results).	Outcomes of interest include employment, earnings and business performance outcomes" (p. 12, last sentence of para 2, under What is this review about?). "Overall, youth employment interventions increase the employment and earnings of those youth who participate in them… " (p. 13, para 3, under What are the Main Findings of this Review?).	the globe. While the evidence gathered was global in nature, capturing 31 countries and all regions of the world, slightly more than half of the evidence derived from interventions in high-income countries" (p. 175, first sentence of issue no. 1, under subsection 6.2. titled Implications for Research). "… the evaluations of youth employment interventions in low- and middle-income countries were concentrated on rather small-scale, NGO-implemented interventions and there was a lack of evidence for larger, nationwide governmental programmes" (p. 175, last sentence of issue no. 1, under subsection 6.2. titled Implications for Research). Recommendations "There is a need to strengthen the evidence base with more studies of promising programmes, especially in sub-Saharan Africa" (p. 14, last sentence of para 2, under the section on, What do the Findings of this Review Mean?)
McGrath, et al. (2019). Vocational education and training for African development: a literature review	"However, the major current theoretical approaches to VET are not up to this challenge. In the context of Africa, we seek to address this problem through a presentation of literatures that	"First, we review the past by examining the major strands of the existing VET literature in/on Africa and critiquing these" (p. 1st sentence of para 3) "Second, we imagine the future by offering a reflexive attempt to	"In the final section, we propose a new framework for theorising VET in Africa for sustainable development. African VET: Balanced economic, human and sustainable development Sustainable Development African agro-ecology / sustainable agriculture; Participatory, inclusive	No potential conflict of interest was reported by the authors.

	contribute to the theorisation of this new vision" (p. 1, sentence 4-5, under Abstract).	contribute to a transformed and transformative way of thinking about VET and sustainable development" (p. 1st sentence of para 4)	knowledge formation; Boundary-crossing learning; Just transitions Policy, Systems and Institutions Historical processes of formation of VET/skills systems; Complex political economies; Strong focus on labour markets and productive possibilities Community Development: Youth and inclusion focused, Local labour market realities and possibilities; Local attitudes and aspirations Critical Capabilities: Agency and aspiration; Experiences of poverty and marginalisation; Decent work for human flourishing Vocational Knowledge, Centrality of knowledge for skills debate, Importance of different forms of knowledge for VET transformation	
Tripney & Hombrados (2013). Technical and vocational education and training (TVET) for young people in low-and middle- income countries: A systematic review and meta-analysis.	"This systematic review examined the evidence from studies evaluating the impacts of TVET interventions for young people in low- and middle-income countries (LMICs)" (p. 1, 2nd sentence under Abstract)	"The 26 included studies evaluated 20 different interventions… " (p. 1, 3rd sentence under Abstract) "… databases were electronically searched (including ASSIA, Econlit, ERIC, IBSS, Medline, PsycINFO, and SSCI)." (p. 3, 2nd sentence under Literature Search and Strategy). "Publication dates of the 26 included studies ranged between 2001 and 2011…" (p. 4, 1st sentence, under Descriptive Analysis).	"Intervention type/model of TVET: technical education, vocational education, vocational training, on-the-job training and apprenticeship training" (P. 6, Table 1, titled Main Intervention Characteristics). "The overall mean effects on overall paid employment, formal employment, and monthly earnings were small, positive, and significant; however, significant heterogeneity was observed" (p. 1, sentence 5, under Abstract). "For three outcomes (overall paid employment, formal employment, and earnings), the grand mean provides some evidence that the TVET interventions were, on average, effective... " (p. 7, 1st sentence under	Gaps on the Studies Reviewed "Despite renewed investment in TVET and increased pressure for evidence-based decision-making, there remains an overall scarcity of research in this area and specific knowledge gaps" (p. 8, 1st sentence of para 2, under Conclusions). "The methodological shortcomings of the current evidence base, and specific knowledge gaps, suggest a number of future research priorities" (p. 10, last sentence of para 5, under Conclusion).

		"meta-analytic methods were used to synthesise the evidence" (p. 4, 1st sentence under Analysis)	Analysis of Homogeneity) "… participation in TVET improves the labour market situation of youth in LMICs, on average, when compared to youth who do not participate, … Thus, it is reasonable to conclude that it is worthwhile to continue investment in TVET provision" (p. 10, 1st two sentences of para 5, under Conclusions).	
Tripney, Hombrados, Newman, Hovish, Brown, Steinka-Fry, & Wilkey (2013). Technical and vocational education and training (TVET) interventions to improve employability and employment of young people in low- and middle-income countries: A systematic review.	"The main objective of this systematic review was to summarise the available evidence on the effects of TVET interventions for young people in developing countries to inform policy, practice, and research" (p. 7, 1st sentence under Objectives).	"The following strings was used to search ERIC and other bibliographic databases using the CSA platform (the KW function searches the descriptor field, title and abstract)…" (p. 102, 1st sentence and whole text under Search Query Terms). "…Of the 26 studies included in the review, 3 utilised a randomised controlled trial (RCT) design, and 23 utilised a quasi-experimental design" (p. 8, 5th sentence under, Data Collection and Analysis). 'The findings … were statistically combined using meta-analytic techniques" (p. 8, 9th sentence under, Data Collection and Analysis).	"The overall mean effect of TVET on paid employment was positive and significant" (p. 9, 1st sentence under Employment). "The overall mean effect of TVET on formal employment was positive and significant" (p. 9, 1st sentence under formal employment). "The overall mean effect of TVET on earnings was positive and significant" (p. 10, 1st sentence under, Monthly Earnings). "The overall mean effect of TVET on self-employment earnings was negative and non-significant" (p. 10, 1st sentence under Self-Employment Earnings). "Thus, it is both important and worthwhile to continue to invest in TVET provision for youth in developing countries." (p. 12, sentence 4 of para 3, under Authors" Conclusion).	Gaps on the Studies Reviewed "… a key finding of this review is the overall scarcity of robust evidence, as indicated by the relatively few studies that met the inclusion criteria. It would seem that only a very small proportion of the many TVET interventions currently in operation in developing countries around the world have been rigorously evaluated" (p.77, sentence 4 & 5 of para 1, under Conclusions). Recommendations "To build the evidence base further, many more of the TVET interventions currently in existence in developing countries need to be rigorously evaluated, and the results reported and disseminated efficiently" (p. 12, last sentence of para 3, under Author"s Conclusions).
Venatius, Musta amal, Subramaniam, Ekwok & Abdullahi (2020). Effectiveness of	"This study critically reviewed the effectiveness of instructional models in teaching and	"The searches… were conducted in databases of Web of Science, Google Scholar, Research gate, Academic Search Premier,	"This paper implies that using instructional models in teaching and learning improves students" technical skills in TVET courses" (p. 4313, 2nd last sentence,	Gaps from Studies Reviewed I saw none Gaps on their Own

instructional models in teaching and learning technical skills: A systematic review and meta-analysis.	learning technical skills in TVET at technical colleges" (p. 4313, 2nd sentence, under Abstract).	Econ Lit, ProQuest, Scopus, Universiti Teknologi Malaysia, UTM Library and Chinese National Knowledge Infrastructure (CNKI)….. " (p.4314, 1st sentence, under Literature Search Process And Inclusion Criteria). "The final review involved sixteen published studies… " (p. 4315, 1st sentence, under Characteristics of Included Studies). "We calculated…using variance analysis" (p. 4315, 2nd sentence, under Statistical Methods).	under Abstract). "… this meta-analysis shows that instructional models contributed significantly positive variation in students" achievement test scores" (p. 4320, last sentence, under Conclusion).	Review "… we limited our inclusion criteria on articles published in English only. It is possible that some articles published in other languages will have missed" (p. 4319, 2nd & 3rd sentence, under Conclusion). "… the quantitative evidence of this review did not include the interaction effect of instructional models and lesson duration on students" achievement test scores" (p. 4319, 5th & 6th sentences, under Conclusion). Recommendations "Based on the study limitations, we recommended that a review study on the interaction effect of instructional models and lesson duration, teachers" qualification on students" achievement test scores be conducted" (p. 4313, last sentence, under Abstract) "… interaction effect of instructional models and lesson duration on students [and]… the interactive effect of instructional models and teachers qualifications on students" achievement test scores… are aspects relevant for further research studies" (p. 4319, 5th,

				6th & 7th sentences under Conclusion).
Yasin, Nur, Ridzwan, Ashikin, & Bekri (2013). Current trends in technical and vocational education research: A meta-analysis.	"…the purpose of this analysis is to identify the current trends, the latest issues of choice and the needs of researchers in the field of research that has been published [sic] TVE" (p. 243, 1st sentence of para 3, under Introduction). "This meta-analysis research was conducted to identify the trends and current issues in TVE which surfaced in the span of five years (2005 until 2010)" (p. 248, 1st sentence of para under Conclusion).	"The articles were obtained from refereed journal sources, including the Journal of Vocational Education and Training (JVET), Education and Training (E & T), Journal of European Industrial Training (JEIT) and Evaluation & Research in Education (E & RE)… " (p. 244, 1st sentence of para 2). "A critique of the 43 articles published in the span of 4 years (2007-2011) was conducted… " (p. 244, 2nd sentence, under Results: Research Themes). "… the content analysis conducted in this research focused on four main themes: research method, research design, data sources, and research issues" (p. 244, last sentence of para 1, under Evaluation of Content: Content Analysis).	"The analysis results show that the issues discussed focus on apprenticeship, evaluation, and ICT in TVE." (p. 246, last sentence of para 2, under Discussion). "Apprenticeship is an important topic in the field of TVE because it is crucial in the preparation of skilled human labour" (p. 246, 1st sentence of para 1, under Apprenticeship in TVE). "… research has shown that focus is given not only to methods of student evaluation but also steps that must be taken towards the accreditation of certificates… " (P. 247, 1ST sentence of para 2, under Evaluation in TVE). "Competency evaluation is the most commonly discussed issue in the articles used as the sample for this research" (p. 247, 1st sentence of para 3, under Evaluation in TVE). "… it can be concluded that evaluation is an important factor in the production of quality workforce" (p. 247, 1st sentence of para 6, under Evaluation in TVE). "ICT issues in TVE focus on aspects related to the implementation of ICT in the teaching and learning process and research has shown that the use of ICT in these fields have been shown to be limited… " (p. 247, 1st sentence of para 1, under	Gaps from Studies Reviewed I saw none Gaps on their Own Review I saw none Recommendations "As a consequence of the emerging issues in TVE i.e. apprenticeship, evaluation, and ICT in TVE, educational institutions concerned with TVE must empower it by encouraging more research in the field so as to fulfil current and future and demands." (p. 248, last sentence of para under Conclusion).

			ICT In TVE).	
Yi Shi1 & Bangpan (2022). Young people's participation experiences of technical and vocational education and training interventions in low- and middle-income countries: A systematic review of qualitative evidence	"This systematic review investigated young people's learning process and consequences of TVET participation in Low and Medium Income Countries (LMICs)" (1, sentence 4, under Abstract).	"..by reviewing qualitative evidence across 31 published and unpublished studies from 2000 to 2019. Adopting a framework thematic synthesis approach, this study…." (p. 1, sentence 6 under Abstract). "The present review adhered to the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidance (Moher et al. 2009)" (p.4, 1st sentence, under method). A systematic and comprehensive search was conducted to locate both published and unpublished studies…. bibliographic databases (including Applied Social Sciences Index and Abstracts, Education Resources Information Centre, SCOPUS, and Social Sciences Citation Index)" (p. 4, 2nd sentence under strategy)	"…this study revealed that TVET participation had a multi-dimensional impact on young people. Firstly, most participants increased their cultural capital in the forms of skills and knowledge, credentials or socio-emotional competencies. Secondly, TVET enabled many participants to accumulate three kinds of social capital an especially valuable asset in LMICs… …bonding and bridging social capital developed through peers, staff, instructors and alumni… supported young people's development professionally and emotionally, "The review also revealed that family and community, though external to interventions, had a decisive influence on young people's learning and wellbeing" (p. 32, 1st sentence in para 1). "Thirdly, participants' economic experiences were closely related to their cultural capital and dependent on intervention type and participant characteristics. The review found that interventions, especially short-term skills training, added the most extra value to the livelihoods of vulnerable youth…" (p. 32, 1st sentence of para 2). "Fourthly, the review found mixed evidence on participants' aspirations and	"… the search was limited to studies written in English. Due to the reviewers' limited resources, the search of grey literature was constrained to key gateways and organization websites. This review revealed a wide range of participants' learning experiences and participation consequences apart" (p. 33, sentence 2-3, subsection, titled strengths and Limitations). Recommendation "Future empirical studies can leverage this review's findings as a starting point to identify key domains of TVET's impact relevant for local contexts and employ a longitudinal and rigorous design to establish any association. Comparative studies should be conducted to identify effective components of different TVET types and contextual factors contributing to participants' positive experiences. More focused evidence is also needed to understand the experiences of the most disadvantaged participants" (p. 34, text under subsection

		capability to aspire. Empowered by accumulated cultural and social capital, many participants aspired to achieve upward socio-economic mobility through educational and professional pursuits" (p. 32, 1st sentence of para 3). "By contrast, some other participants were disoriented due to the lack of clear pathways and harsh reality.." (p. 32, 4th sentence of para 3). "Lastly, based on limited evidence from three studies, the review found while TVET participation diverted some participants from health risks and enabled them to acquire healthy practices, some young people experienced physical and psychological burden due to a heavy workload" (p. 32, sentence no. 7 of para 3).	titled, implications for research).

Several systematic reviews and meta-analyses have examined Technical and Vocational Education and Training (TVET) interventions, instructional models, and outcomes across different contexts, highlighting both achievements and persistent gaps.

According to Table 2.2, Chinedu et al. (2018) reviewed studies on the various ways TVET could help contribute towards societal wellbeing and community development if sustainable development (SD) is rightly integrated into TVET teacher training programs. They reviewed 19 articles, which they searched from three databases, namely, *Web of Science (WoS), Journal Storage (JSTOR)* and *Education Resources Information Center (ERIC).* Using a meta synthesis review approach, Chinedu et al. (2018) made a number of findings. First, the research literature

they reviewed revealed that TVET could be a very important medium to reach out to a whole lot of workers and develop their knowledge, skills and values about SD, since TVET was "a major supplier of the total workforce of nations" (p. 120). Secondly, TVET through lifelong learning could help transition nations towards sustainable development by becoming the tool for the promotion and realisation of the objectives of "a culture of peace, the international citizenry, social cohesion and environmentally friendly culture" (p. 121). Thirdly, they found out that the TVET of the future ought to not only to prepare individuals for employment but, also to develop them into, "responsible citizens… preserving the integrity of their environment and the welfare of others" (p. 121). From the studies they reviewed, Chinedu et al. (2018) concluded that TVET programs had not yet fully yielded to the call of "integration of education for sustainable development [ESD] across curricula" (p. 123).

Chinedu et al. (2018) also pointed out a number of gaps on the studies they reviewed to the effect that, despite the many international fora and caucuses that had taken place over the years, literature still recorded, "low response to the call for education for sustainable development (ESD) integration in TVET" (p. 120). In addition, there was still a vague understanding of what ESD entailed, what its goals were and how it ought to be pursued within TVET institutions. Chinedu et al. (2018), therefore, recommended that; for ESD to become effective and the purpose with which it is meant to serve "it must be holistically integrated into the [TVET] curriculum and institutional practices" (p. 123).

Dogara et al. (2018) did a meta-analysis of 16 articles on available evidences in the literatures about instructional methods employed for the acquisition of skills and the challenges of effective instructional delivery at technical colleges in Nigeria. They used Educational Resources Information Centre (ERIC) to search for relevant published articles using the web

based service providers such as; Science Direct, Wiley Online Library, Springer Link and Google Scholar. Dogara et al. (2018) found out that instructional methods employed for the acquisition of practical skills were “demonstration, lecture, discussion, assignment, multimedia instruction, project-based learning and field trip” (p. 47). They found out challenges affecting effective instructional delivery among others as “inadequate infrastructural facilities, poor funding, dearth of qualified technical teachers, inadequate instructional materials, poor admin/supervision, poor staff development, poor assessment, poor ICT compliance, poor remuneration and poor teaching methods” (p. 48). They also found out a gap that effective 21st century pedagogical approaches were “rarely employed at the TVET institutions for the acquisition of adequate relevant skills by the students” (p. 50). Dogara et al. (2018) hence, recommended that “government should provide the enabling environment for the appropriate implementation of the modern pedagogical approaches for adequate acquisition of practical skills in Technical Colleges” (p. 51)

Kluve et al. (2017) reviewed studies on the impact of youth employment interventions on the labour market outcomes of young people and business performance. The included interventions were, “training and skills development [TVET], entrepreneurship promotion, employment services & subsidized employment (p. 12). They reviewed 113 articles that had been published up to January 2015. Their search process included, “both a primary search (i.e., searching of a wide range of general and specialized databases) and a complementary search (i.e., hand-searching of relevant websites, searching of dissertations, theses and grey literature databases, citation tracking, screening of reference lists and contacting authors and experts)” (p. 18). By use of meta-analytic methodology, Kluve et al. (2017) found out that, overall, youth employment interventions had increased the employment and earnings of those youth who

participated in them. There had been significant effects for “entrepreneurship promotion and skills training, but not for employment services and subsidised employment.” (p. 13). They also found out that, “comprehensive, multi-service training interventions [combining in-classroom with on-the-job training] [had been] more prevalent and worked best in low- and middle-income countries” (p. 149). Under employment outcomes, Kluve et al. (2017) found out that, “employment services interventions [had] provided moderate gains in employment outcomes among young women and men” (p. 158). They also found out that, “overall, subsidized employment interventions [had] reported larger effects on employment outcomes than on earnings” (p. 160).

Kluve et al. (2017), however, pointed out gaps on the studies they reviewed. First, most reports did not provide the information needed to objectively code the information required. Secondly, the methods for calculating comparable effect sizes from studies using more complex multivariate econometric methods had been “underdeveloped and require[d] further research” (p. 173). Thirdly, the existing research had spread unevenly across the globe. While the evidence gathered had been global in nature, capturing 31 countries and all regions of the world, slightly more than half of the evidence had been “derived from interventions in high-income countries” (p. 175). Fourthly, the evaluations of youth employment interventions in low- and middle-income countries had concentrated on rather small-scale, NGO-implemented interventions and there was, “lack of evidence for larger, nationwide governmental programmes” (p. 175). Therefore, much remained to be done to “improve the research and reporting standards and generate more and better evidence about the impact of youth employment interventions” (p. 176). Accordingly, Kluve et al. (2017) recommended that there was need to strengthen the evidence base with more studies of promising programmes, especially in sub-Saharan Africa.

McGrath et al. (2019) reviewed literature that contributed to the theorisation of approaches to VET for the development of Africa, since the (then) current theoretical approaches to VET were not up to the challenge. They first reviewed the past studies by examining the major strands of the existing VET literature in/on Africa and critiquing them. Secondly, they imagined "the future by offering a reflexive attempt to contribute to a transformed and transformative way of thinking about VET and sustainable development" (p. 1). McGrath et al. (2019) provided five theoretical approaches they believed if adopted could ensure an effective VET for a balanced, economic, human and sustainable development in Africa. First is sustainable development approach which should encompass; African agro-ecology/sustainable agriculture; participatory, inclusive knowledge formation; boundary-crossing learning and just transitions. Second is, policy, systems and institutions, which should encompass; historical processes of formation of VET/skills systems; complex political economies; strong focus on labour markets and productive possibilities. The third is, community development, which should be cognizant of; youth and inclusion focused, local labour market realities and possibilities; local attitudes and aspirations. The fourth is on critical capabilities, which should encompass; agency and aspiration; experiences of poverty and marginalisation; decent work for human flourishing. Lastly is the Vocational Knowledge approach which should take into consideration; centrality of knowledge for skills debate, importance of different forms of knowledge for VET transformation.

Tripney et al. (2013) reviewed literature on the effects of TVET interventions for young people in developing countries so as to inform policy, practice, and research. They examined the effects of five TVET interventions, namely; technical education, vocational education, vocational training, on-the-job training and apprenticeship training. They reviewed 26 studies published between 2000 and 2011, which they searched from *Education Resources Information*

Center (ERIC) and other bibliographic databases. By use of meta-analytic techniques Tripney et al. (2013) found out that, "the overall mean effect of TVET on paid employment [had been] positive and significant. The overall mean effect of TVET on formal employment [had been] positive and significant" (p. 9). They also found out that, "the overall mean effect of TVET on earnings [had been] positive and significant. The overall mean effect of TVET on self-employment earnings [had been] negative and non-significant [and] the overall mean effect of TVET on the number of weekly hours worked [had been] positive but non-significant" (p. 10). Tripney et al. (2013), therefore, concluded "it [was] both important and worthwhile to continue to invest in TVET provision for youth in developing countries" (p. 12). Tripney et al. (2013), however, pointed out two gaps on the studies they reviewed. First there was, "overall scarcity of robust evidence, as [had been] indicated by the relatively few studies that met the inclusion criteria" (p. 77). Secondly, "only a very small proportion of the many TVET interventions [then] in operation in developing countries around the world [had] been rigorously evaluated" (p.77). They recommended that, "to build the evidence base further, many more of the TVET interventions [then] currently in existence in developing countries need[ed] to be rigorously evaluated, and the results reported and disseminated efficiently" (p. 12).

Tripney and Hombrados (2013), "examined the evidence from studies [that had] evaluat[ed] the impacts of [20 different] TVET interventions for young people in low- and middle-income countries (LMICs)" (p. 1). Among the intervention types that they evaluated were; "technical education, vocational education, vocational training, on-the-job training and apprenticeship training" (p. 6). Tripney and Hombrados (2013) reviewed 26 articles which they searched from seven data bases of *Applied Social Sciences Index & Abstracts (ASSIA);* economic full-text journal database titled, *Econlit, Education Resources Information Center (ERIC),*

International Bibliography of the Social Sciences (IBSS), medical literature analysis and retrieval system online, titled *Medline,* psychological literature data base, titled *PsycINFO,* and *Social Sciences Citation Index (SSCI).* By use of meta-analytic methods, Tripney and Hombrados (2013) found out that, "the overall mean effects on overall paid employment, formal employment, and monthly earnings were small, positive, and significant (p. 1). Thus, for the three outcomes (i.e., overall paid employment, formal employment, and earnings), the grand mean provided some evidence that "the TVET interventions [had been], on average, effective" (p. 7). They also found out that participation in TVET had on average, improved the labour market situation of youth, compared to the youth who had not participated in the interventions. Tripney and Hombrados (2013) thus concluded that, "it [was] worthwhile to continue investment in TVET provision" (p. 10).

Tripney and Hombrados (2013), however, pointed out a number of gaps on the studies they reviewed. First, despite renewed investment in TVET and increased pressure for evidence-based decision-making, there remained "an overall scarcity of research in [TVET]" (p. 8). Secondly, the methods for calculating comparable effect sizes from studies using complex econometrics methods, as used in their review were "under-developed and require[d] further research" (p. 9). Thirdly, no high quality studies had been identified and some of the methodological concerns associated with those that had been included meant that the studies had, "yielded biased estimates of treatment effects" (p. 9). They concluded that, there was a clear need for "additional primary research in the area [of evaluating the impact of TVET]" (p. 10). Tripney and Hombrados made two critical recommendations. First, "the methodological shortcomings of the [then] current evidence base, and specific knowledge gaps, suggest[ed] a number of future research priorities" (p. 10). Secondly, ''the commissioning of randomised

controlled trials (RCTs) and robust quasi-experimental designs (QEDs) [were] crucial for generating evidence capable of supporting causal claims" (p. 10).

Venatius et al. (2020) reviewed 16 studies on the effectiveness of instructional models in teaching and learning technical skills in TVET. Their search process were conducted in databases of *Web of Science, Google, Scholar, Research gate, Academic Search Premier, Econ Lit, ProQuest, Scopus, Universiti Teknologi Malaysia, UTM Library and Chinese National Knowledge Infrastructure (CNKI),* involving both published and unpublished articles through electronic search. Using a qualitative analysis using Revman 5.3 software, based on their research questions,

Venatius et al. (2020) found out that, "using instructional models in teaching and learning improve[d] the students' technical skills in TVET courses" (p. 4313). They also revealed that the instructional models, "contributed significantly to the positive variation in students achievement test scores" (p. 4320). Venatius et al. (2020) however reported gaps from the studies they reviewed. First, they had limited their inclusion criteria on articles published in English only. It is possible that, "some articles published in other languages [could have] been missed" (p. 4319). Secondly, the quantitative evidence of their review "did not include the interaction effect of instructional models and lesson duration on students' achievement test scores" (p. 4319). They recommended other researchers to do a review study on the interaction effect of instructional models & lesson duration and teachers' qualification & students" achievement test scores.

Yasin et al. (2013) identified and reviewed the then current trends and latest issues of choice in the field of research that had been published in TVET. They reviewed 43 articles, which they searched from the *Journal of Vocational Education and Training (JVET); Education and Training (E & T); Journal of European Industrial Training (JEIT);* and *Evaluation &*

Research in Education (E & RE), and which had been published in a span of five years (2007-2011). By use of content analysis, Yasin et al. (2013) made two critical findings. First, the issues that had been most commonly discussed were; apprenticeship, evaluation, and use of ICT in TVET. From these three issues, "apprenticeship [had been] most frequently studied" (p. 248). Secondly, "the quantitative research method and survey research design [had been] used the most, while interviews [had been] the most commonly used data source" (p. 248) as compared to the questionnaire and document analysis methods. Yasin et al. highlighted one gap that, the development of high quality and up-to-date ICT-based teaching products paused the main challenge in then TVET field. They recommended that, "as a consequence of the emerging issues in TVET [i.e. apprenticeship, evaluation, & ICT in TVET], educational institutions concerned with TVET must empower it by encouraging more research in the field so as to fulfil current and future demands.

Yi Shi1 and Bangpan (2022) investigated young people's learning process and consequences of TVET participation in Low and Medium Income Countries (LMICs). They reviewed 31 published and unpublished studies from 2000 to 2019, which they searched from bibliographic databases including; "Applied Social Sciences Index and Abstracts, Education Resources Information Centre, SCOPUS, and Social Sciences Citation Index)" (p. 4). Yi Shi1 and Bangpan's review revealed that TVET participation had a multi-dimensional impact on young people's learning process. Firstly, "most participants increased their cultural capital in the forms of skills and knowledge, credentials or socio-emotional competencies. Secondly, TVET enabled many participants to accumulate social capital which were a valuable asset in LMICs. That is; the bonding and bridging of social capital developed through peers, staff, instructors and alumni, which supported young people's development professionally and emotionally. The other

was, “the family and community, though external to interventions, had a decisive influence on young people’s learning and wellbeing” (p. 32).

Thirdly, Yi Shi1 and Bangpan (2022) found out that, the participants’ economic experiences were closely related to their cultural capital and were dependent on the intervention type and participant characteristics. They revealed that interventions, “especially short-term skills training, added the most extra value to the livelihoods of vulnerable youth…” (p. 32). Fourthly, the review found mixed evidence on participants’ aspirations and capability to aspire. Empowered by accumulated cultural and social capital, many participants aspired to “achieve upward socio-economic mobility through educational and professional pursuits. By contrast, some other participants were disoriented due to the lack of clear pathways and harsh reality...” (p. 32). Lastly, based on limited evidence from three studies they reviewed, Yi Shi1 and Bangpan (2022) found out that, while TVET participation diverted some participants from health risks and enabled them to acquire healthy practices, some young people “experienced physical and psychological burden due to a heavy workload” (p. 32).

Shi1 and Bangpan (2022) also pointed out some limitations on the studies they reviewed that, the search they used was limited to studies written in English and that; due to the reviewers’ limited resources, the search of grey literature was constrained to key gateways and organization websites. This could have had effect on the results of their reviews. Shi1 and Bangpan (2022) made two recommendations for the attention of future researchers in TVE. First that; future empirical studies could leverage on their findings as a starting point to identify key domains of TVET’s impact relevant for local contexts and employ a longitudinal and rigorous design to establish any association. Secondly, comparative studies could be conducted to identify effective components of different TVET types and contextual factors contributing to participants’ positive

experiences. They further highlighted that, more focused evidence was needed to, “understand the experiences of the most disadvantaged participants” (p. 34).

In summary, the systematic reviews above, demonstrated positive effects of TVET on skill acquisition, employability, and socio-economic development. However, persistent gaps included inadequate integration of sustainable development, limited rigorous evaluation of TVET programs, underutilization of modern pedagogical methods, and insufficient evidence from LMICs. These gaps justified further research on TVET related programs in universities, particularly in Uganda, to inform policy, improve TVET related program delivery, and strengthen alignment with national development goals.

2.3.3 Empirical Studies on TVET in Relation to its Components. In the subsections that follow, is a summary of empirical studies on TVET, categorised according to the four components of TVET in this study (i.e., inputs, transformation mechanisms, outputs and the environment) as denoted in the theoretical framework (Figure 2.1):

2.3.3.1 Empirical Studies in Relation to Students, Academic Staff, Finances and Educational Facilities as inputs to TVET. Researchers have conducted studies on TVET in relation Students, Academic Staff, Finances and Educational Facilities as inputs to TVET. In Table 2.3, is a summary of some of such studies:

Table 2.3

Summary of Empirical Studies in Relation to Students, Academic Staff, Finances and Educational Facilities as inputs to TVET

Authors (Year) & Title	Aim	Methodology: Samples, their Sources & Analysis	Results	Gaps and Recommendations
Douse, & Uys. (2019). TVET teaching in the time of digitization.	"This chapter focuses upon the emerging roles of TVET instructors, as the sector (sub-sector) enters, experiences, affects, and is affected by the digital age. It assesses how best these key concierges of skills development may be prepared to deliver and facilitate the building of capacities in effective and imaginative response to the rapid and accelerating changes in technologies, economies, labor markets, personal aspirations, and the nature of work" (p.	Documents analysis on: "Digital Revolution" (pp. 25-26, 1st sentence of para 3, under The Evolving World and the Embryonic World of Work). "TVET"s Status in This Digital Age" (p. 27, last sentence of para 1, under TVET"s Status in This Digital Age). "Soft Skills for the Digital Age" (p. 29, sentences 1-2 of para 1, under Soft Skills for the Digital Age). "Open TVET Learning" (Last sentence of para 2, under Open TVET Learning) "TVET Instructor Preparation" (p. 35, 1st sentence of para 3, under TVET Instructor Preparation) "Document analysis on automation and robotics and its consequences on professions" (p. 25, sentences 2-3 of Para 1, under The	"Digitization enables and requires the transformation of not just the scope, delivery, and effectiveness of TVET, but, even more fundamentally, enables the creation of comprehensive, open, and non-discriminatory arrangements that bestow both work-related and life-related learning possibilities upon the entirety of humanity, and at last fulfils skills development"s reach and purpose" (p. 36, 1st sentence of para 3, under Conclusion). "The central challenge is that of conceptualizing and creating TVET structures and arrangements appropriate to the dramatically new circumstances of these present and the forthcoming times" (p. 36, 1st sentence of para 2, under Conclusion).	This study however focused on one aspect of TVET, that is, the transformation mechanism of TVET and was void of the other aspects such as inputs to TVET, outputs to TVET and the environment in which TVET operates.

	24, Chapter 1, under Introduction)	Evolving World and the Embryonic World of Work).		
Ddungu-Kafuluma (2014). A review of the quality of technical teacher training in Uganda: Implication for global competitiveness.	'This paper explores what globally competitive technical teacher training should be and the extent to which technical teachers in Uganda are globally competitive" (p. 27, sentence 4, under Abstract).	"The paper begins by presenting a theoretical framework on globally competitive technical teacher training, then, reviews literature on effective training programs for TVE teachers, and briefly discusses the materials and methods" (p.28) "This paper is based on two theories … theory-practice interaction theory of Korthagen and Kessels (1999) and the Parallel technical and teacher training theory of McIntyre (1993)" (p.28)	<u>Training Facilities</u> "Due to limited government support, all TVE teacher training institutions observed lack modern technology training facilities. Some training institutions did not even have any technical workshops. In universities, teacher trainees did not get opportunity to have practical training" (p. 32, sentences 1-3 of para 1, under Training Facilities). Conclusion and Recommendations "…technical teacher training in Uganda still falls far below international standards. The paper advocates a complete rethinking of design, implementation and evaluation of TVE teacher training in Uganda if it is to train globally competitive teachers" (p. 33, sentences 2-3, under Conclusion and Recommendations). "TVE teacher	Being a driven study, the findings of Ddungu-Kafuluma (2014) fell short of addressing all the PESTLE components of the environment in which TVET operates in universities as spelled out in this study.

			training in Uganda should provide a high degree of functionality in ICT and technological processes and equip teacher trainees with the ability to impart generic learning skills to students through their instruction and organization of learning processes" (p. 33, 1st sentence of para 2, under Conclusion and Recommendations).	
Enamudu, Oladunmoye & Okoye (2024). Strengthening TVET to meet industry needs in the changing world of work: Implications for counselling.	"Thus, the current study will critically examine the status of TVET and the place of counseling in achieving TVET objectives in Nigeria. Also, the role of TVET counselling in helping to ensure that the skills and knowledge acquired through TVET are applicable and desired by employers in the changing world of work" (p. 23, last para, under Abstract).	The authors reviewed literature on "counselling, industry needs, technical vocational education and training" p. 23, key words, under Abstarct).	"Despite the significant contributions of counselling to education, … it is faced with myriads of Challenges thereby limiting effective service delivery in schools. Among them are inadequate, limitation of skilled administrative manpower and inadequate training facilities, lack of public interest, and outdated or inaccurate information (Mercy, et al. 2022). … Nigeria Government should as a matter of urgency should reposition counselling for effective service delivery like what is obtainable in Germany, Denmark, and France among others" (p. 26, para 3).	These suggestions are offered in light of the evaluated literature: In Nigeria's context, adequate funding should be made available for TVET programme. Counselling should be reinforced for effective service delivery through adequate funding and the employment of competent personnel. Government should embark on public sensitisation against negative perceptions towards TVET as it is usually considered to be meant for poor academic students. Emphasis should

				also be on training and retraining TVET teachers to expose them to contemporary TVET teaching pedagogies" (pp. 26-27, Subsection, titled Recommendations).
Makinde & Bamiro (2022). Service quality of teaching vocational education and training (TVET) and student's satisfaction in Nigeria	"This study aims at assessing the student's experience of service quality of TVET in the Federal Polytechnic Ilaro, Nigeria" (p. 10, 2nd sentence, under Abstract)	"The study adopted descriptive research design through administration of questionnaire to sampled respondents. The population of the study comprise of 10,250 students during the 2021/2022 academic session… The study adopted multistage sampling technique" (p. 15, 1st Sentence, under subsection titled Material and Method)	"The study discovered that the students who were satisfied with service quality of TVET based on; physical facilities, comfortable classroom, adequate academic resources and appearance of physical facilities are highly ranked tangibility. Lecturer's good knowledge, lecturer's politeness and security measures are highly ranked in assurance and support staff fairness, lecturers sincere interest on student and lecturer's teaching capability are highly ranked reliability. Also, lecturer's adequate capacity, treatment of complaints by student and support staff availability are highly ranked responsiveness and, polytechnic fair treatment, support staff attention to students and lecturer's support to individual students are highly ranked empathy" (p. 22, Sentences 1-3, under Conclusion)	"The study recommends that management should strengthen area of advantages in their TVET training to improve the performance and ranking of the institution in Africa and the world. Management should collaborate with private investors to improve physical facilities for TVET training in the institution for socio-economic development of the country. Management should continuously measure student's experience of TVET training to maintain high standard identified presently in the institution" (pp. 22-23, last 3 sentences under Conclusion).
Okumu & Bbaale (2018). Technical and vocational education and	"This article undertakes a diagnostic study of the Technical and Vocational	"We undertook a cross-sectional pre-	Strengths "… private hospitals, garages, construction companies and factories have offered TVET	

training in Uganda: A critical analysis.	Education and Training (TVET) sub-sector in Uganda, with a view to characterizing the sub-sector and identifying its potential strengths and weakness" (p. 735, 1st sentence under Abstract). "This article has sought to understand the nature of skills development in Uganda's TVET sub-sector in order to identify areas that need to be streamlined and strengthened." (p. 747, 1st sentence under Conclusions).	survey of key stakeholders in the TVET sector to develop a situational analysis of the sector in terms of its strengths and weaknesses" (p. 740, 1st sentence of para 1, under section 3, titled Research Design). "The quantitative data was Collected through a stakeholder-specific structured questionnaire. Qualitative data was collected through desk review, field visits, individual interviews and focus group discussions (FGDs). The qualitative data was analysed using thematic and	students an opportunity to practise what is learnt at the TVET institutions" (p. 746, 2nd sentence under Private-Sector Engagement in Training). "… through real-life projects TVET training institutions are linking up with communities to develop infrastructure that a particular community needs…The symbiotic relationship ensures that students gain practical experience while the community gains infrastructure at no cost of labour" (p. 747, 2nd para under Community Engagement). "… the limited interaction between the Ministry of Education and Sports and TVET institutions leads to inadequate understanding of TVET needs and perhaps funding requirements… the funding allocation is insensitive to the changing technological environment and more broadly the training needs of TVET students" (p. 742, sentences 2-3 of para 1, under Organizational Management of TVET). Weaknesses "… financing and planning constraints have resulted in poor quality equipment, under- and ill-trained staff, limited adoption of a competence-based education and training

	content analysis" (p. 740, last sentence of para 2, under section 3, titled Research Design)..	(CBET) curriculum, [and] supervision inadequacies of TVET institutions" (p.735, sentence 6, under Abstract). "Curriculum reform and a new curriculum have not, however, been accompanied by recruitment of the requisite tutors in government TVET institutions. Rather, tutors who have an understanding of the new courses are typically expected to be instructors, which limits the uniform implementation of the new curriculum" (pp. 740-741, sentences 1-2 of para 3, under Curriculum). "Uganda's educational structure is generally characterized by what is sometimes termed 'the degree syndrome.' … individual would still enrol at university for a sense of achievement, even though university education is more theoretical than practical" (p. 746, para 1 under Public Perception of TVET).

According to Table 2.3, Douse and Uys (2019) examined the emerging roles of TVET instructors in the context of the digital age. They did document analysis of studies on digital revolution, TVET's status in the digital age and TVET instructor preparation. Among others,

Douse and Uys (2019) found out that digitization enabled and required the transformation of the scope, delivery, and effectiveness of TVET, hence ensuring quality outputs (i.e., TVET graduates). They however, pointed out a challenge that needed to be navigated by policy makers and managers of TVET; that of, "conceptualizing and creating TVET structures and arrangements appropriate to the dramatically new circumstances of these present and the forthcoming times" (p. 36). Douse and Uys (2019) also pointed out a gap for future researchers that, "creativity in TVET was an area where limited research findings [were] available" (p. 30).

Ddungu-Kafuluma (2014) explored what globally competitive technical teacher training should be and the extent to which "technical teachers in Uganda [were] globally competitive" (p. 27). He reviewed literature on effective training programs for TVET teachers, based on two theories; theory-practice interaction theory of Korthagen and Kessels (1999) and the parallel technical and teacher training theory of McIntyre (1993). On training facilities as inputs to TVET, Ddungu-Kafuluma (2014) revealed that due to limited government support, all TVET teacher training institutions experience; "lack of modern technology training facilities. Some training institutions did not even have any technical workshops. In universities, teacher trainees did not get opportunity to have practical training" (p. 32). Given the critical role educational facilities play as inputs to TVET, it is imperative that every TVET institution, more so universities, are well facilitated to standard as stipulated in (NCHE, 2001, (pp. 877-878). Based on this, Ddungu-Kafuluma (2014) advocated for a complete rethinking on the design, implementation and evaluation of TVET teacher training in Uganda, if it is to train globally competitive teachers.

Enamudu et al. (2024) examined the status of TVET and the place of counselling in achieving TVET objectives and ensuring that, "the skills and knowledge acquired through TVET

are applicable and desired by employers in the changing world of work" (p. 23). Thy reviewed literature on counselling, industry needs, technical vocational education and training in the context of Nigeria and found out that counselling in TVET institutions was faced with myriads of challenges thereby limiting its effective service delivery. Among them were, "limitation of skilled administrative manpower and inadequate training facilities, lack of public interest, and outdated or inaccurate information" (p. 26). Enamudu et al. (2024) made one recommendation related to the inputs of TVET in this study (i.e., academic staff) that, emphasis should be on "training and retraining TVET teachers to expose them to contemporary TVET teaching pedagogies" (pp. 26).

Makinde and Bamiro (2022) assessed the student's experience of service quality of TVET in the Federal Polytechnic of Ilaro, Nigeria as a case study. Their study adopted descriptive research design through administration of questionnaire to 10,250 students during the 2021/2022 academic session, sampled using multistage sampling technique. The study found out that; the students who were satisfied with service quality of TVET ranked, "physical facilities, comfortable classroom, adequate academic resources and appearance of physical facilities" (p. 22) as tangibility. Students also highly ranked, "lecturer's good knowledge, lecturers' politeness…support staff fairness, lecturers' sincere interest on students" (p. 22) as security and assurance to them (students). On the other hand, students ranked lecturers' teaching capability as their reliability. Students also ranked lecturers' adequate capacity, treatment of students' complaints and support staff availability as being responsive to them (students). At institutional level students ranked, "polytechnic fair treatment, support staff attention to students and lecturers' support to individual students" (p. 22) as empathy. The study recommends that management should strengthen area of advantages in their TVET training to improve the

performance and ranking of the institution in Africa and the world. Makinde and Bamiro (2022) made two recommendations. First, that, “management should collaborate with private investors to improve physical facilities for TVET training in the institution for socio-economic development of the country” (p. 22). Secondly, management should endeavour to continuously measure student’s experience of TVET training to maintain high standards in the institution.

Okumu and Bbaale (2018) undertook a cross-sectional pre-survey study of key stakeholders in the TVET sector in Uganda. By use of thematic and content analyses, they found out that financing and planning constraints had resulted in “poor quality equipment, under and ill trained staff, limited adoption of a competence-based education and training curriculum, and supervision inadequacies of TVET institutions” (p. 735). They in addition revealed that, there was limited interaction between the Ministry of Education and Sports and the TVET institutions. This led to inadequate understanding of TVET needs and funding requirements. Moreover, the funding allocation was “insensitive to the changing technological environment and more broadly, the training needs of TVET students’’ (p. 742). On the curriculum reform and the new curriculum (at the time), Okumu and Bbaale (2018), reported that the reforms had not been accompanied by a corresponding recruitment of the requisite instructors in government TVET institutions, hence, implementation of the new curriculum was at stake. In summary, all the empirical studies (Douse and Uys, 2019; Ddungu-Kafuluma, 2014; Enamudu et al., 2024; Makinde and Bamiro, 2022, Okumu & Bbaale, 2018) reported related findings of a negative picture on the state of inputs to TVET. Their findings were useful in refining and repositioning this study.

The reviewed empirical studies in this section, collectively demonstrated that the effectiveness of TVET systems was strongly conditioned by the adequacy and quality of key

inputs. Across different national contexts, the studies revealed persistent systemic constraints, including inadequate and outdated training facilities, insufficient and underprepared academic staff, weak financing and planning frameworks, and limited responsiveness of TVET institutions to technological change and labour market demands. Although these studies provided valuable insights into the state of inputs to TVET, they largely focused on stand-alone TVET institutions or non-university contexts, thereby leaving limited empirical evidence on how similar input related challenges manifested within the TVET related programmes in universities, particularly in Uganda. This gap justified the need for the present study, which sought to examine the state of students, academic staff, finances and educational facilities as inputs to TVET related programmes in Ugandan universities.

2.3.3.2 Empirical Studies on TVET in Relation to the Transformation Mechanisms of TVET in terms of Academic Staff/Students Contact Hours and Learning. Researchers have conducted different studies on TVET in relation to the transformation mechanisms of TVET. Table 2.4 I is a summary of such studies:

Table 2.4

Summary of Empirical Studies in Relation to Academic Staff/Students Contact Hours and Learning as the Transformation Mechanisms of TVET Related Programmes

Authors (Year) & Title	Aim	Methodology	Results	Observation of Gaps: Recommendations
Dobrydina, Usvyat, & Shipilova (2019). Information and communication technologies (ICT) in VET in Russia: New developments.	"This chapter highlights how modern information and communication technologies, being both a goal and a means of training in VET, open up new learning opportunities and contribute to the formation of key competencies of future specialists to satisfy the demands of present-day labor market with a focus on TVET in the Russian Federation'' (p. 63, senesce 4, under Abstract)	Document analysis on the influence of ICT in Russia	"A lot of new professions have emerged in the modern labour market and this has led to the necessity of new competencies development'' (p. 64, 2nd last sentence under Abstract). "The system of Russian vocational education and training is now being reformed and modernized by changing its structure, updating the content of education, and improving the quality of management. In the context of these innovations, ICT tend to have double-use nature in VET: they are treated as a purpose of training (the use of ICT is an essential element of labor functions of any professional) and as a means of training (the use of ICT makes the study process more effective). Integrating modern information and communication technologies into VET is certain to be an important driving force promoting vocational	Although this study touched on all the aspects of TVET in regard to this study, its context was in the Russian Federation, leaving a gap on TVET in the Ugandan universities.

			education and, consequently, providing in future the economic and cultural growth of the society'' (pp. 74-75, last sentence of para 3, under Conclusion).	
Enamudu, Oladunmoye & Okoye (2024). Strengthening TVET to meet industry needs in the changing world of work: Implications for counselling.	"Thus, the current study will critically examine the status of TVET and the place of counseling in achieving TVET objectives in Nigeria. Also, the role of TVET counselling in helping to ensure that the skills and knowledge acquired through TVET are applicable and desired by employers in the changing world of work" (p. 23, last para, under Abstract).	The authors reviewed literature on "counselling, industry needs, technical vocational education and training" p. 23, key words, under Abstarct).	"Despite the significant contributions of counselling to education, …it is faced with myriads of Challenges thereby limiting effective service delivery in schools. Among them are inadequate, limitation of skilled administrative manpower and inadequate training facilities, lack of public interest, and outdated or inaccurate information (Mercy, et al. 2022). …Nigeria Government should as a matter of urgency should reposition counselling for effective service delivery like what is obtainable in Germany, Denmark, and France among others" (p. 26, para 3).	These suggestions are offered in light of the evaluated literature: In Nigeria's context, adequate funding should be made available for TVET programme. Counselling should be reinforced for effective service delivery through adequate funding and the employment of competent personnel. Government should embark on public sensitisation against negative perceptions towards TVET as it is usually considered to be meant for poor academic students. Emphasis should also be on training and retraining TVET teachers to expose them to

				contemporary TVET teaching pedagogies" (pp. 26- 27, Subsection, titled Recommendations).
Jjuuko, Tukundane, & Zeelen, (2019). Exploring agricultural vocational pedagogy in Uganda: Students experience.	"With Ugandan students" voices, this article examines some of the methodological dilemmas of agricultural education and training- [AET]." (p. 238, sentence 2, under Abstract). '	"The article draws on evidence from a qualitative case study of a public agricultural college that we conducted from February 2016 to September 2017" (p. 243, 1st sentence under Methodology) "We transcribed and organised the interview voices and the recordings … Analysis of evidence followed an iterative, qualitative data analysis procedure. This was undertaken using atlas.ti qualitative data analysis software" (p. 244, last para under Methodology).	"However, according to the majority students, teaching at the case study college is characterised by excessive theory; a phrase they use to mean classroom instruction without a connection to reality" (p. 244, sentences 2-3 of para 1, under Theory and Practice Integration). "… students mentioned industrial training (work placements) and study visits as the most common strategies that the college employs to expose them to the world of work realities" (p. 245, sentence 1 of para 1, under Work-related Teaching Strategies). "According to all students, lecture is the common teaching-learning method at the case study college. The majority of students contend that the quality of lecturing is wanting and that it is mostly characterised by supply of handouts (lecture notes)" (p. 246, sentence 1 of para 1, under Lecture as the Common Teaching Method).	Study by Jjuuko et al., (2019) was limited to an agricultural college (tertiary institution). It did not therefore give insight into TVET in Ugandan universities
Sannerud (2019). vocational	"… This research-based masters programme aims to play in helping	*Work-process analysis* "Based on the outcome of the meetings and symposia, several	"Overall, the programme was successful; 58 students from Uganda and Sudan graduated,	"However, a number of the masters theses produced by

pedagogy.	develop a sustainable vocational education system in Uganda" (233, 3rd sentence of para 2). The masters course was established to improve knowledge about VET and build capacity for research and development in the sec- tor	internal workshops were held to build action-oriented research capacity among academic staff in the Faculty of Vocational Education at KyU.	and considerable capacity was built among the academic staff who delivered the programme. Indeed, graduates of the programme have already been instrumental in improving the VET sys-tem in both the public and the private sector" (p. 236, sentences 2-3 of para 1, under, The 'new" masters degree in vocational pedagogy). "Despite a number of challenges, graduates of the masters programme have qualifications that will contribute to the gradual development of VET" (p. 246, sentence 4 of para 4, under Reflections and conclusion).	graduates of the NOMA programme highlighted the need for updated training in the VET system, and for stronger collaboration between education institutions and employers" p. 236, 1st sentence of para 2).

The reviewed empirical studies demonstrated that the effectiveness of TVET outcomes was heavily mediated by the quality of transformation mechanisms operating within the training institutions. From Table 2.4, Dobrydina et al. (2019) examined how modern information and communication technologies (ICTs) had opened up new learning opportunities and contributed to the formation of key competencies of future TVET specialists. Dobrydina et al. (2019) did a document analysis of ten scientific sources on informatization of education and seven other studies by the Russian scientists on the integration of ICT in TVET and the influence of ICT tools on the effectiveness of teaching in TVET. Dobrydina et al. (2019) found out that ICTs had tended to have a double-use nature in TVET because they had been treated as both a purpose as well as a means of training. They further found out that a lot of new professions had emerged out

in the modern labour market and this led to the necessity of new competencies development for the future TVET specialists. Therefore, integrating modern ICTs into TVET was certain to be ‘’an important driving force that promoted TVET’’ (pp. 74-75). However, the context of Dobrydina et al. (2019) was in the Russian Federation and may not be informative on TVET in the Ugandan universities.

Enamudu et al. (2024) examined the status of TVET and the place of counselling in achieving TVET objectives and ensuring that, “the skills and knowledge acquired through TVET are applicable and desired by employers in the changing world of work” (p. 23). They made two recommendations related to the transformation mechanisms of TVET in this study. First that, counselling should be “reinforced for effective service delivery through adequate funding and the employment of competent personnel” (27). Secondly, that “government should embark on public sensitisation against negative perceptions towards TVET as it is usually considered to be meant for poor academic students” (p. 27). These are policy oriented recommendations which should ideally benefit policy makers in the TVET sector.

Jjuuko et al. (2019) examined what they termed as “methodological dilemmas of agricultural education and training in Uganda as a case study” (p. 238), with the aim of finding out how the college prepared “its students for the agricultural world of work” (p. 243). They did a qualitative study and drew their findings using students” experiences and by use of thematic analysis approach enhanced by “atlas.ti qualitative data analysis software” (p. 244), Jjuuko et al. (2019) found out that, in general there had been, “limited evidence to suggest effective preparation of students for the agricultural world of work” (p. 247). Lecture, mostly characterised by supply of hand-outs, had been the most common teaching-learning method used by lecturers as opposed to demonstration and farm practice method which integrated both theory

and practice. According to the majority of the students, teaching at the case study college was characterised by *excessive theory*, a phrase they used to mean "classroom instruction without connection to reality" (p. 244). Hence, Jjuuko et al. (2019) concluded that poor pedagogical practices constituted a huge part of the failure of TVET education.

Sannerud (2019) undertook a study to find out whether a research based masters degree programme in vocational pedagogy that had been established at Kyambogo University in 2009, had played its role of building research capacity among TVET students. Based on an action research design, Sannerud (2019) used work-progress analysis approach and found out that, overall, the programme had been successful as "considerable capacity had been built among the academic staff who delivered the programme (p. 236). However, from the quality of the masters theses produced, Sannerud (2019) found out that the TVET graduates had methodological inadequacies. He highlighted the need for further advanced training among the TVET graduates.

All the three studies in Table 2.4 (Dobrydina et al., 2019; Jjuuko et al., 2019; Sannerud, 2019) point a finger at the use of poor pedagogical approaches for instruction in the TVET institutions. This goes against the expected learning outcomes from leaners as advocated by the Kirkpatrick and Kirkpatrick (2019). In their training evaluation level 2, titled learning, Kirkpatrick and Kirkpatrick (2019), highlight that the learning evaluation level 2, measures the degree to which participants acquire the intended knowledge, skills, and attitudes based on their participation in the learning event. Measurement of this level reveals how training develops the skills, attitudes and knowledge, as well as the confidence and commitment of leaners. According to Kirkpatrick & Kirkpatrick (2019) the training evaluation level 2 also measures what participants think they'll be able to do differently as a result of the training. For example, in the case study college by Jjuuko et al. (2019), supply of hand-outs which was commonly used by the

lecturers as the teaching-learning method, was seen to be responsible for the poor learning outcomes, hence ineffective preparation of students for the agricultural world.

However, there was also evidence of effective transformation mechanisms in TVET. For example, Jjuko et al. (2019) reported a contrary revelation made by the students that, industrial training (work placements) and study visits were some of the strategies that the college (lecturers) employed to "expose them [students] to the world of work realities" (p. 245). This could have been responsible for the visible learning outcomes among the students of the case study agricultural college by Jjuko et al. (2019).

In summary, the above studies highlighted that learner-centred and practice-oriented transformation mechanisms, including industrial training, study visits, ICT-supported instruction, and structured staff capacity development enhanced competency formation and learner engagement. These findings aligned with Kirkpatrick and Kirkpatrick's (2019) Level 2 training evaluation model, which emphasises the acquisition of knowledge, skills, attitudes, and confidence as central indicators of effective learning. However, the studies predominantly focused on non-university TVET institutions or contexts outside Uganda, with limited empirical attention given to how transformation mechanisms function within TVET related programmes in Ugandan universities. This gap constrained understanding of how TVET related programmes in universities operationalised the teaching, learning processes to achieve desired graduate outcomes. Accordingly, this study responded to this gap by examining the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda

2.3.3.3 Empirical Studies in Relation to Students' Behaviour as Outputs from TVET. Table 2.5, displays a summary of the different studies that investigated on Students' Behaviour as Outputs from TVET:

Table 2.5

Summary of Empirical Studies in Relation to Students' Behaviour as Outputs from TVET

Authors (Year) & Title	Aim	Methodology	Results	Observation of Gaps
Bonvin (2019). Vocational education and training beyond human capital: A capability approach.	"The chapter shows how a capability approach to vocational education and training (VET) marks a clear departure from human capital theories'' (p. 273, first sentence of Abstract).	''The chapter draws from the results of the document analysis on four successive EU projects, namely, the CAPRIGHT project (FP6 2007–2010), the WorkAble project (FP7 2009–2012), the SoCIetY project (FP7 2013–2015), and the ongoing Re-InVEST project (H2020 2015–2019)'' (p. 273-274, last sentence under Abstract).	Under the Capability Approach to vocational education and training (VET) ''Specific emphasis is placed on the issues of timing (giving enough time to learn) and voice (taking account of the trainees' aspirations and viewpoints) and on the necessity to consider VET as having both adaptive and transformative objectives (creating not only efficient workers and rational consumers but also active citizens able to form their own aspirations and to push them within public debates), as well as intrinsic and instrumental value. CA also requires going beyond the all too frequent focus on the supply side of VET (equipping trainees for the market) and integrating also the demand side (equipping the market for trainees, i.e., asking firms and employers to take due account of the trainees' needs and	Whereas Bonvin's study focused on all the four components of TVET (i.e., inputs to TVET, transformation mechanisms, outputs and the environment in which TVET operates) as stipulated in this study, his context was project oriented. His findings may therefore not be representative of TVET in a university setting.

aspirations)'' (p. 273, sentences 3 – 4 of Abstract).

"Thus, capability for education depends on the whole configuration of resources and individual and contextual conversion factors: it is not only a matter of individual motivation or capacity but of how educational systems are designed and what resources are devoted to this end. In other words, developing individual competencies, aspirations, and availability goes hand in hand with the presence of sufficient resources and appropriate social and institutional conditions'' (p. 284, sentences 1-2 of para 7, under Capability for Education" and Its Implications for VET).

"The empirical findings of the WorkAble and the SocIEtY projects have shown that educational measures inspired by the CA perspective may boost the trainees' willingness and motivation to train. As such, the CA perspective on VET may be the most promising avenue toward reconciling educational justice and

			economic efficiency'' (p. 288, last two sentences of the last para, under Conclusion).	
Jwasshaka & Fadila (2020). Minimizing unemployment of graduates through technical education and training	"… this study ex-rayed into causes and effects of unemployment among Nigeria, graduates and how to minimize it" (p.41, 1st sentence under Conclusion).	"Various published journal articles were searched online from an online database of the Educational Resources Information Centre (ERIC) through different network-based service provider. The database includes; Google scholar, Science direct, Wiley online library and Springer link" (p. 38, 1st sentence under Strategies for Data Collection and Analysis). "The published journal papers reviewed were those within the ranges of 2011 to 2018.… only 16 were used… " (p. 38, 1st sentence of para 3 under Strategies for Data Collection and Analysis" "It adopted meta-analysis approach to analyse related published journal articles searched from different data-base provider" (p. 41, 2nd sentence under Conclusion).	[Causes of unemployment] "… the trend still persists because the programs were flawed by lack of supervision, misplace of priority areas and lack of political good will among others" (pp. 39-40, 2nd sentence of para 3, under Causes and Effects of Unemployment). [Effects of unemployment] "… unemployment has negative consequences on the economy and the security stability of any society" (pp. 39-40, 3rd sentence of para 1 under Causes and Effects of Unemployment). "[Unemployment] is the reason for high magnitude of poverty and instability of peaceful coexistence of most societies… " (pp. 39- 40, 4th sentence of para 1 under Causes and Effects of Unemployment). "The society… does not place any value or dignity on graduates anymore" (p. 39-40 1st sentence of para 4, under Causes and Effects of Unemployment).	Gaps from Studies "… most studies carried out focused only on Youths in general regardless of whether educated or not" (p. 39, 1st sentence of para 1, under Causes and Effects of Graduates" unemployment). "…most of the study conducted concentrated on poverty reduction and youths unemployment, neglecting a particular section of the youths who have gone through the four walls of the classroom and has [sic] obtained certificates but are unemployed" (p. 41, 2nd sentence of para 1, under Conclusion). Recommendations "Deeper study can be carried out on the political attachment to this lingering problem of unemployment among graduates in Nigeria" (pp. 41- 42, last sentence of para 2, under Conclusion).

[TEVT: Minimising unemployment]
"… emphasis should be on psychomotor skills rather than cognitive and affective domain only." (pp. 39-40, sentence 3 of para 5, under Causes and Effects of Unemployment).
'... proper funding, planning and organization of TVET Institutions can help minimized graduates" unemployment" (pp. 39-40, 1st sentence of para 2, under Causes and Effects of Unemployment).
"Re-engineering Technical and vocational training centers, TVET programs, training and re-training of TVET personnel will travel a long way in halting the rate of unemployment … (pp. 39-40, last sentence of para 5 under Causes and Effects of Unemployment).

"… effective collaboration of TVET institution with the industry in devising a means to financing, building, managing, preserving and equipping the graduates with the required work skills, unemployment will be a history in Nigeria" (pp. 40-41 last sentence of para 3, under Minimize the

			Rate of Unemployment Among Nigerian Graduates).
Kintu, Kitainge, & Ferej (2019). An Exploration of Strategies for facilitating graduates' transition to the world of work: A case of technical, vocational education and training graduates in Uganda	"The study, we set out to identify different strategies for facilitating TVET graduates' transition to the world of work in Uganda" (p. 1, sentence 2, under abstract).	"A qualitative approach was used to collect data, analyze and present findings. Thirty respondents, comprising of employers of TVET graduates, trainers and officials from: skilling Uganda, Uganda employers' union, Ministry of education officials, and TVET graduates in formal employment were randomly selected and interviewed" (p. 1, sentence 5-6, under abstract).	"The various strategies identified were: use of employment agencies, income generating units at the institutions, institutional-industrial linkages, provision of start-up capital, tools and materials for self-employment, training with production and internship/ industrial attachments programs" (p. 1, sentences 7-8, under abstract) It is recommended that "an active labour market information system be established at TVET institutions to analyze, collect, evaluate and provide labour market information to identify evolving occupations, skills shortages and areas of skills oversupply and redundancy; that there should be an increase in apprenticeship programs and that TVET institutions adopt approaches such as case studies, project-based learning, real life problem-based learning, and teamwork learning activities" (p. 1, sentences 9-11, under abstract).

Matenda (2019). The role of technical and vocational education and training in women's empowerment: A capabilities perspective:	'This study set out to investigate the role of TVET in women's empowerment" (p. 13, last sentence of para 2, under subsection 1.5, titled Rationale of the study).	"The capability approach (CA) is adopted in this research study as an evaluative framework mainly because it brings to the forefront the voices and the perspectives of the women students in TVET" (p. 15, 1st sentence of subsection 1.7, titled Analytical Framework for the Study). "Due to the above reasons, I adopted the qualitative enquiry as I saw that it was best suited to adequately answer the research questions" (p. 114, last sentence of para 2, under subsection 5.1.1 titled Qualitative Research).	"The findings in Chapters 7 and 8 demonstrate that, while TVET institutions in South Africa have made strides in increasing access for women to predominantly male fields, such as engineering, women still find it difficult to navigate the education system owing to challenges, such as male dominance in the learning environment, which lead to feelings of alienation" (p. 248, 1st sentence of para 4, under question 2, titled What are the experiences of women students studying engineering at a TVET college?).	"In addition, despite increases in the enrolments of women in TVET, engineering education remains male-dominated. Most women TVET students are studying business, social care and teaching" (p. 242, sentence 11 of para 2, under Introduction). "Not much research had been done in South Africa on the experiences of women students, which is the focus of this study" (p. 242, sentence 12 of para 2, under Introduction).
Okumu & Bbaale (2018). Technical and vocational education and training in Uganda: A critical analysis.	"This article undertakes a diagnostic study of the Technical and Vocational Education and Training (TVET) sub-sector in Uganda, with a view to characterizing the sub-sector and identifying its potential strengths and weakness" (p. 735, 1st sentence under Abstract). "This article has sought to understand the nature of skills development in Uganda's TVET sub-sector in	"We undertook a cross-sectional pre-survey of key stakeholders in the TVET sector to develop a situational analysis of the sector in terms of its strengths and weaknesses" (p. 740, 1st sentence of para 1, under section 3, titled Research Design). "The quantitative data was Collected through a stakeholder-specific structured questionnaire.	Strengths "… private hospitals, garages, construction companies and factories have offered TVET students an opportunity to practise what is learnt at the TVET institutions" (p. 746, 2nd sentence under Private-Sector Engagement in Training). "… through real-life projects TVET training institutions are linking up with communities to develop infrastructure that a particular community needs…The symbiotic relationship ensures	Weaknesses "… financing and planning constraints have resulted in poor quality equipment, under- and ill-trained staff, limited adoption of a competence-based education and training (CBET) curriculum, [and] supervision inadequacies of TVET institutions" (p.735, sentence 6, under Abstract). "Curriculum reform and a new curriculum have not, however, been accompanied by recruitment of the requisite tutors in government TVET institutions. Rather,

	order to identify areas that need to be streamlined and strengthened." (p. 747, 1st sentence under Conclusions).	Qualitative data was collected through desk review, field visits, individual interviews and focus group discussions (FGDs). The qualitative data was analysed using thematic and content analysis" (p. 740, last sentence of para 2, under section 3, titled Research Design)..	that students gain practical experience while the community gains infrastructure at no cost of labour" (p. 747, 2nd para under Community Engagement). "… the limited interaction between the Ministry of Education and Sports and TVET institutions leads to inadequate understanding of TVET needs and perhaps funding requirements… the funding allocation is insensitive to the changing technological environment and more broadly the training needs of TVET students" (p. 742, sentences 2-3 of para 1, under Organizational Management of TVET).	tutors who have an understanding of the new courses are typically expected to be instructors, which limits the uniform implementation of the new curriculum" (pp. 740-741, sentences 1-2 of para 3, under Curriculum,). "Uganda's educational structure is generally characterized by what is sometimes termed 'the degree syndrome.' … individual would still enrol at university for a sense of achievement, even though university education is more theoretical than practical." (p. 746, para 1 under Public Perception of TVET).
Powell & McGrath (2019). Capability or employability: orientating VET toward	"This chapter forms part of a broader body of work that examines the role that TVET plays and can play in intervening in poverty and does so by engaging the voice and experience of TVET students and youth" (p. 371, 1st sentence of para 7, under Abstract).	"This chapter draws empirically from 30 interviews undertaken with young people living in urban townships in the Nelson Mandela Bay metropolitan in Port	"Drawing on the capabilities approach, this chapter shows that the employability agenda, with its associated emphasis on income poverty, serves in reality to ignore the multiple capability deprivations that affect South African youth living in low socioeconomic status urban townships" (p. 370, 1st sentence of para 3). "It is clear from the above that while work most definitely matters, the	Although Powell and McGrath (2019) in their study appeared to have touched on all the aspects of TVET, their study was premised in South Africa. The peculiarity regarding TVET in Uganda, more so in the universities remain unknown.

			orthodox "skills for employability" agenda simply does not hold within a social justice framework. While it has been presented as a win-win situation for all, the reality is that it has served to maintain unequal access to education, to knowledge, and to work and has done so by doing nothing to challenge the broader structural inequalities that constrain the lives of young South Africans" (p. 389, sentences 1 & 2 of para 1, under Conclusion).	
Wamala (2023). Technical vocational education and training (TVET), employment and poverty in Uganda:	"The general objective of this study is to examine the relationship between TVET, employment and poverty in Uganda" (p. 5, subsection 1.3, titled The General Objective of the Study).	"The study employed a quantitative research approach. Data from 2019/2020 Uganda National Housing was utilised for empirical analysis. Descriptive statistics have been used to display summaries on the key variables and regression analysis has been employed to study the underlying causal relationships. The empirical models are estimated by the discrete choice modelling techniques, namely, the logit, probit, 2LSLS, Ivprobit and biprobit regressions while paying attention to endogeneity concerns" (p. x, sentence 2-4, under abstarct)	"Overall, the study finds that TVET education attainment is a key determinant of employment outcome for the Uganda labour force. In addition results show that TVET education attainment is a significant factor that influences poverty incidence of employed individuals aged 14-64 years" (p. 152, sentences 1-2 of para 4, under subsection 6.1, titled Study Summary). "When the TVET education attainment variable is interacted with various employment quality characteristics, the study finds that, the chances of plunging into poverty by	While Wamala (2023) provides an informed picture concerning TVET, employment and poverty in Uganda, the study did not address the state of TVET in universities in Uganda.

	employees with TVET education attainment significantly increase when they work in agricultural sector rather than working in the services and industrial sector. The study also finds that individuals with TVET education attainment who are employed in paid employment relative to contributing family workers are more likely to fall into poverty relative. Furthermore, the study finds that the chances of individuals falling into poverty reduce when they work with NGO/Embassy rather than working in the government, same as working with registered employment rather than working with nonregistered jobs/employment" (p. 153, sentences 3-5 of para 4, under subsection 6.1, titled Study Summary).

In Table 2.5, Bonvin (2019) examined how capability approach (CA) to technical vocational education and training (TVET) marked a clear departure from human capital theories and boosted production of better outputs (TVET graduates). By use of document analysis Bonvin (2019) drew insights from the results of "four successive EU projects, namely, the CAPRIGHT project (FP6 2007–2010), the WorkAble project (FP7 2009–2012), the SoCIetY project (FP7 2013–2015), and the then ongoing Re-InVEST project (H2020 2015–2019)" (p. 273-274). From the results of the document analysis, Bonvin (2019) found out that under the CA, specific

emphasis was placed on the issues of timing (giving enough time to learn) and voice (taking account of the trainees' aspirations and viewpoints) and on the necessity to consider TVET as having both adaptive and transformative objectives. CA also required going beyond focus on the supply side of TVET (equipping trainees for the market) and "integrating the demand side (equipping the market for trainees, i.e., asking firms and employers to take due account of the trainees' needs and aspirations)'' (p. 273). Bonvin (2019) also reported that the empirical findings of the WorkAble and the SocIEtY projects showed that educational measures inspired by the CA perspective boosted the trainees' willingness and motivation to train. As such, the CA perspective on VET could be, "the most promising avenue toward reconciling educational justice and economic efficiency'' (p. 288).

Jwasshaka and Fadila (2020) reviewed 16 journal articles published between 2011 and 2018 that examined the causes and effects of unemployment among graduates and how to minimize it. They searched the journal articles from an online database of the Educational Resources Information Centre (ERIC) through different network-based service provider. The database included; "Google scholar, Science direct, Wiley online library and Springer link" (p. 38). Using a meta-analysis approach, they revealed "lack of supervision, misplacement of priority areas and lack of political good will" (p. 40), as the major causes of unemployment of TVET graduates. In terms of effects of unemployment, they revealed major effects that unemployment was responsible for the negative consequences on the economies of societies; high magnitude of poverty and instability and that, unemployment had made societies not to place any value or dignity on TVET graduates anymore. As a remedy to unemployment, Jwasshaka and Fadila (2020) made a number of propositions, including; TVET putting emphasis on psychomotor skills rather than cognitive and affective domain; proper funding, planning and

organization of TVET Institutions; re-engineering TVET centres and programs; training and re-training of TVET personnel and effective collaboration of TVET institution with the industry. Jwasshaka & Fadila (2020) pointed a key gap from the studies they reviewed that most of them (studies) focused on Youths in general regardless of whether they were educated or not. I also postulate that the study by Jwasshaka & Fadila (2020) was premised in Nigeria therefore, its findings may not wholesomely apply to Uganda.

Kintu et al. (2019) undertook a study to identify different strategies for facilitating TVET graduates' transition to the world of work in Uganda. They employed a qualitative research approach to collect data, analyze and present findings. They involved 30 respondents, comprising employers of TVET graduates, trainers and officials from; skilling Uganda, Uganda employers' union, MoES officials, and the TVET graduates in formal employment, whom they randomly selected and interviewed. Kintu et al. (2019) identified various strategies for facilitating TVET graduates' transition to the world of work such as; use of employment agencies, income generating units at the institutions, institutional-industrial linkages, provision of start-up capital, tools and materials for self-employment, training with production and internship/industrial attachments programs. In the interest of improving the quality of TVET graduates from institutions, Kintu et al. (2019) made a number of recommendations. First, that an active labour market information system be established at TVET institutions to analyze, collect, evaluate and provide labour market information to identify evolving occupations, skills shortages and areas of skills oversupply and redundancy. Secondly, that there should be an increase in apprenticeship programs and that TVET institutions adopt teaching/learning approaches such as case studies, project-based learning, real life problem-based learning, and teamwork learning activities. Thirdly, that a supportive policy framework to foster the cooperation of industry and

TVET training institutions be formulated because quality TVET depends on the collaboration of industry and training institutions. Fourthly, TVET graduates with inadequate skills be recalled back, to the training institutions to be supported through internship and other skills development programmes to increase their chances of securing employment.

Matenda (2019) examined the role of TVET in womens' empowerment in TVET colleges in South Africa. She used a case study approach and adopted the capability approach as "an evaluative framework" (p. 15). By use of thematic analysis enhanced by NVivo software, Matenda (2019) found out that TVET institutions in South Africa had made strides in increasing access for women to predominantly male fields, such as engineering. However, "women still found it difficult to navigate the education system owing to challenges, such as male dominance in the learning environment, which led to feelings of alienation" (p. 148). Matenda (2019) pointed out some gaps in her study. Her case study (i.e., Acacia TVET College) was an "urban TVET college in one of the provinces of South Africa" (p. 261). Her findings could not therefore be generalised. The women students she interviewed were from one academic programme, that is, the National Accredited Technical Education diploma. Experiences of those women could not be applied on women students in other programmes. Matenda admitted that her research had been influenced by her personal experience and value system, given that she attached a lot of importance to women issues. Although she interviewed male lecturers, Matenda admitted that her study represented views of only women students, leaving out the other critical gender in TVET, men.

Okumu and Bbaale (2018) undertook a diagnostic study of the TVET sub-sector in Uganda. By use of thematic and content analyses, they reported one weakness that related to the outputs from TVET (graduates) that, "Uganda's educational structure [was] generally

characterized by what they termed as *the degree syndrome* where individuals enrolled at university for a sense of achievement, even though university education [was] more theoretical than practical" (p. 746).

Powell and McGrath (2019) examined the role that TVET played and could play in intervening in poverty. They drew empirical findings from 30 interviews which they undertook with young people living in urban townships in the Nelson Mandela Bay metropolitan in Port Elizabeth and those living at Nelson Mandela University in South Africa. Drawing on the capabilities approach, they found out that the employability agenda, with its associated emphasis on income poverty, served in reality to "ignore the multiple capability deprivations that affect[ed] South African youth living in low socioeconomic status urban townships" (p. 370). While employability had been presented as a win-win situation for all, the reality was that it had served to maintain unequal access to education, to knowledge, and to work and had done so by "doing nothing to challenge the broader structural inequalities that constrain[ed] the lives of young South Africans" (p. 389). Although Powell and McGrath (2019) touched on a key aspect of TVET (i.e., employability of TVET graduates), their study was premised in South Africa. The peculiarity regarding TVET in Uganda, more so in the public universities remained unclear.

Wamala (2023) examined the causal relationship between TVET education attainment, employment and poverty in Uganda. Based on quantitative study approach, he used cross-sectional secondary data of the "Uganda National Household Survey of 2019/20" (Uganda Bureau of Statistics [UBOS], 2019) which he obtained from UBOS. By use of both descriptive statistics and regression analysis, Wamala (2023) found out that TVET education attainment was a key determinant of employment outcome for the Ugandan labour. He also found out that the TVET certificate holders had a higher likelihood of escaping poverty by finding jobs in the

industrial and services sector. Wamala (2023) reported a number of problems in the TVET sector. Among them were that, many TVET institutions were facing a challenge of inadequate infrastructure; negative attitudes towards TVET and inadequate funding for the sector. These inadequacies had a bearing on the quality of the TVET outputs (graduates). However, Wamala (2023) concentrated on the causal relationships between the three variables (i.e., TVET, employment and poverty) and did not touch on the state of TVET related programmes in public universities in Uganda.

In summary, the reviewed studies showed that effective TVET outputs were reflected in graduates' readiness for work, adaptability, confidence, entrepreneurial behaviour, and ability to navigate complex socio-economic environments. However, despite the rich insights provided by the reviewed studies, most of the empirical evidence was drawn from non-university TVET institutions, project-based interventions, or contexts outside Uganda. Even within Ugandan studies, emphasis was largely placed on employment and poverty outcomes with limited focus on how TVET-related programmes in universities shaped students' behavioural outputs. This empirical gap underscored the relevance for this study, which examined students' behaviour as outputs from TVET related programmes in Ugandan universities.

2.3.3.4 Empirical Studies in Relation to the political, economic, social, technological, legal and ethical state of the environment in which TVET operates in public universities in Uganda. In Table 2.6, is a summary of studies undertaken by researchers in relation to the environment in which TVET operates:

Table 2.6

Summary of Empirical Studies in Relation to the political, economic, social, technological, legal and ethical state of the environment in which TVET operates in public universities in Uganda

Authors (Year) & Title	Aim	Methodology	Results	Observation of Gaps
Adamsa, Intsiful, Haruna & Essumand (2024). Examining public perception on technical and vocational education and training enrolment in Ghana.	"This study aims to investigate the operations of TVET in the Ayawaso-West Municipality of the Greater Accra Region in Ghana to determine the level of public perception and its impact on enrolment" (p. 147, sentence 4, under Abstract).	"The study employs the impression formation theory as a framework. An exploratory research design and a qualitative research approach were used to conduct the study. Thirty-six participants were selected using a purposive sampling technique" (p. 147, sentences 5-7, under Abstract).	"The findings revealed that the negative perception affecting the progress of the TVET subsector included lower societal recognition, lower job prestige and public ignorance of TVET. The study recommends continuous advocacy for TVET to correct public perception" (p. 147, sentences 8-9, under Abstract). "Therefore, action must be taken in this direction. Firstly, policy should be enacted that will project TVET education. This policy must set agenda that intensified education on TVET through print and electronic media… on the socioeconomic development. "Secondly, Government and other stakeholders should institute programs like TVET quiz and exhibition for students in the TVET schools to showcase their talents… Thirdly policies that	"The study selected qualitative approach and, therefore, used few number of (36) participants, which constrains the generalizability of the findings, and this may be prone to bias (e.g. Gartner, 2007)" (p. 161, 1st sentence under Limitations and implications of the study.)

			regularize and standardize the activities of artisans in Ghana to be developed and enforced. Fourthly, the government should also develop a policy that will grant tax relief for industries that hire TVET professionals, both foreign and local, and such funds should be directed to the development of the sector such as improving infrastructure and environment. Fifth, there should be career guidance and counseling units operational in all high schools to educate and encourage the students to appreciate a career in TVET.	
Aldossari (2020). Vision 2030 and reducing the stigma of vocational and technical training among Saudi Arabian students	"This quantitative study investigates the role of recent socio-economic transformations in changing attitudes toward TVET" (p. 1, 3rd sentence under Abstract).	"This study applied capability theory to quantitatively assess the perceived impact of the economic and social transformations embodied in Vision 2030 among Saudi vocational students" (p. 3, last sentence of para 2). "Although 1016 students completed the questionnaire,	"The results indicate particular optimism for the role that supporting women's participation in TVET can play in reducing the stigma attached to TVET" (p. 21, 1st sentence of papa 2). "Our results also indicate a more optimistic view among students concerning the match between women's skills and technical and vocational jobs…. Therefore, supporting women	"This study has some limitations. The survey failed to ask students about which course they were studying. This information would have been useful in casting more light on the attitudes and responses of students studying different courses within the overall technical sector. This is a limitation which could be taken

		nine were discarded as incomplete, leaving a total of 1007 questionnaires. Following data collection, the responses were analyzed using SPSS version 24.0" (p. sentence 2-3, under subsection titled, Data Collection and Analysis) "This study examined both personal factors (gender, marital status, monthly family income, parental educational level) and social conversion factors (employability policies, income and incentives policies). These two dimensions influence how a person can convert the characteristics of the commodity into a functioning (achievement)" (p. 4, 1st sentence of para4).	through facilitating their needs would positively change their attitudes toward TVET" (P. 21, sentence 3 of para 4) This study can assist policy makers in updating legislation to promote relevant policies related to TVET.	into account by future researchers" (p. 22, sentences 5-5 of para 2). "…this study did not obtain data on current employment rates for TVET Program graduates, including women's employment rates. Future research should expand the sample to include young adults who are either enrolled in non-technical schools or not attending school…" (p. 22, last two sentences of para 2).
Atukwase (2015). Development of vocational	"This paper therefore assesses the role of	"Atukwase (2015). did a document analysis on	"The development of VE in Uganda has always been hampered	Atukwase, A. (2015) was more focused on

education (VE) in Uganda: The potential of internationalisation.	internationalisation towards the development of VE [vocational education] in Uganda." (P. 98, sentences 1 of para 2, under Introduction). "…can internationalisation of VE contribute to development of the sector? How can we organise teaching and learning to cater for the internationalisation aspect?" (p. 98, sentences 2 – 3 of para 1, under Introduction).	published empirical studies on internationalisation and the development of VE" (P. 98, sentences 7 of para 2, under Introduction).	by a number of factors…. as provided hereunder; Weak national economies, shrinking or stagnant wage employment opportunities especially in the industrial sector, huge numbers of poorly educated, unskilled and unemployed youth, uncoordinated, unregulated and fragmented delivery systems, teachers Incompetency (MoES, 2013), low quality VE programmes and stifled academic freedom, poor public perception of VE, geographical, gender and economic, inequities (African Union, 2007; MoES, 2011), changes in the labour market (ILO, 2010) in terms of skills required, technology advancements and globalization threats, weak monitoring and evaluation mechanisms (MoES, 2011) and, inadequate financing, poor management and ill-adapted organisationa" (pp. 99 – 100), sentence 2 of para 3, under Factors Influencing the Development of Vocational Education).	Internationalisation in the context of the development of vocational education.
Ddungu-Kafuluma (2014). A review of the quality of technical teacher training in Uganda: Implication for global	"This paper explores what globally competitive technical teacher training should be and the extent to which technical	"The paper begins by presenting a theoretical framework on globally competitive technical teacher training, then,	Training Philosophy "TVE teacher training in Uganda is still very conservative and oblivious to modern technical training. This makes her graduates less competitive in the global	Being a driven study, the findings of Ddungu-Kafuluma (2014) fell short of addressing all the PESTLE components of the

competitiveness.	teachers in Uganda are globally competitive" (p. 27, sentence 4, under Abstract).	reviews literature on effective training programs for TVE teachers, and briefly discusses the materials and methods" (p.28). "This paper is based on two theories …theory-practice interaction theory of Korthagen and Kessels (1999) and the Parallel technical and teacher training theory of McIntyre (1993)" (p.28).	market" (P. 32, last 2 sentences, under Training Philosophy). Training Facilities "Due to limited government support, all TVE teacher training institutions observed lack modern technology training facilities. Some training institutions did not even have any technical workshops. In universities, teacher trainees did not get opportunity to have practical training." (p. 32, sentences 1-3 of para 1, under Training Facilities). Conclusion and Recommendations "…technical teacher training in Uganda still falls far below international standards. The paper advocates a complete rethinking of design, implementation and evaluation of TVE teacher training in Uganda if it is to train globally competitive teachers" (p. 33, sentences 2-3, under Conclusion and Recommendations).	environment in which TVET operates in universities as spelled out in this study.

			"TVE teacher training in Uganda should provide a high degree of functionality in ICT and technological processes and equip teacher trainees with the ability to impart generic learning skills to students through their instruction and organization of learning processes." (p. 33, 1st sentence of para 2, under Conclusion and Recommendations).
Wang (2016). Rethinking the role of technical and vocational education and training (TVET) in Southeast Asia: A human development approach.	"In light of the current reemphasis on TVET, it is both necessary and important to view TVET through the broader lens of the human development approach and to reshape its development process in order to meet more overarching goals" (p. 2, sentence 3 of para 5, under Introduction).	"…. did a documents review on studies related to a new approach to technical and vocational education (TVE) with a new lens; emphasizing the need to move beyond a narrow focus on skills to include theoretical knowledge and address issues of social inequality" (p. 2, sentence 5 of para 5, under Introduction).	"Through the lens of human development approach, the value of TVET is embedded in its ability to integrate the marginalized groups, enable people to achieve what they value, develop agency freedom, and promote human wellbeing and environmental sustainability" (p. 3, sentence 5 of para 1, under TVET and the Human Development Approach). "In general, TVET schools tend to cluster in places where expected enrolment might be high due to its high unit cost, resulting in limited access to students from the marginalized groups. Large discrepancies in the quality of education are also observed between schools in

	urban and rural areas" (p. 4, sentences 1-2 of para 1, under Integrating ICT in TVET), "In all cases, ICT-enabled learning technologies allowed TVET to overcome the constrains of unequal distribution of physical educational resources, underqualified teaching personnel and learning challenges faced by individuals. By bringing quality education to students, ICT-enabled TVET optimizes their learning experiences and ensures equitable opportunities in acquiring skills, knowledge and capacities for economic, social and political empowerment. While the integration of ICT into TVET directly addresses the targets for SDG4 Quality Education and SDG8 Decent Work and Economic Growth, it also has strong connections to SGD5 Gender Equality, particularly Target5.5 and SDG10 Reduced Inequalities, particularly Target10.1, 10.2 and 10.7" (p. 8, sentence 2 of para 1, under TVET and the SDGs). "By adopting the human development approach, TVET institutes will be able to access funding that serves the far-reaching goals of development and policy makers will be able to

	recognize the value of TVET beyond the narrow range of economic indicators to its broader social cultural and environmental implications" (p. 9, sentence 4, under Conclusion).

In Table2. 6, Adamsa et al. (2024) investigated the operations of TVET in the Ayawaso-West Municipality of the Greater Accra Region in Ghana to determine "the level of public perception and its impact on enrolment" (p. 147). They employed the impression formation theory as a framework and used an exploratory research design and a qualitative research approach to conduct the study on 36 participants whom they purposively selected. Adamsa et al. (2024) revealed that the negative perception affecting the progress of the TVET subsector included, "lower societal recognition, lower job prestige and public ignorance of TVET" (p. 147). This did not provide a conducive environment for TVET to thrive, hence they made a number of recommendations for action. Firstly, policy should be enacted that would project TVET education through print and electronic media, including showcasing success stories and documentaries on the impact on the socioeconomic development of TVET. Secondly, government and other stakeholders should institute programs such as TVET quiz and exhibition for students in the TVET schools to showcase their talents. Thirdly government should put in place and enforce policies that regularize and standardize the activities of artisans. Fourthly, the government should also develop a policy that would grant tax relief for industries that hire TVET professionals. Fifth, there should be career guidance and counselling units operational in all high schools to educate and encourage the students to appreciate a career in TVET. Adamsa et al.

(2024) however revealed a gap that, theirs was a qualitative study in which they selected a few people (36 participants), which could have constrained the generalizability of the findings, making them prone to bias.

Aldossari (2020) investigated the role of the then recent socio-economic transformations in changing attitudes toward TVET among Saudi Arabian students. Aldossari (2020), "applied capability theory to quantitatively assess the perceived impact of the economic and social transformations embodied in Vision 2030 among 1016 sampled Saudi vocational students" (p. 3). He analyzed data using SPSS version 24.0. Specifically, Aldossari (2020) examined both the "personal factors (gender, marital status, monthly family income, parental educational level) and social conversion factors (employability policies, income and incentives policies)" (p. 4). In regard to the environment in which TVET operated, Aldossari's findings indicated that supporting women's participation in TVET reduced stigma attached to TVET. In addition, the findings indicated a more optimistic view among students concerning the match between women's skills and technical and vocational jobs…. Therefore, "supporting women through facilitating their needs would positively change their attitudes toward TVET" (P. 21). Aldossari (2020) contends that this study could assist policy makers in updating legislation to promote relevant policies related to TVET, hence creating a facilitative environment to TVET.

Atukwase (2015) undertook a document analysis empirical studies on internationalisation and the development of Vocational Education (VE). Among the studies she analysed were; Nahamya (2014); Harman (2005); Lutalo-Bosa (2007) and Leask (2002). While addressing the role of internationalisation towards the development of vocational education (VE), Atukwase (2015) revealed challenges related to the environment in which TVET operates in universities that, the development of TVET in Uganda was hampered by among others; "weak national

economies, shrinking or stagnant wage employment opportunities especially in the industrial sector, huge numbers of poorly educated, unskilled and unemployed youth, uncoordinated, unregulated and fragmented delivery systems, stifled academic freedom, poor public perception of TVET and geographical, gender and economic, inequities" (pp. 99 – 100). In her analysis, Atukwase (2015) addressed some components of environment in which TVET operates in universities such as; political and economic environments. However, her study was more inclined to Internationalisation, though in the context of vocational education. Atukwase (2015) did not explicitly address other peculiarities regarding the environment in which TVET operates in public universities in Uganda such as ethical and legal environments.

Ddungu-Kafuluma (2014) explored what globally competitive technical teacher training should be and the extent to which "technical teachers in Uganda [were] globally competitive" (p. 27). He made a revelation in relation to the environment in which TVET operates that, teacher training in Uganda was still very conservative and oblivious to modern technical training. This resulted in Uganda's graduates being less competitive in the global market. Technical teacher training in Uganda therefore, still fell far below international standards. Ddungu-Kafuluma (2014) advocated for a complete rethinking of design, implementation and evaluation of TVE teacher training in Uganda. By this he implied among others, a redesign of the TVET policy environment to cater for TVET in institutions of learning (universities inclusive).

Wang (2016) aimed at reshaping the TVET development process and did a document review on studies related to a new approach to technical and vocational education (TVE) in Southeast Asia. With a new lens Wang (2016) emphasized the need to move beyond a narrow focus on skills to include theoretical knowledge and address issues of social inequality. He viewed TVET through the broader lens of the human development approach and revealed that

the value of TVET was embedded in its ability to "integrate the marginalized groups, enable people to achieve what they valued, develop agency freedom, and promote human wellbeing and environmental sustainability" (p. 3). However, according to Wang (2016), TVET institutions tended to cluster in places where enrolments were expected to be high. Although the clustering of TVET institutions around urban areas could have satisfied the economic needs, Wang (2016) observed, that arrangement limited access to TVET education for students from the marginalized groups of society. Furthermore, large discrepancies in the quality of education were observed between schools in urban and rural areas. In this case, the uneven distribution of TVET institutions created an inhibitive environment for TVET to thrive, hence a lesson to Uganda as well. This goes against the expected ethical environment in a TVET institution. In his PESTLE organisational analysis Buye (2021) under the ethical environment, advocates for the promotion of morality, integrity and justice for the common good of all members of the society.

In summary, the empirical studies reviewed under this section demonstrated that the political, economic, social, technological, legal, and ethical (PESTLE) environment played a decisive role in shaping the performance, perception, and outcomes of TVET in higher education contexts. Collectively, the studies revealed that TVET does not operate in a vacuum; rather, its effectiveness is contingent upon the broader policy, socio-economic, institutional, and normative environments within which it is embedded. However, most studies either focused on non-university TVET institutions, single environmental dimensions, or contexts outside Uganda. There was limited empirical evidence that holistically examined the interaction of political, economic, social, technological, legal, and ethical factors and the TVET related programmes within public universities in Uganda. This gap justified the present study, which adopted a

comprehensive PESTLE lens to examine the political, economic, social, technological, legal and ethical state of the environment in which TVET operated in public universities in Uganda

Chapter Three

Methodology

3.0 Introduction

This chapter displays the research paradigm, research design, study participants, methods of data, collection, instruments for data collection, data quality control: trustworthiness, research procedure, data management and ethical considerations.

3.1 Research Paradigm

This study is grounded in the interpretivist worldview, drawing on Weber's (1949) concept of *Verstehen*; a German word Weber (1949) contextually used to refer to the interpretive understanding of social action from the actor's point of view. Interpretivist researchers do "not accept the view of a stable, coherent [and] uniform world. They argue that, all meaning is situated in a particular perspective or context, and, since different people and groups have different perspectives and contexts, there are many different meanings in the world, none of which is necessarily more valid or true than the other (Gay et al., 2012). Ontologically, in the context of this study, I subscribe to the position denoted by Neuman (2014) that social reality is "fluid and fragile" (p. 104). People construct social realty as they "interact with others in ongoing processes of communication and negotiation…. Social reality is largely what people perceive it to be; it exists as people experience it and assign meaning to it" (p.104). Epistemologically, this study is anchored to the standpoint of Weber (2004) that "the knowledge interpretivists build reflects their particular goals, culture, experience and history…. [Therefore], knowledge is built through social construction of the world" (p. vi). I

value TVET related programmes in universities because they equip learners with job-ready, practical skills aligned to the labour market needs of Uganda where formal jobs are limited but skills demand is high. Based my ontological and epistemological stance, I interpreted the state of TVET related programmes in public universities from the lenses of the most critical and closest stakeholders to a TVET related programme in universities, that is, the programme coordinators and students who held some leadership positions in a TVET related programme.

3.2 Research Design

I employed the case study research design. According to Fàbregues and Fetters (2019) a case study is a qualitative research design that involves:

> intensive and holistic examination of a contemporary phenomenon in a real-life setting. It uses a variety of methods and multiple data sources to explore, describe or explain a single case bounded in time and place (ie, an event, individual, group, organisation or programme) (p. 1).

The case study design enabled collection of viewpoints from the programme coordinators and students who gave in-depth information on the programmes they managed or studied.

3.3 Study Participants

3.3.1 Unit of Analysis. Casteel and Bridier (2021) describe the unit of analysis as the "entity being examined and ultimately analyzed to provide a conclusion that explains the outcome and addresses the research problem" (p. 341). My unit of analysis was a non-traditional TVET related academic programme which I examined using the four research questions (Refer to Section 1.4) that also form the themes for this study. A TVET related academic programme is

a form of hard science in which aspects of the universe are investigated by means of hypotheses and experiments involving rigorous scientific methods (Shapin, 2022). Within the family of TVET related programmes, I anchored this study on non-traditional TVET related programmes and left out the traditional TVET related programmes (e.g., bachelors degree in civil engineering; bachelors degree mechanical engineering) which were then flooded and had low employment opportunities (Ssemwogerere, 2024). The non-traditional TVET related programmes were relatively new programmes designed by universities such as Bachelor of Petroleum Engineering and Environmental Management attainable at Mbarara University of Science and Technology; Bachelor of Science in Polymer, Textile and Industrial Engineering attainable at Busitema University.

3.3.2 Unit of Observation. Casteel and Bridier (2021) describe a unit of observation as the "source of data about the unit of analysis" (p. 343). My units of observation were a programme coordinator and a student leader for a particular TVET related programme. A program coordinator is part of faculty with assigned duties to assist with the operations of an academic program (https://www.tarleton.edu/cosm/program_coordinators). Beyond the programme coordinator, I interviewed students who were both leaders and beneficiaries of a TVET related programme. In the learning process, students actively participated in classroom discussions and assignments and consistently aligned their behaviour to the planned TVET related programme learning outcomes. Moreover, students who held some leadership responsibility around a TVET related programme, possessed in-depth knowledge about the programmes, hence they were effective voices for this study

3.3.3 Sampling. Trochim (2020) describes sampling as a process of selecting units such as people and organisations from a population of interest. However, in qualitative

studies there is no rule of the thumb for determining the number of participants, rather several factors are critical in deciding the samples (Patron, 2015). In line with Patron (2015), my geographical scope were the universities of Busitema, Kyambogo, Gulu, Makerere, MUST and Soroti, which were purposively selected based on their intensity in offering TVET related programmes. Based on the Information on public universities admissions for 2023/2024 academic year (MoES, 2023), I identified 30 non-traditional TVET related programmes, drawn from across the six universities (Refer to Appendix A). I used purposive sampling to identify one hundred and eighty participants (i.e., one programme coordinator and five students per programme) based on their level of involvement in the respective TVET related programmes, as recommended by Creswell and Clark (2007) that the selection of research participants in qualitative studies should be based on their familiarity with the subject under investigation.. By virtue of their mandates, 30 programme coordinators automatically fell as participants. Programme coordinators managed, coordinated, and oversaw curriculum development, execution and assessment for the programmes they coordinated. On the other hand, I purposively selected one hundred and fifty students (5 students per programme) based on their level of leadership responsibility on the TVET related programmes they pursued. Out of the five targeted students, I automatically selected class coordinators and assistant coordinators for each programme. The other three students (for each programme) were selected based on other associated responsibilities that they held in relation to the TVET related programmes they pursued, such as discussion group leaders. The above inclusion and exclusion criteria, guided my sampling of the most critical voices for the TVET related programmes I studied.

However, at data collection level, guided by the principle of saturation in qualitative studies (Creswell, 2014), I adjusted the sample and interviewed 77 participants (i.e., 12

programme coordinators and 65 students from 5 universities of Busitema, Kyambogo, Gulu, MUST and Soroti. I entirely dropped Makerere University. One programme (Bachelor of Environment Science Technology and Management) at Kyambogo University was non-existent. At Gulu University one coordinator could not be accessed and one programme at Mbarara University had no student leaders (they were out of university) for holiday break (Refer to Appendix N).

3.4 Methods of Data Collection

3.4.1 Interviewing. I conducted interviews with the programme coordinators. Interviews involve "unstructured and generally open-ended questions that are few in number and intended to elicit [specific] views and opinions from the participants" (Creswell, 2014, pp. 241-242). I used semi structured interview guide to collect data from the programme coordinators based on the four research questions of this study (Refer to Appendix B). I applied probing questions (where necessary) which enabled me to get in-depth information from the programme coordinators, given their rich experiences, and perspectives on the particular TVET related programmes each of them managed. Although known to possess weaknesses such as researcher bias (Creswell & Creswell, 2018), I ensured that participants' views in terms of experiences, perceptions, feelings and beliefs were captured (verbatim) rather than mine.

3.4.2 Focus Group Discussions. Dakwa (2015) defines focus group discussions (FGD) as "unstructured interviews which involve a researcher leading a discussion between a small group of respondents on a specific topic" (p. 299). Borrowing a leaf from Gay et al. (2012) I used FGD on students because it enabled me collect data from a group of students on each TVET related programme more quickly than if I had to interview each student separately. Besides, I was

advantaged to do on spot cross-check of facts as the students verified each other's responses. I used FGD guide which designed based on the four research questions of this study (Refer to Appendix C) to collect data from the students.

3.5 Instruments for Data Collection

3.5.1 Interview Guide. I designed interview guide for programme coordinators (Refer to Appendix B) based on the four research questions, which determined the four thematic areas of this study (i.e., inputs, transformation mechanisms, outputs and environment). Being a qualitative study, I ensured that each research question was expanded with guiding (open ended) questions. This aided capture of the coordinators' lived experiences on the constructs under each thematic area, which I extracted from the standard documents as provided in Section 2.2. In part A (inputs) there were four constructs (i.e., students, academic staff, finances and educational facilities). In part B (transformation mechanisms) there were two constructs (i.e., staff/student contact hours and the learning process). In part C (outputs) there was one construct that is, the behaviour of graduates measured in terms of knowledge, skills and attitudes. In part D (environment) there were six constructs (i.e., political, economic, social, technological, legal and ethical).

3.5.2 Focus Group Discussion Guide. I designed a FGD guide (Ref to Appendix C) for students based on the four broad questions in this study. Being a qualitative study, I expanded each broad question with guiding (open-ended) questions. This stimulated informal and in-depth discussions on students' lived experiences in regard to the four thematic areas (inputs to TVET related programmes, transformation mechanisms of TVET related programmes, outputs from TVET related programmes and the environment in which TVET related programmes operate).

Each thematic area comprised constructs which I extracted from the standard documents as provided in Section 2.2. In part A (inputs) the constructs were students, academic staff, finances and educational facilities. In part B (transformation mechanisms) the constructs were staff/student contact hours and the learning process. In part B (outputs), the construct was the behaviour of graduates measured in terms of knowledge, skills and attitudes. In part D (environment) there were six constructs (i.e., political, economic, social, technological, legal and ethical).

3.6 Data Quality Control

I ensured that my data and research process adhered to the four standards for judging the quality of qualitative research. These included; credibility, transferability, dependability and confirmability (Connelly, 2016).

3.6.1 Credibility. At the levels of data collection, analysis and thesis writing I did a credibility check to ascertain whether or not the research findings, represented the voices I obtained from the participants. According to Connelly (2016), credibility is analogous to internal validity in quantitative research. Borrowing a leaf from Connelly, I employed three approaches. Firs I triangulated the data collected through the two data collection methods to "counter threats to trustworthiness" (Bowen, 2009, p. 38). This helped me to check and I confirmed consistency of findings. I also identified and corrected inconsistent records. Secondly, I shared my work with my supervisor and members of the doctoral committee to solicit their critique on the flow of my findings. I corrected the errors they found and ensured alignment and flow of the entire dissertation. Thirdly, borrowing a leaf from Shenton (2004),

I did “thick description” that is, I did detailed description of the research context, participants, and procedures. This helped me to capture the actual meaning in the participants’ voices, not just their behavior. Throughout the research process, I continuously and consciously reflected on my ontological and epistemological stance and ensured I conveyed the reality of TVET related programmes in public universities from the lenses of the most critical and closest stakeholders to a TVET related programme, that is, the programme coordinators and students.

3.6.2 Transferability. The nature of transferability, is the extent to which findings are useful to other persons or contexts (Connelly, 2016). Borrowing a leaf from Shenton (2004), I laid two strategies to ensure transferability of the findings. First, in the design process of this study, I included purposive sampling which helped in the selection of right participants who gave their. This enabled me to capture the lived experiences of the most critical stakeholders to the TVET related programme (i.e., programme coordinators and students). Secondly, at data collection, analysis and thesis writing levels, I continuously triangulated data from interviews with that from FGD. This helped me to detect contradictions, inconsistencies and diversities which I addressed.

3.6.3 Dependability. In the context of qualitative research, (Stahl and King, 2020) refer dependability as the consistency and reliability of the research findings as well as the degree to which the research procedures are documented and transparent. (Stahl and King, 2020) further highlight that “in order to address the dependability issue more directly, the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results” (p. 71). In this study, I ensured rigor in line with the “Graduate Handbook of Policies, and Guidelines and Procedures” (Makerere University

Directorate of Research and Graduate Training [Mak DRGT], 2024). I provided detailed description of the research design, data collection methods and data analysis procedures. This included clearly outlining both the research questions and questions, explaining the selection of the participants, clearly describing the data collection techniques and providing an account of how the data was analyzed and interpreted.

I also submitted the research proposal of this study to my supervisor and members of the doctoral committee, who examined and critiqued the methodology and the processes proposed for data collection and data analysis, hence ensuring the accuracy of findings. My research tools and sample size were also reviewed and approved by my supervisor. During data collection, some participants were not easy to locate due to their busy schedules. Nonetheless, I endeavored to reach such participants through continuous communication through various channels (email, phone) physically visiting their offices. Others, especially programme coordinators were attending workshops in various locations. I made telephone calls, shared consent forms and tools on whatsup and on receiving consent, held interviews with them. I thoroughly trained research assistants. This ensured consistency and accuracy of the entire research process.

3.6.4 Confirmability. Is the neutrality or the degree to which findings are consistent and could be repeated (Connelly, 2016). Confirmability is a crucial aspect of qualitative research and focuses on establishing that the researcher's interpretations and findings are derived directly from the data and are not influenced by personal biases and preconceptions (Stahl and King, 2020). ' Based on this, I provided a clear explanation of the process of data collection and the analytical process for accountability and to allow the findings to be traced back to the data collected. I also provided a detailed methodological description and clearly articulated my ontological and epistemological orientations and how they shaped my view of what constitutes

reality and how one can know that reality. This aided me to detect my conscious or unconscious biases, especially at data transcription level, hence enabling me to accurately report (verbatim) the participants' original voices. This therefore provides a basis for those who may wish to establish that my findings, analysis and interpretations are informed by data I collected during my research.

3.7 Research Procedure

Upon approval of the proposal to this dissertation, I obtained an introductory letter from the Dean of EASHESD and proceeded to identify, recruit and thoroughly train research assistants on the implementation of all research protocols. In each university, I did courtesy calls to the office of the University Secretary and/or academic registrar (as guided), where I received clearance to undertake dada collection as described below:

3.7.1 Interview with Programme Coordinators. To interview the programme coordinators, I did courtesy call to the offices of the respective deans and/or heads of department in each of the universities and submitted the introductory letters. I proceeded to secure convenient venues, observed the preliminaries of rapport, obtained informed consent (Refer to Appendix E) from each participant and conducted interviews using the already designed interview guide (Refer to Subsection 3.5.3). I personally recorded written notes while the research assistant helped with audio recordings. Finally, I closed each interview by thanking the participants for their corporation.

3.7.2 Focus Group Discussion with Students. I conducted focus group discussion with the students with the assistance of a research assistant. I did courtesy calls to the relevant offices (i.e., school/faculty deans, heads of department and the programme coordinator) and sought seek

permission to meet the students. With the help of the programme coordinators, I conducted purposive sampling to select five students (participants), starting with those who held some responsibilities related to the TVET related programme they studied (i.e., class coordinator and the assistant class coordinator) as compulsory participants. I proceeded to secure convenient venues, observed the formal preliminaries and conducted the FGD using the already designed FGD guide (Refer to Subsection 3.5.2). I personally recorded written notes while the research assistant helped with audio recordings. While moderating the FGD, I ensured natural flow of organic conversation (i.e., used follow-up probing questions, allowed active participation by all while maintaining control of the discussion). Finally, I closed each FGD by thanking the participants for their corporation.

3.8 Data Management

I employed the framework method for analyzing the data that I obtained from the two sources (i.e., programme coordinators and students) based on the four research questions of this study (Refer to Section 1.4). According to Gale et al (2013), "the Framework Method sits within a broad family of analysis methods often termed thematic analysis or qualitative content analysis. These approaches identify commonalities and differences in qualitative data, before focusing on relationships between different parts of the data, thereby seeking to draw descriptive and/or explanatory conclusions clustered around themes" (p.2). Based on my research philosophy and ontological stance that reality is multiple rather than static, I employed the framework method for analyzing the data that I obtained from the two sources (i.e., programme coordinators and students) based on the four research questions of this study (Refer to Section 1.4). According to Gale et al. (2013) the framework method is a tested and popular qualitative content analysis

method that was developed by researchers, Jane Ritchie and Liz Spencer, from the Qualitative Research Unit of the National Centre for Social Research in the United Kingdom in the late 1980s. Accordingly, I employed the seven analysis stages suggested by Gale et al. (2013) to analyze data based on the four predetermined themes of this study (i.e., inputs, transformation mechanisms, outputs and the environment).The stages are; transcription, familiarization with the interviews, coding, developing a working analytical framework, applying the analytical framework, charting data into the framework matrix and interpreting the data as outlined below.

Under transcription stage, I did a verbatim transcription of all the audio data obtained from the programme coordinators and students. I used earphones to listen (and re-listen) to the recorded voices from the recorder, while physically typing (verbatim) the audio data on the computer. In the process of transcription, I avoided conventions of dialogue transcriptions which could be difficult to read (e.g. pauses or two people talking simultaneously), because the content was of primary interest. I ensured transcripts had large margins and adequate line spacing as this later enabled me to do coding and making notes. I used my recorded notes to patch up any unclear areas in the audio recordings. The transcription stage, helped to immerse me into the details of the data.

In the second stage (i.e., familiarization with the interviews), to ensure consistency and accuracy, I further internalized all the data sets (from interviews and FGD), comparing the audio recordings with the transcripts which I had translated into text. Alongside, I recorded some analytical notes, thoughts and/or impressions on the text margins to help in coding. In stage three (that is, coding), I carefully read the transcripts line by line, while applying a paraphrase (underlining) what I perceived as important, but following the four themes of the study (inputs, transformation mechanisms, outputs and the environment) and the constructs (subthemes) which

I examined under each theme. This helped me to classify and code all of the data, hence capturing the four themes as told by the data. Coding helped to minimize data analysis errors that could have affected data validity. It also helped me to identify major narrations (based on themes and subthemes) from which I extracted verbatim quotations reflected under data presentation and discussion.

In stage four (development of a working analytical framework) I grouped the data into the already predetermined themes of this study (i.e., inputs of TVET related programmes in universities, transformation mechanisms of TVET related programmes in universities, outputs from TVET related programmes in universities, the environment in which TVET related programmes operated in universities). I further dissected the data into sub-themes based on constructs which I examined under each theme. This formed my working analytical framework. To avoid ignoring useful data, I did several iterations between the coded data and that (data) that did not fit into either of the four themes or sub themes. Finally, I developed a working analytical framework.

In stage five, I applied the analytical framework by cataloguing them based on the four themes of this study and their respective subthemes. The main output of stage five was analytical notes, which were summarized interpretations of the participants' responses. In stage six (charting data into the framework matrix), I used a spreadsheet to generate a matrix and charted the data into the matrix according to themes and subthemes. Charting involved summarizing the data by theme and subtheme and mapping it onto the matrices for easy interpretation. While charting, I ensured to retain the original meanings of the participants and also included (coded) references of all the quotations I made. Finally, I implemented stage seven, where I referred to the charted data on the matrix, interpreted it based on the four themes (and subthemes therein)

and wrote down the findings of this study. I read and reread the data on the matrices while identifying the initial observations and corroborations between themes (and subthemes) and how they applied to the research questions. This contributed to the originality of my work.

3.9 Ethical Considerations

In the entire process of this study, I adhered to the research authorship and academic integrity in line with the "Graduate Handbook of Policies, and Guidelines and Procedures" (Mak DRGT, 2024, Section 13, Subsections 13.1), which stipulates professional standards for research and the misconduct researchers must avoid such as fabrication or falsification of results and all forms of plagiarism and cheating. I acknowledged all the works referred to in this study in order to avoid any form of plagiarism as a research misconduct that could distort my personal image and that of Makerere University. Furthermore, I consciously ensured honesty with my own actions and declared any conflict of interest in consistence with Makerere University research agenda. . At all stages of this research, I observed the principle of confidentiality of participants, ensuring anonymity by use of pseudonyms in form of codes to conceal the identity of participants.

I further observed confidentiality and privacy by conducting all interviews in a private setting, not being judgmental and ensuring the safety of the participants. For both the interviews and FGDs I gave the participants opportunity to freely express themselves and share their lived experiences on the TVET related programmes they managed or pursued. I also sought informed consent from the participants by introducing the topic and the purpose of my study. Once the participants registered their acceptance, I gave them the consent form (Appendix E) to read, understand and sign.

Chapter Four

Data Presentation, Analysis and Interpretation

4.0 Introduction

This chapter covers data presentation, analysis and interpretation based on four themes, which I derived from the four questions of this study (i.e., inputs to TVET related programmes in public universities in Uganda, transformation mechanisms of TVET related programmes in public universities in Uganda, outputs from TVET related programmes in public universities in Uganda and the environment in which TVET related programmes in public universities in Uganda operates). I used Gale et al. (2013) seven stage thematic data analysis techniques to process the field data.

4.1 Profile and Coding of the Participants

Data was gathered from 77 participants (12 programme coordinators and 65 students) who by virtue of their respective mandates, were the closest to the TVET related programmes. To ensure anonymity of the participants' identity I used pseudonyms in form of codes. In coding, all participants were categorised according to their respective programmes. I interviewed 12 coordinators whom I coded according to the 12 TVET related programmes as; SCEECE, KCEAPE, KCSCPE, KCMBE, KCSTCT, BCSPTIE, BCAMIE, BCSAE, BCSME, GCSBE, MCME and MCPEEM. I also grouped the 65 student participants (interviewed) according to their respective TVET related programmes and formed 13 focus group discussions (FGD) which I coded as; SFEECE, KFEAPE, KFCPE, KFMBE, KFSTCT, BFSPTIE, BFAMIE, BFSAE, BFSME, GFSBE, GFSFB, MFME and MFPEEM. The 5 students in each FGD

were assigned a digit number raging from (1-5), which I attached to each FGD code to represent the individual voices of students.

4.2 Presentation of Findings

Below I present, analyze and interpret the state of TVET related programmes in public universities in Uganda based on the lived experiences of the participants under four themes which I derived from the four questions of this study (Refer to Subsection 1.4).

4.3 Inputs to TVET Related Programmes in Universities

I examined inputs to TVET related programmes in universities based on four constructs, which also formed the four subthemes. That is; students (as specified in the National Council for Higher Education [NCHE], 2007), academic staff, finances and educational facilities (as specified in the National Council for Higher Education [NCHE], 2001).

4.3.1 Students as Inputs to TVET Related Programmes in Universities. I sought views of the programme coordinators on the categories of students they had in their programmes in terms of their (students') admission paths. The findings from the programme coordinators revealed that the universities had admitted the right quality of students as suggested by NCHE (2007). A number of students had been admitted based on higher education certificate offered by UNEB, others through diploma scheme, but the majority had been admitted through direct entry. One programme coordinator (KCMBE) corroborated this view and reported that: "we have those [students] who join with certificates or diplomas but we mainly have those who join through direct entry." This response commonly surfaced from other programme coordinators as well. During the focus group discussions (FGDs), students were in agreement with programme

coordinators that; the majority of them had been admitted through diploma scheme and direct entry.

I further sought to find out from program coordinators what had attracted or discouraged students to enrol for the programs they coordinated. The findings were varied. However, the view of the TVET related programmes having an inherent promise of employment opportunities after the course, largely contributed to the students choosing to enrol for the respective programmes they (students) pursued. There was a predominant believe that; the TVET related programmes would equip the learners with knowledge and technical skills needed in the job market. For example, one of the programme coordinators (BCSME) mentioned that: "first and foremost this program is a skilling course which gives technical skills and knowledge required in industries hence widening the job opportunities." In affirmative, another programme coordinator (KCEAPE) mentioned that:

> There are quite many reasons why students enrol for this program. Job opportunities of course is key but we [also] have entrepreneurship skills; a reason why our students end up opening their engineering firms. In fact when you talk about jobs, our students under this program are highly employable.

Other programme coordinators attributed the attraction of students to pursue the programmes they coordinated to the general awareness which students received while in high school through career guidance. For example, one of the programme coordinators (KCSCPE) reported that:

> I think that… they go through career guidance and awareness of our programmes at high school, where they are enabled to know the different engineering programs and their potentials. And of course they get to know that these discipline will train them towards

> the required job market and labour force. Hence such students apply directly from senior six.

However, another programme coordinator (BCSME) who had few students enrolled for the programme he coordinated, gave a contradictory view:

> Mining is a very good course, but currently does not have the required enrolment even when there are some scholarship opportunities. The course needs further popularization. Both the community and the students have not yet perceived it properly.

Another programme coordinator (MCBE) added that, "There is currently a big rush for our program because it has job opportunities. It is also skills based and a science based program." Related to this response, one programme coordinator (SCEECE) also added that "We offer engineering courses which promise jobs to students. We also conduct outreaches which further attract students to our programs hence the raising number".

I sought to find out what discouraged students from taking enrolling for certain programs. One of the programme coordinators (BCSPTIE) pointed out that some of the students had wrong mentalities and mind-set about some programs due to limited awareness. This programme coordinator revealed that:

> They have a mind-set that textile engineering means sitting on a sewing machine. So there is a fear; how can I do a course of four years and I end up being a tailor. So they have a wrong mind-set about the course…. So that is the most fear that students have.

Views from students on what had attracted and/or discouraged them to offer their respective courses ranged from skills and knowledge acquisition, awareness, job opportunities, opportunities for government sponsorship. For example, one of the students (SFEECE4) pointed out that:

> I took this program because of its diversity. You are able to apply your knowledge in almost everything. During COVID-19, most people were working online…. That is one thing that motivated me. Also government sponsorship – because affording university education is not so easy. I also had passion and the university encouraged me. It is worth doing this course".

In a related way, one students (MFBE1) in one focus group stated that:

> I looked at courses that offered more job promises…. So I picked Biomedical Engineering solely based on the fact that there were promises of job opportunities and the course was relatively new. The course provides a never dying necessity and this attracted me".

Another student (BFSME1) re-echoed the aspect of job opportunities as what attracted them to the program hence, reported that:

> Me I am doing Bachelor of Science in Mining Engineering. And what attracted me was that a lot of explorations were being done in different parts of the country and different types of minerals were found in those parts of the country and I saw it was an opportunity. Like there is demand for engineers and there is an increase in… in job opportunities in the sector of mining. So I saw that I would not find challenges in a job after the course.

However, some of the students during the FGDs reported that the programs they were offering were not their choice and that they had no interest in them. Some of these reported that they were influenced by their parents. Others said that they had no option, while others took up the

programs as stepping stones to other levels. For example, one student (GFSBE) informed me that:

> I wanted to do medicine, but I got radiography. So, when I was filling in the Joint Admissions Board (JAB) forms there was no medicine but the next science course I could see was Biosystems Engineering. So I put it there and they gave it to me. So Biosystems was the only… closest that I could do.

I also got a related revelation from another student (BFAMIE1) who declared that:

> I am doing Bachelor of Science in Agricultural Mechanization and Irrigation Engineering and basically I am seeing this as a stepping stone…. What I had in mind right from senior three [was] robotics and automation engineering. I saw that the course was not in Uganda. Because I wanted to deal basically in programming and making machine… I saw this as my stepping stone towards that career

I sought to find out from the programme coordinators on how the process of admitting students could be improved. I received varied views which included increasing government sponsorships, loans schemes, creating awareness of the programs, reduction of tuition fees, expansion of educational facilities, provision of grants, giving support to those who were upgrading, improving on the facilities among others. For example, one of the programme coordinators (SCEECE) suggested that "there should be more support to students of Higher Educational Certificate (HEC) to help fair students to access university studies. In addition, government should enhance students' sponsorship and loan schemes. These courses also need to be popularized."

In the same line (of supporting those who were upgrading and hence increasing access to higher education), one of the programme coordinators (KCEAPE) gave a suggestion that:

> We could put in place… (Directorate of Industrial Training) DIT programs which can get students who have not studied A" Level but have O" Level. If they can get certificates [and] also be supported with diploma then we are able to admit them the into bachelors program.

Through the FGD, I also sought views from students on how they proposed improvement of students' admissions to their program. Two of the students (KFCPE2 and MFBE3) shared a view of improving or expanding the learning facilities as key in improving students' admissions. This view was corroborated by one programme coordinator (KCSCPE) was of the view that "the number of admissions is determined by the space that we have. So it would be good if the university or the government put up more of the infrastructure and may be other universities to start the same program."

By use of FGD, I also requested the students to describe the challenges they faced in pursuing their programs. The issue of insufficiency of educational facilities was again re-echoed by one student (BFSAE2) who reported that:

> The big challenge we have here… is that practical are limited. Even for the theory that we have, still the facilities are not enough. Let us say like in terms of lecture rooms, you realize that sometimes you may be having like three course units colliding…. In case you book a room, you will be interrupted by another group of students or even be chased away by another lecturer.

In line with this challenge others lamented that there was no mentorship into their fields of study since the professionals in those fields were scarce. In this regard one student (SFEECE2) submitted that:

> Personally one of the challenges is limited exposure to practical world and to professionals already practicing. For example, it is hard to find an electronic engineer. So we do not have someone to borrow knowledge from-we only rely on the little we study and wait for opportunities to apply for jobs.

To emphasize the challenge of exposure to industry, one of the BFSME1 made a re-echo reporting that:

> Yes, I am doing Bachelor of Science in Mining Industry. The main challenge I face and I think some of my colleagues face is the limited exposure to the outside world like laboratories. Yes we study the theory but we have limited exposure to the practical….

Another student (SFEECE3) re-echoed a similar challenge to the effect that:

> … this course is the first of its kind being proposed in Uganda. That itself presents a challenge though it can also be positive. We find it hard to access some resources especially consultations. Because the course covers telecom, software, computer science and computer engineering, we need to consult all people from all these disciplines. You realize that if you are not sure about something, you cannot call any one for assistance.

Still on the issue of challenges, one of the students (BFAMIE2) mentioned that some of the practical course units had been taught online yet for better understanding it needed face-to-face interactions. This reported that:

> Yeah, we find a course unit can be like programing… which would be practical or like face to face and then it is taught online. It is not easy. You find yourself first go for tutorials and yet there was a chance of interacting with the lecturer. Yeah, so it would be quite easier to understand a practical skill when it is physical interaction than online.

In light of the above voices, the findings suggested that universities had paid less attention to practicals. It was also indicative that universities required to set up mentorship programs for students in these fields of study as well create awareness of the programs which were offered at universities. In my further probing, I requested students to give suggestions of the possible solutions to the challenges which they had raised. These gave their opinions such as emphasizing practical skills, investing in ICT, support students through students" loans, proper budgeting for practical, improve on the university infrastructure, increasing numbers of lectures among others. One student (BFSAE1) suggested that:

> I am doing Agro-processing Engineering. Yes for the practical side of it the fact is that some lecturers would wish to conduct these practicals but do they know them? So to me I would suggest that let them some engineers from those different industries…. I think it would be a very good solution for the practical bit of it. To add on still, I think the curriculum needs to be revised in such a way that let us study a bigger percentage of practicals and less of theory.

Another student (BFSME2) in a focus group reported that:

> I pursue a mining degree. Yes my advice would be apart from the practicals, I feel universities should cooperate with industries, like with the companies because you are going to find out that we study some course unit but they will never be applicable. Yes, so I basically believe that universities cooperate with companies such that they can review our curriculum that would be a better case.

In addition, one student was of the view that some of the programs needed to be popularized through public campaigns and platform. Otherwise, they said that there was limited information

of what some programs entailed. In particular, one of the students (GFSBE3) in one of the focus groups reported that:

> These people in the public who talk about food processing should give us a platform whereby we talk about food processing. People may get to know it because it is a good course. Yes, people should know that it exists. Because if you speak about it, some will be lie "eh". Most times they will think you are doing Biomedical.

Stressing this point of creating awareness of some of the programs, one of the students (GFSBE1) from the same focus group further reported that "actually someone asked me, "what are you doing in your course; you said "Biosystems?" She asked, "Bio what"? Then she said I thought maybe you were doing the systems of digestion systems." In another submission regarding the possible solutions to the challenges raised by students, one of the students (BFSPTIE3) raised the need to regulate the use of AI, extend research funds to undergraduate and as well find ways of sending out information about the programs. The same student suggestion that:

> I think I have three points. We need to acknowledge the changing of the 21st century and one of the current trends is Artificial intelligence. If you can see it from the other extreme end, you realize that it is having a very huge negative impact on human centered creativity. So what does this mean? Institutions will need to come up with frameworks and guidelines on how these AI tools can be utilized. So that can be done at institutional level and government level. Then the other point will be about the issue of students settling for less in their research project due to financial constraints. I think through the Science Technology and innovation Secretariat, the research fund should be broken down such that even the undergraduates can benefit. Because most of the beneficiaries of these

> programs have been those people doing postgraduate programs….. Then the final point will be about… some programs in that the information about them is not well represented outside there. So here institutions can look at having websites say for each faculty….

Another suggestion from one of the students (BFSPTIE2) was that:

> I would advise the university to revise the course titles because if I provided to you my transcript and you see the tittles alone you will not actually understand all that we do inside the course. So it is quite challenging that you go for an opportunity where you have the skills but because of the tittle course, the employer you from the name you miss out…. As an example, my course tittle Polymer Textile and Industrial Engineering. Most of the people confuse that course that it is textile based, but we do a lot of mechanical work. We do a lot of processing engineering throughout the course. But most of them confuse it with textile a lone.

Another suggestion was that government should ensure reduce risk of not getting employed in Uganda when students complete their studies. In this regard, one of the students (SFEECE5) noted that:

> With this course, there is a real risk that we may work in Uganda because the necessary infrastructure does not yet exist. We have gained knowledge, but to apply it. We need an ecosystem that supports it. That means government has to actively think about developing such infrastructure.

In terms of students as inputs to TVET related programmes, the findings indicated a number of scenarios: On students' admission, some of the students had been admitted through the higher education certificate (HEC) program offered by universities, others through diploma scheme, but the majority had been admitted through direct entry from senior six. This testified

that the universities adhered to the minimum entry requirements for admission to a university as stipulated in the (National Council for Higher Education [NCHE], 2007). On attraction to TVET related programmes, the findings indicated that; although the students had various reasons for choosing to pursue TVET related programs, the overarching reason was that they had high hopes of acquiring skills, knowledge and attitudes that would facilitate them (students) to access employment opportunities after their studies. On challenges that limited the students from achieving their expectation in regard to the TVET related programs they offered, the findings indicated two factors. One, there was lack of use of practical approaches in the teaching of most course units by lecturers and secondly, students lacked practical exposure to modern technology.

4.3.2 Academic Staff as Inputs to TVET Related Programmes Universities. My first question to programme coordinators on staff as inputs to TVET universities was "do you have adequate number of academic staff for you program? Please give your comment in terms of a) PhD holders b) Masters holders". In line with this question, programme coordinators from most of the universities were in agreement that they were understaffed although they had enough staff who were masters holders and were teaching well at undergraduate level. They were also in agreement that there were few PhD holders or professors. For example, one of the programme coordinators (GCSBE) reported that "we do not have professors and associate professors. I am a senior lecture and the rest are lecturers and assistant lecturers…. We are under staffed because our staffing structure is not yet achieved."

In a closely related submission, the same coordinator (GCSBE) revealed that:

> If you look at the structure, our department is supposed to have one professor, three associate professors, three senior lecturers or assistant lecturers. But at the moment we do

> not have any up to the level of senior lecturers. From professor, associate professor senior lecturer there is no body.

However, one programme coordinator (SCEECE) revealed that they had enough academic staff and hence reported that "we have enough; 17 PhD Degree holders and 10 Masters Degree holders. It looks overstaffing for now, but the university is still new with few programs but gradually expanding." To further follow up the submissions from the programme coordinators on the staffing, I requested students in focus groups discussions to respond to the statement, "give you assessment on the availability and/or non-availability of lecturers to handle the various modules (units) within your program". These revealed that there were few lecturers and hence they frequently missed lectures. For example, one of the students BFAMIE3 in one of the focus group discussions made an observation to the effect that:

> Yes there are lecturers but actually they are very few because you will realize that at times we do the same course units for the whole academic year with those at bachelors level. So most of the people were complaining whether the lecturer was marking the work… since most of the course works were not returned.

In line with this submission another student (KFMBE1) in one of the focus group discussions revealed that:

> For my case there is some inadequacy because you find that we study most of the course units towards the end of the semester and then go for exams. And we have a lot of part-time lecturers. Like for my case in engineering and most other department, most of the lecturers are part-time…. So they do not really get enough time for the people who are supposed to study.

Another student (GFSFBA2) in one of the focus groups reported that some of the lecturers simply gave them notes which they could not understand. This same student revealed that:

> You will find that someone gives you bulky notes and you do not even know where to start from. Half of it is something you do not really know because it is a new concept. They never get time to explain so you find it difficult going through those notes. You just look for materials that can help you understand the work better.

When asked what they often did in the absence of lecturers, some of students reported that they would use online materials for self-study such as You Tube while others reported that they would make peer to peer consultations among themselves. Looking at the submissions given by the programme coordinators and students I noted that most of the universities were under staffed.

In line with the question on academic staff, I requested program coordinators to give their views on the possible causes of understaffing or overstaffing in their programs and hence propose how staffing levels in their programs could be met and sustained to ensure effective teaching. Most of the programme coordinators were in agreement that there were few senior lecturers in various programs and hence suggested universities to embark on capacity building programs. In particular, one of the programme coordinators (MCBE) was of the view that "the university [should] take up the option of capacity building by encouraging lecturers to go for further education and be eligible for promotion to higher ladders. The university should also allocate enough funds for massive recruitment." Another programme coordinator (KCMBE) noted that understaffing was "due to the existence of multiple campuses." This same gave a suggestion to the effect that the university must look for more funds to train staff at masters and PhD level within and outside Uganda.

In terms of academic staff as inputs to TVET, the findings indicated that; although the universities claimed to have had adequate staffing, the majority were masters degree holders. The senior qualified staff such as senior lecturers and professors who were supposed to be the majority in running university programmes as per the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, pp. 877-878), were very few to the extent that some TVET programmes did not have any.

4.3.3 Finances as Inputs to TVET Related Programmes Universities. In terms of finance as an input to TVET universities, my first question was, "what in your opinion are the factors responsible for the inadequacy of funding (if any) for running your program? My focus here was only on program coordinators since they are the ones who manage programme finances at that level. In response to the question I raised, most of the program coordinators were in agreement that there inadequacies of funding for the programmes they coordinated due to; reduced funding by government, high costs of some of the programs, low tuition fees collected from students among others. Specifically, one programme coordinator (SCEECE) noted that:

> Government grants are inadequate and affected by budget allocation by government. In addition we have few private students and fees from these are subject to Treasury Single Account (TSA) Policy (through URA), constraining the university from direct use of the funds yet these programs need a lot of funds to finance equipment.

This submission was emphasized by another programme coordinator (BCSAE) to the effect that:

> Government grants are inadequate and affected by budget cuts and delay in releases and yet fees from private students are subject to treasury single account (TSA) policy (through URA) which constrains the university form direct use of funds. Our programs need a lot of funds to finance the competency based curriculum.

In a related submission, one of the programme coordinators (GCSBE) mentioned that "consolidated funding system is a major issue. All universities pay to one pool and then that money is released in quarters like all government sectors. It sometimes delays funds and these programs requires robust budgets to run smoothly." According to these submissions I realized that there was inadequate funding of programs in the different universities which affected their smooth running. I noted that responsible factors included limited/low government grants, delayed release of grants, indirect access to fees collected from private, few private students and high costs needed to run the programs.

In my efforts to identify possible solutions, I requested programme coordinators to respond to the statement to the effect that, "give your views on how you propose more funding could be mobilized for running your programs." These gave responses which included increase funding from government, proper budgeting, increase in number of private students among others, proposal writing for grants, review of financial policies among others. Particularly one programme coordinator (SCEECE) suggested that "one sure way is writing research proposals for grants. This will help our program so much our program to run well. This will also boost up the funding from government and fees collection from private students."

In the area of finances as inputs to TVET the findings indicated that government grants in all universities had been inadequate to finance quality provision of TVET and were in addition affected by budget cuts and delay in releases. On the other side fees from private students had been subjected to Treasury Single Account (TSA) Policy (through URA), which indirectly constrained the universities from utilising the funds for the cause of the TVET programmes. This scenario contradicted the financial health expected to run a university programme as described in the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001).

4.3.4 Educational Facilities as Inputs to TVET Related Programmes. In terms of this item, I requested programme coordinators to give their assessments on the sufficiency of education facilities for their programs. Their assessments captured issues such as teaching learning equipment, laboratories, computers, internet among others. Some of the programme coordinators revealed that there were enough facilities to run the programs although there were some gaps to be addressed. These revealed that there were enough libraries with online resources as well as workshops. In this regard, one programme coordinator (BCAMIE) made a submission to the effect that:

> We have a central library but we do not have a departmental library. Hence we still rely on the central library and e-library to which the university subscribes. We have efficient internet for both staff and students. We have a computer laboratory though with some computers not functioning.

This submission was emphasized by another programme coordinator (BCSPTIE) who mentioned that "we have workshops, library and we also have online resources for both lecturers and students. These facilities are sufficient although some are outdated." This submission was strongly re-echoed by another programme coordinator (KCSCPE1) who reported that "internet is all over the campus. WiFi, Ubernet,.... Students anywhere they access internet. We have three libraries including the two old ones". However, one of the coordinators gave contradiction information to these submission noting that the facilities were not sufficient to smoothly run the programs. For example, one of the programme coordinator (MCPEEM) mentioned that:

> We have a challenge with some of the training equipment and facilities which are very rare and expensive. For example, a drilling rig is very expensive. Our students rarely have the opportunity to operate it, since even the industry players strictly guard theirs.

In terms of educational facilities as inputs to TVET in universities, I the findings indicated that universities had adequate teaching and learning resources for the teaching of TVET. However, most facilities were very expensive, insufficient and technologically out of date. This affected the learning process

4.4 Transformation Mechanisms of TVET Related Programmes in Universities

I examined transformation mechanism of TVET in universities in terms of two constructs; that is, the academic staff/students contact hours as per the checklist of quality and universities capacity indicators (NCHE, 2001) and the learning process as per level two of Kirkpatrick's training evaluation model (Kirkpatrick and Kirkpatrick, 2019). Accordingly these constructs formed two sub themes as presented below:

4.4.1 Academic Staff/Students Contact Hours. Regarding this item (under the transformation mechanism of TVET related programmes) I requested program coordinators to give their assessment on the teaching by lecturers of their programs. Some of the programme coordinators (SCEECE, KCEAPE, KCSCPE, KCMBE, KCSTCT, MCBE and MCPEEM) were in agreement that a standard period of contact hours had been set for their respective programs and had to be followed accordingly. These said that generally the staff/student contact hour was good. One of the programme coordinators (KCSTCT) said that:

> Normally we have a standard [contact hours] we are supposed to meet a student. For instance, the lecture is supposed to have 15 contact hours a week with a student. We are always here and the staffroom is always full of staff lecturers.

However, some of the programme coordinators had views contrary to this submission. These revealed that they had large numbers of part-time lecturers who could not observe the

recommended staff/student contact hours even though it was stipulated. In particular one programme coordinator mentioned that:

> We have a number of part-time lecturers but surprisingly the contact hour is slightly low. You do not have the mandate to force a part-time lecturer to teach but you may have the mandate to tell a full time lecturer to teach. The part-time lecturers will always give excuses of not meeting the students.

In addition to this submission, another programme coordinator (BCAMIE) reported that "we have many part time lecturers. The quality of contact hours… is weak. The gap in staffing especially in terms of senior lecturers and professors needs to be improved. This gap affects learning of students." At the focus group discussion, I requested students to give their assessment of the teaching by their lecturers of their programs. These reported that there were usually delays in starting to have lectures since some of the lecturers would start teaching in the seventh to ninth week hence, affecting the learning of students. For example, one of the students (GFSFBA1) reported that:

> When the semester begins, for like a month or even half way the semester lecturers do not come to class. They start coming to class in the middle of the semester, like week six, week seven and so on. They do not observe those contact hours or lecture hours or practical hours.

In the same line (of lecturers starting to teach late after the beginning of the semester), another student (KFMBE1) strongly emphasized that:

> Concerning that issue of student-lecturer contact hours I am not fearing to say this will say it openly that some lecturers do not respect the student lecturer contact time. Because you find that the whole semester which runs for say for four month a lecturer will come

> after a month or a month and a half. And then you expect this lecturer to deliver….? So the challenge we have is that the lecturer ends up taking us through half or if not… a quarter of what they are supposed to teach. That is what we always face.

In addition to this submission another student revealed that:

> The lecturers first of all they feel they are not touchable…. There is no penalty given to them for coming late. So in these first week, they keep on doing their own projects, doing their own things. Because after all nobody will come to find out whether the lecturer came or not. And even if they found out… nothing will happen.

According to the views I received from both program coordinators and students, I realized that yes the staff/student contact hours was stipulated in almost all the universities but it was not being followed by lecturers. Equally noted was the fact that many of the universities largely depended on part-time lecturers and that there was mechanism of following up the learning of students as per the checklist of quality and universities capacity indicators (NCHE, 2001).

After observing from students that they would sometimes fail to get their lecturers as mentioned above, I probed to find out how they (students) coped with that kind of situation. Hence in the focus group interview I raised a question to students to effect that "if the lecturers are not available for some modules (units) how do you cope to bridge the gap?" These revealed various way in which they would cope with the situation including use of libraries, discussion groups, You Tube and Artificial Intelligence (AI) engage in practical sessions among others. For example a student (BFAMIE1) in one of the focus groups informed me that:

> One of the ways of coping is by watching You Tube tutorials. You also realize that we are in the world of AI, so most of us sometimes depend on AI, like GPT and Google in order to learn and do more research on what we have missed out. Just like I said lecturers

> are scarce, the do not give us time so we end up teaching ourselves where we have missed out.

In line with this submission, another student from the same group mentioned that:

> One of the ways we cope with absenteeism of lecturers is by making group discussions. We make group discussions… and each one of us may be assigned a certain part of the course unit… maybe a topic. We say you are going to handle this topic, you are going to handle this, then we come sit down and discuss to ourselves.

These submissions were indicating that online materials such as You Tube materials were a strong backup for students in the event that lecturers were not available. Universities may therefore need to invest more in ICT in teaching and learning.

From the program coordinators I sought to find out the factors that could be responsible for the lectures" absenteeism which was affecting the learning process within various programs. Hence, I raised a question to the effect that, "what factors in your opinion could have contributed to the weakening (if any) of the learning process in your program?" Some of the responses I received were that some of the lecturers had personal businesses to attend to, others mentioned the introduction of blended learning, limited staff, strikes, study trips among, some mentioned lack of equipment and other university activities both official and non-official. For instance, a programme coordinator (KCEAPE) reported that:

> You know in a semester we have quite a number of activities that come throughout. I will give you an example yesterday in the morning hours there were strikes at campus…. Students" strikes. And then there are some activities within the university that disrupt the learning. We can have conferences in place though it is part of the learning, it does not directly relate to examinations…. Then we have study trips.

In the same line, one programme coordinator (BCSME) gave a submission to the effect that "some of the lecturers are busy outside the university, mostly in industries. But sometimes students too have too many trips while at times lecturers want to teach but the equipment is inadequate." Still on the issue of less contact hours, another programme coordinator (BCSME) attributed the cause to blended learning hence reporting that "the introduction of blended learning since COVID19 time. You cannot tell if the person actually achieves the contact hours required. But generally with blended learning there is less contact hours with students."

In a focus group discussion, some of the students revealed that most of their lecturers were part timers who were usually paid for their services for long periods of time which reduced their motivation. For example, one of the students (KFMBE4) reported that:

> Most of the time I interact with those guys the lecturers since were are almost in the same age bracket. I have come to realize that most of the time they are not motivated. You find someone has taught for the whole semester they have not him paid and he is still putting extra effort. He has a home, he has children and other things.

To emphasize this another student (KFMBE3) from the same group loudly put it that:

> Like in our department, the full timers are few. They depend on part-timers and part-timers are not being paid. You find that they spend even a year…. Where will that person get the interest to or morale to of teaching? The problem is that I do not know the person who pays those guts but may be the government.

Summarily, in terms of staff/student contact hours, the findings indicated that universities had set their standard structure which had to be followed as evidenced in the timetables capturing each programme. However, the timetables were not adhered to because universities heavily

relied on part time academic staff and assistant lecturers who were often absent, came late and were not paid in time, hence affecting the learning.

4.4.2 Learning. I conceptualized the learning in terms of level two of Kirkpatrick"s training evaluation model level two which measures the extent to which participants acquired the intended knowledge, skills, and attitudes (Kirkpatrick & Kirkpatrick, 2019). Since most of the programs were science based, I sought to know the learning approaches that were used within the various program in the universities. In particular I intended to find out how/whether the teaching was balanced between practical and theory. Hence, my statement to achieve this was, "between theoretical and practical teaching/learning, explain the ones used by lecturers." Some of the programme coordinators revealed that there was a balance between the two approaches, others revealed that there was an inclination towards the practical side while others reported that the practical part had been grossly left out. For example, in the interviews, one of the programme coordinators (KCSTCT) mentioned that "currently we have really been too theoretical but we are working onto that…. We have got equipment and we are trying to make the course more practical for the students to learn more about it." Not differing much from that submission, another programme coordinator (BCAMIE) reported that "we largely do a lot of theory. During teaching the practical part covers about 30% and 70% theory. But we are hopeful that when they go for internship training, they will interface with the equipment."

Other programme coordinators admitted that the approach of teaching was theoretical although the hope was that with artificial intelligence (AI) students would gain thee practical skills through self-learning. One student (KFMBE) specifically mentioned that "there is the theoretical bit of it initially. But with the introduction of self-learning programs like You Tube and AI students are able to practice on their own". But some of the program coordinators

explained that in terms of assessment, practicals were carrying less weight as compared to theory part which meant that more emphasis was needed on the theory part. Accordingly one of the programme coordinators (KCEAPE):

> 60% theory and 40% practical that is how I can categorize it. I am doing so because once you have a theory, then we have a practical attached to it…. I am giving you the ideal but it all depends upon the lecturer…. But as per the university standards when you are rewarding marks practicals take 25 out of 100.

In the same line of argument, another programme coordinator (KCMBE) gave a submission that:

> There is a structure to follow like… we normally have internship training when they get hands on when they go to the hospitals. But during teaching, the practical can go to 30%, 70% goes to theory. But we are hopeful that when they go for internship training, they will interface with the equipment.

On the same issue of approaches used in teaching and learning I had focus group discussions with students whom I requested to make an assessment of the approaches which lecturers of their programs commonly used. One student (GFSFBA3) submitted that "there are some courses that literally are practical by their names. But you will still not do the practical. What is it called? Food chemistry and analysis? We never did analysis. We just studied. But yes you will learn them." In line with this submission, another student (KFMBE1) revealed that:

> Concerning that I can say our lecturers are theoretical. I can give it 70% to 80%. But when it comes to the practical bit of it, my colleagues here will agree with me that it will not be more than 30%.

In a related submission another student (MFBE2) in one of the focus groups reported that:

> Theoretical is predominantly used but there is a shift for fourth year we do practicals. So I believe they are bringing a shift from theory to more practical work but it is a phase that will take a bit of time to catch up.

Some of the students in focus group interviews attributed the predominance of theoretical teaching to lack of equipment. For example, one of the students (SEECE3) mentioned that:

> In most cases they are theoretical. Specifically, lecturers avoid practicals due to due to limitation of resources. For example, if someone wanted to teach you… on low consumption power in machines, he/she will go theoretical.

However some of the students in the focus group discussions acknowledged that there was a balance in the approaches of teaching as per the structure and nature of the course unit taught. In regard to this, a student(SEECE1) commented that:

> For example, I am doing professional ethics and wires technology. How do I do a practical in ethics? Same with project management- it is mostly modular studies and calculations. But to sum it up, it has been balanced depending on the course units. Some require practicals others do not.

Still under learning among students as a transformation process, I sought for opinions best the staff/student contact hours and the learning process could be improved. From the interviews, program coordinators gave suggestions which included close monitoring, improved staffing, increase in practical sessions, exposure to industrial experience, use of guest lecturers from industries among others. For example of the (BCSAE) suggested that:

> We need to enhance industrial training to at least three time before a student graduates, year 1, year 2 and year 3. We can as well use more guest lecturers where industrial players come and talk to students and as well increase the practical contact hours.

This submission was re-echoed by another programme coordinator (KCEAPE) who emphasized that:

> Already we are doing it…. We send our students for industrial training three time from year 1, year 2 and year 3 to go for practical field. Then another way we can do it is by having these guest lecturers. We have industrial players who come and talk to these students and guide them on what is happening in the industry. And then we can increase on the practical contact hour.

In the same line of argument, another programme coordinator emphasized that: "we need to give practical session more time. I think that is the only way we can improve can improve the staff/student contact hour." The issue of giving more practical as a solution to improve on the teaching and learning was again stressed by another programme coordinator (BCSME) who put it that:

> May be giving students more practical sessions… I think that is the only way we can improve the contact hour between a teacher and a student. Having them with more hands on I think it would be the best instead of giving them theory and they go away.

In terms of the learning process, the findings indicated that most lecturers used theoretical approaches while teaching. This not only affected the learning process, but also reduced students' competitiveness in the era of the 21st century work place.

4.5 Outputs From TVET Related Programmes in Universities

I examined outputs from TVET in universities as the behavior of graduates as per Kirkpatrick"s training evaluation model level three. According to Kirkpatrick and Kirkpatrick 2019), behavior refer to, "the degree to which participants [graduates] apply what they learn during training (p. 4)

and is measured in terms of the knowledge, skills and attitude of the learner. In my interviews, I asked program coordinators to give their professional assessment of their students in terms of level of knowledge, skills and attitude which they had possessed after joining their programs and their ability to apply what they had learnt. According to the programme coordinators their graduates were good and competitive with a high industry demand implying that their graduates had acquired the necessary knowledge, skills and attitudes. For example, one of the programme coordinators (SCEECE) informed me that:

> Our graduates are good technicians…. They are ready for the world of work. The industry demands for our students. We have instituted an institutional culture which provides the students with the freedom to apply what they have learnt.

In a related submission, another programme coordinator (KCSCPE2) reported that:

> … in terms of skills they are ready right from year 1 despite the fact that we have over 60% theory. We take them to industries where they spend 10 weeks. Of course Covid had reduced the weeks but we are now back to 10 weeks that is two month in an industry where they get exposure to the work environment.

In the same line, another programme coordinator (KCSCPE1) added that:

> We take them for industrial training and internship. We have MOUs with some institutions where during lecture time we take the students there and they interface with the equipment which we do not have…. By the time they reach year four they are skilled and they are ready to join the work force.

One of the programme coordinators (KCMBE) further illustrated on the issues of skills which their students had acquired after training by explaining what they were able to present during exhibitions. The same programme coordinator reported that:

> We had an exhibition here and it was graced by the minister of education but our student had the best presentation. He was imaging cancer and diagnose before it escalates. We really believe they have the skills and really upcoming and growing. So look at somebody who came in year 1 with no skill at all [but] by the time he is in his fourth year he has presented such a project. I think that is sufficient enough to show that he has got the skill.

On the same aspect of behavior in terms of knowledge, skills and attitude, I interacted with students to obtain their views and opinions. I asked them whether they had ever applied what they had learnt outside class room and if so to sate what they had applied, when and where. A good number acknowledged that indeed they had applied their knowledge and skills outside classroom. For example, one of the students (BFSAE1) in the focus groups pointed out that:

> To me despite all the challenges that we have faced in this course, I have really tried to apply what I have learnt. The practical bit of it that is software. It is called Solid works and then also AutoCAD. They are design software. I have really tried to apply them to many projects for students, like drawing. Yeah I have been called outside several times to design for other companies let us Kiira Motors. At least I have ever done for them these drawings. And also to those lecturers of mine, yes I have still done for them drawings using the software that I learned.

In relation to this submission, another student (BFAMIE1) mentioned that:

> I can say that I am able to apply some of it [knowledge] at my place of residence…. You realize that sometimes our electrical appliances can fail. With the little knowledge that I was able to get… I can at least apply it and may be fix my broken electrical things like percolators or PCs. Then I have also seen some of my friends… in second year who learn

> programing and they are able to apply it in their final projects using those different software.

Sill on whether the students could apply their knowledge and skills or not, another student (GFSFBA4) revealed that the knowledge and skills had been used to help people within the community. This same student reported that:

> I have used the knowledge to help people who have certain diseases like diabetes and other cardiovascular diseases. My dad is diabetic, I have an uncle who is diabetic, so they often call to ask me like what should I do?... Sometimes there even people whom I do not know but I have been helpful to them.

However, some of the students in focus group discussions revealed that they could not do anything outside classroom with the knowledge and skills they had acquired. These lamented that they could not apply whatever had been taught when in industries to the extent that they were even doubted in places where they would go for placements. For example, one of the student (GFSFBA1) informed me that "If you go to the hospital, those people always tell us that student trainees do not know the practical things so it is very hard for us to train them. Yet we are supposed to come when we at least have some ideas." In probing, I inquired from students what they would do in the event that they could not apply the knowledge and skills they had acquired. They told me that under such circumstances they would either apply for short courses elsewhere which are more practical or volunteer to work in some places. On this account, one of the students (GFSFBA1) revealed to me that "first we went to a nearby hospital called Laro Health Centre. So we learnt something from there, like that practical bit of it. Yeah we just volunteered. Most of us actually just look for ways of volunteering." On the same issue, some of the students lamented that it was very difficult to find opportunities to apply their knowledge and

skills since the required equipment was very expensive and when in internship they are not even allowed to touch such equipment. In particular, one of the students (BFSME1) mentioned that, "it is very difficult for us to apply what we have learnt. It require you to go to a mining site such King Fisher. It is expensive and even those people will not allow you to enter inside, not even to touch their equipment."

Still on the outputs from TVET related programmes, I sought to find out the factors that would reduce students from getting the expected knowledge, skills and attitudes. Hence, I requested program coordinators to give their comments on the factors they believed could have slowed down or prevented their children from acquiring the expected levels of knowledge, skills and attitudes. Among the issues raised were lack of exposure to modern technology, lack of equipment, limited staff especially professors, gender, having limited hands on among others. To this effect, one of the programme coordinators (BCSAE) noted that:

> Our students often have little exposure to modern technologies which are being used in industry. Sometimes we also lack the necessary tools for students to learn with. And sometimes lecturers are engaged elsewhere and occasionally miss lectures, leaving the teaching assistants to do the teaching.

Another progamme coordinator (KCEAPE) explained that the nature of the jobs offered would reduce on the expected knowledge and skills of the students. The same programme coordinator revealed that:

> Some factors are there that hinder students to apply what they have learnt. One is the nature of the job. Because of the wideness and richness of the course, different indirect players want the same people who have studied the same thing. For example, they take you up to become a transport manager because of the automotive engineering knowledge.

> You will not practically practice but you will coordinate transport in the field. Then two what can hinder students is gender.

In an effort to identify possible solutions to the hindrances of achieving the expected knowledge, skills and attitudes I requested program coordinators to give their proposals on what would be done to have their students to be more effective in applying what they had learnt from their programs. These were of the views that more career guidance be given to students, more funding, use of artificial intelligence, and more exposure to modern technology as well as more hands on experiences. For example, one of the programme coordinators (BCAMIE) suggested that "integrating artificial intelligence and use of You Tube in our program can support students' self-study. In addition, they need more exposure to the industry and modern technology." This aspect of integrating ICT in the program was re-echoed by another programme coordinator (KCMBE) who suggested that:

> I think moving forward we need to focus on integrating artificial intelligence in Biomedical Engineering. Imaging should involve artificial intelligence, machine learning because their background of being engineering needs to enhance a lot of machine learning and artificial intelligence…. You do not need to cut somebody when you do not know what is inside, we now use machine learning to tell me the extent of damage of the liver before I open somebody's body. So by the time we open, I am sure of the damage is this…. You get it? It is not bad to go to that direction….

In the same line, another programme coordinator (KCEAPE) gave a submission to the effect that:

> One is revising the knowledge and technology. They call it Technology Obsolescence when technology gets outdated. Basically what I mean by that is that we are using

> outdated technology so we need to update our technology. The second we can use proper career planning and guidance. This is very key to everyone. And then I will insist on strong partners with private and public industrial players. Why? We have had partnerships with these institutions for example like this one where every year… it becomes easy for our students to get job….

Another programme coordinator (KCSCPE) was of the view that staff improvement was key to increasing the effective application of students" knowledge, skills and attitude. The same participant suggested that:

> Yes you start with staff. Once we manage with government recruitment and costs are managed people will give all their best to us. They will stay with students all the time and try to take them to the field. So the availability of a stable staff is a challenge and of course once we have one part-timer, he goes then another one come you find that that particular unit which is changing cannot grow….

Generally, the findings indicated that students' level of confidence and readiness for the world of work was high, implying that they had acquired the necessary knowledge, skills and attitudes. The findings also revealed that the students made a better use of online learning media resources (YouTube, AI, e-library & textbooks) and industrial training to bridge the gap left behind by the theoretical classroom leaning.

4.6 Environment in Which TVET related programmes Operate in Universities

I examined the environment in which TVET in universities operated based on four constructs political, economic, social, technological, legal and ethical (PESTLE) which I extracted from Buye (2021, pp. 3-9).

As per Buye (2021) environment provides both facilitating and inhibiting influences on organizational performance. He emphasized that; an organization should continuously adapt to the changing environment in order to be effective and efficient. Buye (2021) demonstrated PESTLE analysis as an effective technique for analyzing the influence of environment on organizations, hence its selection for use in this study. My intention was to assess the environment in which TVET related programmes in public universities in Uganda operated in terms of PESTLE as constructs. This was mainly because a TVET related programme is not a closed system as it interfaces with its surroundings. The six facets of environment as per Buye (2021) formed the subthemes for this study as presented below:

4.6.1 Political Environment. From the programme coordinators I sought to find out the level of autonomy and freedom they had as programme coordinators to make decisions and changes on core issues concerning their programmes such as admission of students, time tables, modules/units and recruitment of lecturers. The assessment revealed that whereas the programme coordinators played a role in decision making in some aspects such as designing time tables, policy inhibited them from deeper involvement in some areas such as; admission of students, making changes in modules/units and recruitment of lecturers. In this regard, one programme coordinator (BCSME) submitted,

> with admission of students, there is a system that is followed. Students apply and final decisions are made at senate level but during admission, the department sets the requirements of what we expect of a students to be admitted [in our programme]. So when they are admitting they follow that criteria.

In a related submission, another programme coordinator (KCSTCT) expressed a mixture of both a facilitative and inhibitive political environment. He stated that:

> Okay when it comes admission of students… we the department set the requirements for the student to be admitted…. Because we are the ones that say we need a science student with such and such essentials…. In terms of time-table, it is always drafted at the departmental level…. Our head of department calls us and tells us that these are the course units you are going to lecture.

They raised a number of issues that limited their full performance which included limited powers to change the curriculum, limited access to funds, limited powers to recruit members of staff. To this effect, one of the participants (KCEAPE) observed that: "changing a program name, module, or content no. We can propose but has to be approved by National Council for Higher Education."

The constraint of adjusting the curriculum was re-echoed by another programme coordinator (BCSME) who also mentioned that:

> According to the National Council for Higher Education, a program is always reviewed after five years. So during those five years, if we feel that there is a unit we want to remove or a module which the content needs to be modified, we cannot do that. We propose and send to senate level. Yes National Council for Higher Education has that rule that you have to adhere to. So after that period, the call for the curriculum review.

The constraint of adjusting the curriculum was emphasized by other programme coordinators who revealed that nothing could be done on any curriculum until a specified period of time elapsed no matter how urgent it would be. In particular, one programme coordinator (BCSME) shared to the effect that:

> National has that rule that you have to adhere to what is happening until five years elapse. So during that time we are try to put down our points for the changes we are going to

> make after five years. So after that period they call for the curriculum review then we do at departmental level… it is discussed at senate level until it goes to National Council for Higher Education. So that one has a specific period, we cannot just say we need them to have this… no it has to go through the right procedure of scrutiny then we are allowed to teach.

As per the issue of recruitment of full-time lecturers, a programme coordinator (BCSME) admitted that this was not under the docket of the department although they were partly allowed to participate. He stated that recruitment of academic staff was bound by the Universities and Other Tertiary Institutions Act (2001). The same programme coordinator (BCSME) reported that:

> That is the work of Human Resource Manager. But after the people have applied, they always bring back the applications and I and my team look at them and then we discuss and comment then the HR shortlists. The recruitment of academic staff is bound by the Universities and Other Tertiary Institutions Act (2001) which gives authority to recruit academic staff to the appointments committee of the university council.

A programme coordinator (MCBE) pointed out policy a factor affecting their autonomy and submitted,

> Policy of the National Council for Higher Education (NCHE) does not allow us to change any parts of our programme until after five years, but we can keep sending them the proposed changes. The NCHE is rigid. The curriculum doesn't change until it has expired. Equally, staff appointments are done by the Appointments Committee of the University Council. It's the one which administers the interviews. On the day of the interview we however sometimes represent our department as technical experts.

This view underscored the inhibitive mandate of the NCHE as enshrined in the Universities and Other Tertiary Institutions Act (2001) which among others requires NCHE to; ensure minimum standards for courses of study to set and co-ordinate national standards for admission of students. This view also highlighted the dilemmas caused by laws and policies in connection to the recruitment of academic staff.

During the focus group discussions, I requested students to give their views on the autonomy and freedom they had they had on their programs of study to propose changes and decisions for the good of their programs. These informed me that the programs had predetermined fixed structures that had to be followed according to the years of study. To this effect one of the students (MFBE1) reported that:

> We have what is called core course units and we have electives. Now all through year 1 and year 2 we study core course units [where] we have to do every single one of them and they are seven. When you go to year 3 and year 4, we have two electives, so can choose one…. For example, this semester we had an elective between Robotics and Medicine I Biometric Engineering…. So some of us picked Robotics so we completely have no control of the course units we do.

The same student (MFBE1) emphasised that:

> I could say some of the things in the program have already been set and we are told that the only way some things can change is after four years when our curriculum has been revised. So before that that revision is done there are certain things you cannot change.

I sought from the students about their freedom to participate in making decisions related to their programmes. The students emphasized that they had limited freedom. In Gulu University, a student (GFSFBA) had this to say;

> They [lecturers] dictate how the timetable should be. For example, the timetable for exams. They could release the timetable and confirm it themselves. Then, during the exam time, you're already doing your exam. Someone will come and say, Hey, I have changed. Now, you're going to do this paper on this day. And you do not have a say about it. You just align. We had this *experience* this very last semester, actually.

However, there was some slight difference captured from one of the TVET related programme at Kyambogo University. In their responses, some agreed that to a large extent they had the autonomy to handle a number of issues and as well participate in some decision making regarding their programmes. One student (KFMBE1) had this to say;

> Though for the time table yes we have [autonomy) because we always do that. You find that there is meant to be lecturers on Saturday we shift them to another Saturday if we have other things to do. So time table is okay but I think the rest we have no say we really have no say because even when the lecturer gives you things in a different way when you try to say something it is taken as bias.

In terms of the political environment, the findings indicated that students' participation in critical matters concerning their programmes such as admission of students, tuition, making changes in modules/units and recruitment of academic staff was minimal or in some cases non-existent. Moreover, the students' participation was mainly curtailed by the existing external and internal university policy regime. In some cases, students' participation, even though supported by policy, was curtailed by undocumented prohibitive practices by lecturers and university management.

4.6.2 Economic Environment. As regards the economic environment, the participants revealed both facilitative and inhibitive influence of the economic environment to TVET related

programmes. I asked the programme coordinators to give their views on the autonomy they have to mobilize and/or utilize funds for the good of their programmes. They revealed their lack of autonomy to utilize fund by departments. They also revealed that though they made budgets for their departments, the funding received was not enough. For example, one of the programme coordinator (MCPEEM) mentioned that; "We make budgets and submit to management. We receive funding for our budgets but not enough. We do not have the autonomy and access to utilize the funds which our students pay." In the same line of argument, another programme coordinator (SCEECE) also reported that:

> Government grants are inadequate and affected by budget allocation by the government. We have few private students, yet fees from private students are subject to Treasury Single Account (TSA) Policy, constraining universities form direct use of funds, moreover, programmes need a lot of funds to finance equipment and others.

It appeared that TSA policy was inhibitive across universities as also viewed by another programme coordinator (BCSPTIE):

> I have already said that the funding from both the government and students is not adequate. Now government operates a single treasury account system where we have to wait to get money after it has been released by the MoFPED. Very cumbersome as sometimes it delays or your programme budget is trimmed down.

I asked students in a focus group in one of the universities if they had power to change the fees structure (to increase or to decrease). In chorus all the students chorused, "*No"* signifying that they were not involved in decision making on important issues such as setting the fees structure of their programmes. On the mode of payment, one student (GFSFBA) from the same university elaborated their plight;

> Even the policies they have, some are broken. For example, as a student you are supposed to have paid at least 75% of fees before exams, but even if you pay the 75%, you will not do exams, they want it up to zero balance, yet the policy says at least 75%. Moreover our parents are struggling at home

Despite the above, the majority of the programme coordinators, from all the five universities, when I sought their views on how best to mobilise finances to run their programmes, concurred on revising tuition fees upwards. For example, a programme coordinator (BCSAE) made the following proposal;

> We need to; reach out to the alumni that is on the smaller side; we need to review tuition and functional fees upwards and government should increase funding to the university. And then maybe if we can also do partnership with other established universities outside Uganda Also seeking support from key industrial players where our students work.

In terms of economic environment, I the findings indicated that universities had two major streams of funding. These were; government grants and fees from private students. Whereas government grants were inadequate and affected by budget cuts in all universities, the fees from private students, were subjected to the Treasury Single Account (TSA) Policy, which curtailed the universities from directly utilising the funds for the benefit of TVET related programmes. Given that TVET related education was structurally cost intensive, the findings indicated that the provision of TVET related programmes inevitably suffered quality issues.

4.6.3 Social Environment. As per Buye (2021) social forces influence the attitudes, interests and opinions of people and also create their behaviour. I assessed the social environment by finding out the sort of attitudes which both programme coordinators and students experienced from the university management (faculty/school/college); other students and the

community towards their programmes. There appeared to be predominant positive (facilitative) attitudes towards the TVET related Programmes. This could have laid a foundation for students to choose and study the TVET programmes. For example, a programme coordinator (BCAMIE) categorically gave this view; “people have high respect for Agricultural Mechanization and Irrigation engineers”. Another programme coordinator (BCSPTIE) stated; “People love our programme. It is cherished for easy access to job opportunities and for self-employment”. This was also resounded by a programme coordinators who stated; “I’m very confident that all parties have a very positive attitude towards our programme. The VC is personally proud of our programme.”

In affirmative, a programme coordinator from (KCMBE) had this to say;

> Actually the Deputy Vice Chancellor (DVC) normally says this is a programme in engineering that normally sells us most. Because we have an MoU with the Ministry of Health and when we go to the community outreaches we are supported by the Ministry of Health and it is always everywhere in press. So we are friendly with them.

However, one programme faced challenges of poor perception. Despite the programme having some scholarship opportunities, it had few students enrolling for it. A programme coordinator (BCSME) from the same university stated;

> Mining is a very good course, but needs further popularization. Both the community and the students have not yet perceived it properly. Even when we have some scholarship funding, its enrolment is still low.

I asked the students on the attitudes that the university management (faculty/school/college); other students and the community have towards the programmes they studied. On this a student (GFSBE2) gave this view;

> Well, the fact that it holds the word engineering. Whichever way they understand it, the fact that it has the word engineering, they feel it's a powerful word. It is seen as a powerful course, eh? Yes, just because of the word engineering. Though they don't even understand it.

One student (KFSCPE) stated;

> Now from other students to our course programme they have a positive one towards those pursuing it in such a way that when they hear the name Chemical Engineering … when they see you pursuing that course of course it has chemistry in it so they just know you are some top guy in chemistry….

In affirmative one student (SFEECE1) stated; “actually in the community here, people respect us so much. I have never seen the respect that I am getting today”.

However there was a differing view from one student (GFSFBA) who expressed a dilemma of loss of identity. The course they were studying had components from other agricultural courses, giving other students to question the actual identity of their course. The same student stated;

> Especially when you come in year one [for our particular programme], even your fellow year mates, like people who are in year one but doing other courses like BSC in Agriculture or something. They ask us, what are you doing? Agriculture or what? So that's the first impression they get. People who do agriculture feel like, yeah, it's our course, it's our faculty. Who are you? … Whenever they make decisions, the decision is

> based on the students of agriculture. And yet there's the rest of us who don't exactly do agriculture.

Under the social environment, the findings revealed that there were positive attitudes from the key stake holders towards TVET related programmes. This was probably due to the paradigm shift in Uganda towards science based education. The findings also revealed existence of low awareness on some TVET related programs even though such programmes had scholarship opportunities. This had lowered enrolment of students into such programmes.

4.6.4 Technological Environment. Buye (2021) contends that; changes in the technological environment may present both opportunities and threats to the organization. In this study, I examined the different technologies that the teaching staff and students of TVET related programme used to facilitate learning in terms of their availability; user-friendliness and relevance. The participants revealed both facilitative and inhibitive scenarios arising out of the influence of the technological environment to their programmes

A programme coordinator (SCEECE) reported:

> Our technologies are available, relevant and user friendly. They are accessible to students and staff for example RENU fibre internet is very fast. Workshops are enough although some equipment are obsolete.

Another programme coordinator (KCMBE) also noted that:

> We have so many high profile calibrating equipment. The technicians are teaching the (students) very well. We have technicians who know the equipment very well. They have been trained very well on how to use the equipment.

However a student (GFSFBA) for a particular programme in one of the universities painted a gloomy picture, signifying technology as inhibitive to learning:

> And you've ever seen that BMI board that you spin with hands? That thing confuses very many people. In fact, you even meet a doctor who is in 4th year and the person still doesn't know how to use it. Those doctors don't know those things.

There was also another expression of inhibitive tendencies of the technological environment as stated by a programme coordinator (KCMBE) that:

> You know technology rapidly advances. A technology that was relevant last year may not be relevant this year. Besides, the university procured so many high profile calibrating equipment… One challenge is as I told you, what to test them on. So we believe that the equipment are good in terms of Biomedical Engineering what may be archaic we have those which have been lying there, the washing machine t are those which are not so good. The X-ray machine that is there was donated so many years ago it is getting obsolete and the technology may not be compatible with it. Just to see the structure what else there are some that are really getting out of date but just to get the hardware.

A programme coordinator (KFEAPE) stated;

> Technology is there but other technology is also low and needs upgrades. On the side of our field of Automotive okay Engineering as a field like designing card software, solder works you find that we have 2020, 2016 but right now you would be expecting 2024, 2025. So that upgrading is still lacking.

Moreover some programmes were yet new and needed very expensive technologies. In such scenarios, universities relied on industrial training sessions to have students access some technologies. Even though, the private sector were guarded on their equipment and could not allow students access to practice using the technologies. A student (MFPEEM3) expressed his feelings:

> Like for example we studied drilling in petroleum engineering but no one here knows how a drilling bit looks like. I know how a drilling bit looks like in pictures but physically I've never seen it. Even I know the theory of how it works but practically no. Even when we go for a field study, yeah you stand at a distance they just explain this and this. Actually it is the same like class work.

In terms of the technological environment, the findings indicated that the teaching staff and students of TVET related programmes in universities had access to technologies that facilitated the teaching and learning process. However, some technologies were outdated, yet in some cases universities could not afford some equipment (e.g. a drilling rig) due to their high costs

4.6.5 Legal Environment. As per Buye (2021), the legal environment involves all regulatory and law determinants that can negatively or positively affect the normal functioning of an organization. In this study, I sought the views of both the programme coordinators and students on their levels of participation and involvement in their programme affairs. For most programme coordinators and students, the external and internal university policies were stringent and curtailed them from active participation in decision making about their programmes.

A programme coordinator (BCSPTIE) revealed, "when it comes to units and modules, we have no control. The policy empowers NCHE to make changes, but only after five years. But we make our observations for change which we submit to the Dean". The same programme coordinator (BCSPTIE) added that "the legal regime on employing staff was even more stringent. We are totally not involved." The students I interrogated emphasized that the students had limited participative freedom due to policy. For example on the mode of payment of tuition fees, which policy is set by the University Council, a student (GFSFBA) had this to say;

> For example, students by policy are supposed to have paid at least 75% of fees before exams, but even if you pay the 75%, you will not do exams, they want it up to zero balance, yet the policy says at least 75%. Moreover our parents are struggling at home.

In regard to the legal environment, the findings indicated that TVET related programmes in universities had peculiarities such as high cost of educational facilities (workshops and equipment). In addition, there were rapid changes in technology models, making some of them obsolete before universities could acquire the latest models to facilitate effective learning. Furthermore, whereas a specific policy (TVET Act, 2025) existed to guide the TVET education, it was silent on TVET related programmes in universities, yet the Universities and Other Tertiary Institutions Act (2001) on the other hand provided for the general regulation of university education, regardless of the peculiarities surrounding the TVET related programmes (e.g, cost intensiveness).

4.6.6 Ethical Environment. According to Buye (2021), ethical factors involve duties, morality, integrity, behaviour, what is good and bad for the organisation, employees and society as a whole. Values influence the way people interact, make decisions, and handle challenges. A strong set of values creates a positive and consistent workplace culture where employees feel connected and motivated. In this study, I sought views of the students on the values exhibited by the teaching staff and students of their programme. By far and large most of the students affirmed they had confidence in themselves based on the values they learnt in their respective programmes. For example, a student (GFSBE1) stated, “but then, me, most of my ethics, I get them from my school. There is the person I look up to. I know he's a professor. He's an associate professor. So, he is always available when I need him. When I work on my research or consulting, he's always there for me”.

From another programme in the same university, a student (GFSBE2) stated:

> We are key on being environmentally aware. All the solutions that we provide are kind of focusing on green technologies that are environmentally friendly. Promotion of environmental sustainability, something like this. Yeah, sustainability. And then our goals are towards the Sustainable Development Goals (SDGs). They call them the engineering ethics.

Another student (BFAMIE) affirmed;

> As engineers, we have been groomed, they advise us that for whichever project that you're planning about, you plan for generations ahead…. we have been mentored through environmental health and safety. So, it has been exposed to us that most of the challenges that we face in the environment, they are because of our own activities. So, …it is within us that whichever activity that we do, it should be in line with the safety of the environment.

As per the ethical environment, the findings revealed that most coordinators and students exhibited strong ethical values and were bound to the professional ethics of their respective programmes.

Chapter Five

Discussion, Conclusions and Recommendations

5.0 Introduction

The purpose of this study was to examine the state of TVET related programmes in public universities in Uganda as guided by systems theory in terms of the state of its inputs, transformation mechanisms, outputs and the environment. In this chapter, the primary findings of this study are discussed as well as the study's major conclusions and contributions to the body of knowledge on the topic. The study's limitations are also discussed and opportunities for future investigations are offered. Finally practical recommendations to facilitate the comprehensive provision of TVET related programmes in public universities are offered.

5.1 Discussion of Findings

The discussion of findings are structured based on the four themes (inputs to TVET related programmes, transformation mechanisms of TVE related programmes, outputs of TVET related programmes and the environment in which TVET related programmes operate), derived from the four questions of the study (Refer to Subsection 1.4). Accordingly, I discussed each theme based on the subthemes under it. The discussion sets up the conversation between the existing literature and the study's primary findings with the aim of advancing new knowledge on the topic.

5.1.1 Inputs to TVET Related Programmes in Universities. I conceptualized inputs to TVET related programmes in universities in terms of students (National Council for Higher Education [NCHE], 2007), academic staff, finances and educational facilities NCHE (2001). In terms of student as inputs to TVET related programmes I universities, the findings revealed that

some of the students had been admitted through the higher education certificate (HEC) program offered by universities, others through diploma scheme, but the majority had been admitted through direct entry from senior six. This finding tallied with the expectations of the National Council for Higher Education as enshrined in the "Minimum Entry Requirements for Admission to Universities" (National Council for Higher Education [NCHE], 2007, p. 845). From the findings, students had opted to pursue TVET related programmes for various reasons. But the overarching reason for them to select the programs was the high hopes of acquiring skills that would access them job opportunities after their studies. The students, therefore, had high expectations to acquire necessary technical skills and knowledge that would enable them to compete favourably for the job market or create jobs for themselves. The students' expectations indeed coincided with those of program coordinators who also observed that the programs they coordinated were highly employable. I was able to find cases where students who were offering some of the programs such as mining, had been able to get jobs even before completion of their studies. Furthermore, the students' aspirations confirmed a revelation by Wamala (2023) who examined the relationship between TVET education attainment, employment and poverty in Uganda and found out that TVET education attainment was a key determinant of employment outcome for the Ugandan labour.

While the programs had been praised for being attractive and offering high opportunities of employment, it was not true that all the students offered them as their best choices. Some of the students actually offered the programmes as a way of attaining other academic levels. For others, it was due to the influence of their family members, especially parents. There were cases where students lacked awareness of what exactly the programs entailed. Other students took up the programs because they were given to them under government sponsorship and they had no

option. Indeed, such scenarios were not only found in Ugandan universities. Yi Shi1 & Bangpan (2022) investigated young people's learning process and consequences of TVET participation in Low and Medium Income Countries (LMICs) and revealed that family and community had "a decisive influence on young people's learning and wellbeing" (p. 32). Unfortunately, such cases raise a risk of both parents and government losing resource in training such students, who may in future follow a different career path. This calls for more intensified career guidance and awareness to both parents and students.

On challenges that limited the students from achieving their expectation in regard to the programs they were offering, the findings indicated lack of practical approaches in teaching most of the course units. This finding corroborated with that of Jjuuko et al. (2019) who investigated on the pedagogical practices in an agricultural college in Uganda and found out that there had been "limited evidence to suggest effective preparation of students for the agricultural world of work" (p. 247). They found out that lecture had been the most common teaching-learning method used by the lecturers in the case study college, as opposed to the demonstration and farm practice method which integrated both theory and practice. According to Jjuuko et al. (2019), the "methodological dilemmas" had contributed to a huge failure of TVET education.

From the findings, lack of practical exposure, limited the students from delivering to the expectation of the industry since their practical skills were low. To the extreme, some course units which required practicals were being taught online hence disadvantaging students. This situation created a gap between what was taught and what is on demand in the industry. To meet the demands of the 21st century workplace, Oviawe et al. (2017), hinting on exposure of leaners, emphasise that "TVET educational institutions [needed to] collaborate with the industry towards bridging the skill gap" (p. 7). If such collaborations are to be achieved, then universities offering

TVET related programmes must embrace the practical approach of teaching. This requires acquisition of technical staff as recommended by Oludolapo et al. (2020); that governments should support institutions offering TVET in hiring more trained teachers and also "spearhead curriculum changes in order to make the curriculum flexible and work-oriented" (p. 184).

In terms of staff as inputs to TVET related programmes, I found out that universities had staff which were dominated by masters degree holders. The senior qualified staff such as PhD holders or professors were few to the extent that even some departments did not have any. But generally majority of the universities were understaffed with most of the staff being on part time basis. I found some cases where students at different levels such as degree program, diploma and certificate combined during some lectures. The findings also indicated that some of the lecturers were overwhelmed with marking students' scripts to the extent that some students hardly received accurate feedback of their course works. Due to the overwhelming work load, some of the lecturers resorted to giving hand outs to students which they (students) found it hard to understand. This resonated with the findings of Jjuuko et al. (2019) who reported that lecture was the common teaching-learning method used at the agricultural college (their case study). According to Jjuuko et al. (2019), students of the agricultural college contended that the quality of lecturing was wanting and that it was, "mostly characterised by supply of handouts [lecture notes]" (p. 246). This finding also corroborated that of Ddungu-Kafuluma (2014) who explored what globally competitive technical teacher training should be and the extent to which "technical teachers in Uganda [were] globally competitive" (p. 27). Ddungu-Kafuluma (2014) revealed that TVET teacher training in Uganda had still been very conservative and oblivious to modern technical training. This had made Uganda's technical teacher graduates "less competitive in the global market" (P. 32).

I found out that, in the event that lecturers had not been available, students resorted to discussions and use of ICT tools, predominantly YouTube and artificial intelligence (AI). This situation sparked a reflection of what Oludolapo et al (2020) suggested that governments need to hire more trained teachers to support TVET institutions. My findings however disagreed with that of Sannerud (2019) who reported that some universities such as Kyambogo had built considerable capacity among the academic staff who were able to successfully deliver TVET programmes.

Regarding finances as inputs to TVET related programmes in universities, my findings were no different from that of Okumu and Bbaale (2018) who examined the TVET sub-sector in Uganda and found out that financing constraints had resulted in poor quality equipment and limited adoption of a competence-based education and supervision inadequacies of TVET institutions. I found out that government funding to support TVET related programmes had remained limited, despite the high costs associated with the delivery of the programs. The other stream of funding from tuition which were fees from private students were subjected to treasury single account (TSA) policy which constrained universities from direct use of funds. Moreover, funding to universities was associated with budget cuts and delayed releases. I found out such constraints had adverse negative effects on the performance of TVET related programmes in universities as corroborated by Okumu and Bbaale (2018). Going on with this trend of financial constraints unchecked, will see TVET related programmes in universities producing graduates of low quality in terms of skill, knowledge and attitudes. Moreover, the situation is expected to worsen due to the coming in of the TVET Act (2025), which scope excludes TVET related programmes in especially universities established under the UOTIA Act (2001).

Educational facilities as inputs to TVET related programmes in universities, included things such as teaching and learning equipment, laboratories, computers, internet among others. These are critical requirements in the operation of learning in institutions as spelled out in NCHE (2001, pp. 877-878). In general these facilities were adequately available in most of the university. The availability of resources such as the internet gave a big advantage to students in terms of research and personal reading. Other resources such as the e-library provided a wide and accessible reading materials. But I came across some cases where the training equipment and facilities were very rare and expensive to the extent that universities could not afford them and at the same time students were prohibited from getting in touch with them when they went for industrial training. This indeed remained a big challenge to both the students and universities. Scenarios of insufficiency or obsoleteness of educational facilities for TVET had been repeatedly reported by a number of researchers including; Ddungu-Kafuluma (2014); Okware and Ngaka (2017); Okumu and Bbaale (2018); Wamala (2023). On this note, Dogara et al. (2018) offer advice which I consider worth pursuing. That the governments should provide the enabling environment in TVET institutions for the appropriate implementation of TVET and to "facilitate adequate acquisition of practical skills at technical colleges" (p. 51).

5.1.2 Transformation Mechanisms of TVET Related Programmes in Universities. I conceptualized transformation mechanism of TVET related programmes in universities in terms of academic staff/students contact hours as per the checklist of quality and universities capacity indicators (NCHE, 2001) and the learning process (Kirkpatrick and Kirkpatrick, 2019). Regarding academic staff/students contact hours I found out that in most cases universities had set standard student contact hours which had to be followed. However, I found out that the actual staff/students contact hours achieved, were often less than what was programmed. While several

reasons were raised, the overarching reason was that staff were dominated by part time lecturers. According to the study findings, part time lecturers had very little time to attend to student to the extent that some would appear towards the middle or even three weeks to the end of the semester. This situation left a very big gap between what students ought to cover and what actually the covered by the end of their programs. While universities had relied on many part time lecturers to support the few full time staff, findings suggested that these (part time lecturers) were in addition busy with their personal businesses since universities would take long periods such as a full semester without paying them.

As per the learning process it is important to note that TVET related programmes programs are supposed to be more practical than theory in nature. TVET related programmes are designed with the aim of producing graduates with work ready (employable) skills (i.e., competitive knowledge, technological expertise, hands-on practical skills and the right attitudes) in handling the various sectors of economic and social life (UNESCO & ILO, 2003). Although I found out cases of use of practical approaches for teaching, there was a high inclination towards the theoretical approach. This again affected students in that it resulted into a gap in practical skills gained which are needed for industrial work. As Jjuuko et al. (2019) noted, such kind of student preparation in TVET institutions does not produce students who are ready for the job market. This observation of Jjuuko et al. (2019) on the learning process in TVET intuitions, tallies with that of Okumu and Bbaale (2018) who undertook a diagnostic study of the TVET sub-sector in Uganda and reported that Uganda's educational structure was generally characterized by what they termed as "*the degree syndrome* where individuals enrolled at university for a sense of achievement, even though university education was more theoretical than practical" (p. 746).

5.1.3 Outputs from TVET Related Programmes in Universities. I conceptualized outputs from TVET in universities as the behavior of graduates as per Kirkpatrick"s training evaluation model level three. According to Kirkpatrick and Kirkpatrick 2019), behavior refers to, "the degree to which participants [graduates] apply what they learn during training (p. 4). From Kirkpatrick"s model, I conceived behavior in terms of knowledge, skills and attitude. According to my study findings graduates from TVET related programmes in universities were good and competitive with a high industry demand implying that they (graduates) had acquired the necessary knowledge, skills and attitudes. They were ready for the world of work since industry indicated high demands for them. Their exposure to industries as early as year one was a strong tool in developing their skills. In addition, the students' personal investment in research and their use of IT tools such as Youtube and AI were other strong tools behind their skill development and confidence.

These findings indicated that majority of the students were in position to apply the knowledge they had acquired in their daily situations such as repairing domestic electrical gadgets or advising communities on how to manage chronic diseases such as diabetes. It was also an indication that despite the challenges such as limited practicals students benefited from what they had been taught and could apply it outside classroom. The personal learning initiative by students confirms the findings of Douse and Uys (2019) who examined the emerging roles of TVET instructors in the context of the digital age and reported that "digitization enabled and required the transformation of the scope, delivery, and effectiveness of TVET (p. 36)." In essence, digitization enhanced the quality of TVET outputs (i.e., TVET related programmes graduates). The findings were also in line with the argument by Afeti and Adubra (nd) who reported that technical and vocational skills are advocated because they promote employability,

employment, productivity, and lifelong learning. TVET skills and knowledge are key in creating self-employment. In the same line of argument Wamala (2023) reported that TVET education attainment is a key determinant of employment outcome for the Uganda labour force.

However there were some cases where students could not relate the knowledge and skills they had acquired outside the classroom. These had almost no idea of what to do to the existent that they were even doubted whenever they went out to the field. This meant that industries would not take them up because of the knowledge gap between what they had and what was needed. Such students lacked exposure to modern technology, equipment, staff especially professors and generally hands on experiences. In affirmation of this finding, Dogara et al., (2018) who reviewed literature on instructional methods employed at technical colleges, revealed that effective 21st century pedagogical approaches had been "rarely employed at the TVET institutions for the acquisition of adequate relevant skills by the students" (p. 50). To catch up with the demands of the job market, such students had to enrol afresh for short courses in other institutions other than universities where teaching was more practical as compared to universities.

5.1.4 The Environment in which TVET Related Programmes Operate in Universities. I conceptualized the environment in which TVET related programmes in universities operated as political, economic, social, technological, legal and ethical (Buye, 2021). As per Buye (2021) environment provides both facilitating and inhibiting influences on organizational performance. He emphasized that; an organization should continuously adapt to the changing environment in order to be effective and efficient. Buye (2021) demonstrated political, economic, social, technological, legal and ethical (PESTLE) as an effective technique for analyzing the influence of environment on organizations in which organisation operate. I found out that academic staff

played some roles in decision making in some aspects such as designing time tables, but they were inhibited from deeper involvement in critical matters such as admission of students, making changes in modules/units and recruitment of lecturers. Even the curricula were designed according to the rigid demands of National Council for Higher Education and any change required to wait for a specific period of time (five years) as enshrined in the UOTIA Act (2001), which stipulates the functions of UNCHE (2001, Section 5, [g & i]) as "to monitor, evaluate and regulate institutions of higher education; to ensure minimum standards for courses of study and the equating of degrees, diplomas and certificates awarded by the different public and private institutions of Higher Education."

In terms of economic environment I found out that that the main source of government aided universities were government grants which were inadequate and affected by budget allocation according to the government. The other stream would have been fees collection from private students but these (fees) were subjected to Treasury Single Account (TSA) Policy (through URA), which limited the universities from directly using funds to meet the TVET related programmes needs, yet the programmes needed a lot of funds to finance equipment and other aspects. Study findings in addition revealed that universities had rigid policies on fees structure, which stipulated down payment of at least 75% before registration, of which students had no powers of negotiation. Such policies affected many students whose parents were low income earners and the extreme the poor, hence promoting imbalance in access to higher education.

From the social environment in universities, findings suggested that there were positive attitudes towards the TVET related Programmes from university management, students, parents and communities at large. This could have been attributed to the promise of employment which

TVET related programs inherently have and the paradigm shift from the old perception of TVET programs as inferior to the growing perception of TVET as important. Despite, the changing attitudes towards TVET related programmes, findings indicated that there were still programs such as BSC in mining which had low enrolment despite the existence of scholarship opportunities. Most participants agreed that such programs needed to be popularized so that stakeholders perceive it properly. This view is supported by Enamudu et al. (2024) who examined the status of TVET and the place of counselling in achieving TVET objectives and ensuring that, the skills and knowledge acquired through TVET are applicable and desired by employers in the changing world of work. They recommended that governments should "embark on public sensitisation against negative perceptions towards TVET." (p. 26).

As for the technological environment, findings indicated that the teaching staff and students of TVET related programmes had relevant and user friendly technologies that facilitated the teaching and learning processes. Internet was one of the technologies that provided a facilitative teaching and learning environment for both teaching staff and students in all the universities in this study. There were concerns however, that some technologies required upgrading since they were outdated. This concern substantiated the findings of Okumu and Bbaale (2018), who in their diagnostic study of the TVET sub-sector in Uganda, reported among other poor quality equipment.

In regard to the legal environment findings indicated that both external and internal university policies had been stringent and limited active participation of both programme coordinators and students in decision making about their programmes. From the external environment, National Council for Higher Education had policies that had to be adhered to, as dictated by the UOTIA Act (2001). Peculiarities associated with TVET related programmes had

been disregarded, yet the TVET Act (2025) was equally silent about TVET related programmes in universities. Universities also had internal policies (e.g. policy on payment of tuition) that programme coordinators, students as well as parents had to adhere to, but were discriminatory and disadvantaged the less privileged. As per the ethical environment, I found out that most students exhibited strong ethical values and were bound to the professional ethics of the respective programmes they pursued.

5.2 Conclusions

Basing on the discussion in (Section 5.1) conclusions were accordingly drawn based on the four questions of this study:

5.2.1 Inputs to TVET Related Programmes in Universities. I examined *i*nputs to TVET related programmes in universities in terms of students, academic staff, finances and educational facilities (NCHE, 2001). In terms of students as inputs to TVET related programmes in universities, discussions indicated that all universities admitted the right quality of students as per (NCHE, 2007). Admissions had been done through the three main avenues (i.e., higher education certificate; the diploma scheme & the majority through direct entry from senior six).

On reasons for enrolment into TVET related programmes programmes, the majority of students had enrolled for their respective programmes based on the prospects for career opportunities attributed to the programmes after completion. However, for some students, enrolling for TVET related programmes had not been their choice, but that of their parents. Such students planned to join other careers after completion of their studies. On challenges faced while pursuing their programs, students had encountered lack of practicals and limited exposure

to the industry as key challenges. These reduced their ability to achieve the skills needed at the job market.

In terms of academic staff as inputs to TVET related programmes in universities, most universities had employed enough lecturers, but majority of the lecturers had been of low skill and qualification. There had been extremely few senior qualified staff such as PhD holders and/or professors. Universities had relied on part timers whom in most cases they (universities) had not been able to pay on time.

As far as finances as inputs to TVET related programmes in universities were concerned, government grants in all universities had been inadequate to finance quality provision of TVET related programmes, and had most often been affected by budget cuts and delay in releases. Moreover, fees from private students had been subjected to Treasury Single Account (TSA) Policy (through URA), which had constrained universities. They (universities) could not directly use the funds, yet the demands of the TVET related programmes were high and could not wait. In terms of educational facilities as inputs to TVET related programmes in universities, all the universities had adequate teaching and learning resources for the teaching of TVET related programmes. However, most educational facilities had been very expensive, insufficient and technologically out of date. This affected the learning process.

5.2.2 Transformation Mechanisms of TVET Related Programmes in Universities. I examined transformation mechanism of TVET related programmes in universities in terms of academic staff/students and learning process. In terms of staff/student contact hours, most universities had set their standard structure which had to be followed. However, the realized staff/students contact hours were often less than what had been stipulated in the time tables. This was because universities had inadequate full time academic staff and heavily relied on part time

and assistant lecturers whom they (universities) had often failed to pay in time. Moreover, some fulltime academic staff had been intermittent in their attendance to duty. As per the learning process, there had been use of poor pedagogy by lecturers, who predominantly employed theoretical approaches for teaching as opposed to practical approaches. This had reduced the ability of students to acquire the necessary skills needed in the 21st century work place.

5.2.3 *Outputs from TVET Related Programmes in Universities.* I examined *o*utputs from TVET related programmes in universities in terms of knowledge, skills and attitude which students had acquired during and after their programs of study. Based on the discussion in Section 5.1, most students pursuing TVET related programmes programmes in all universities had been good and competitive, implying that they had acquired the necessary knowledge, skills and attitudes. The students had relied on personal learning and research using online media resources (YouTube, AI, e-library & textbooks), and had made the better use of industrial training to bridge the gap left behind by the theoretical classroom leaning. However some of the students could not apply the knowledge and skills beyond the classroom, hence had not been not ready for the job market. This was due to the teaching methodologies which had focused more on the theory rather than the practical. Other causes were limited exposure to modern technology and use of obsolete learning equipment and the inadequate senior staff, especially professors.

5.2.4 The Environment in which TVET Related Programmes Operate in Universities. Environment in which TVET related programmes in universities operated was operationalized as political, economic, social, technological, legal and ethical factors. From the political aspect, universities' external and internal policies had been stringent on active participation of both programme coordinators and students in decision making in critical matters concerning their

programmes such as admission of students, tuition, making changes in modules/units and recruitment of academic staff.

In terms of economic environment on TVET related programmes in universities the major streams of funding were government grants which had been inadequate to meet the needs of the universities. The second stream of funding was fees collection from private students, which universities had no direct access to, since it had been had controlled under the Treasury Single Account (TSA) Policy. Students on the other hand operated under a rigid fees structure which had heightened the imbalance in access to higher education.

In terms of the social environment, there had been positive attitudes towards the TVET related programmes programmes from the stake holders due to the paradigm shift. However, there had existed low awareness on some programs even though they (programmes) had scholarship opportunities. This had lowered enrolment of students into such programmes. For the technological environment, teaching staff and students of TVET related programmes had technologies that facilitated the teaching and learning process. However, some technologies had been outdated, yet in some cases universities could not afford some equipment (e.g. a drilling rig) due to their high costs. In regard to the legal environment both external and internal university policies had been stringent and had limited the active participation of academic staff and students in decision making about their programmes. There had been no specific policy to guide the provision of TVET related programmes in universities. The Universities and Other Tertiary Institutions Act (2001) provided for the general regulation of universities. The peculiarities associated with TVET related programmes in universities (e.g., high cost of educational facilities) needed a specific policy framework, yet the Technical, Vocational Education and Training Act (2025) was silent on TVET in universities. As per the ethical

environment, most coordinators and students exhibited strong ethical values and were bound to the professional ethics of their respective programmes.

5.3 Recommendations

In light of the conclusions in Section 5.2 of this study on technical, vocational education and training (TVET) related programmes in public universities in Uganda, I make the following recommendations based on the four questions of this study (i.e., inputs to TVET related programmes in universities, transformation mechanisms of TVET related programmes in universities, outputs from TVET related programmes in universities and the environment in which TVET related programmes in universities operated):

5.3.1 Inputs to TVET Related Programmes in Universities. To enhance enrolment into TVET related programmes in universities, the Technical Vocational Education and Training Operations and Management (TVET O&M) department of the Ministry of Education and Sports should strengthen career guidance on TVET related programmes in universities at high school level. Universities on the other hand, through their academic registrars' offices should enhance sensitisation of communities and popularisation of TVET related programmes. In terms of academic staff as inputs to TVET related programmes in universities, all universities (through their university secretaries) should ensure recruitment and filling of the staffing levels of all faculties and/or schools offering TVET related programmes up to 100% (inclusive of senior lecturers and professors) as guided in the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, pp. 877-878). On finances as inputs to TVET related programmes in universities, Ministry of Education and Sports together with the Ministry of Finance, Planning

and Economic Development should jointly revise (upwards) the grants to universities offering TVET related programmes, with special consideration on the peculiarities associated with the TVET related programmes (e.g., high unit cost of training equipment). Government through the Ministry of Finance and Economic Development (MoFPED) should prioritise TVET related programmes in universities and ensure adequate budget allocation and timely releases. On educational facilities as inputs to TVET related programmes, universities (through their university secretaries) should deliberately plan for and invest in the provision of sufficient and technologically up-to-date educational facilities (workshops, equipment, libraries) for TVET related programmes. This will ensure exposure of TVET related programme students, hence production of skilled graduates ready to meet the manpower requirements of the 21st century work place.

5.3.2 Transformation Mechanisms of TVET Related Programmes in Universities. To ensure attainment of staff/students contact hours for all programmes as planned, faculty and/or school deans in all universities should strengthen their supervisory functions and structures to ensure that both full time and part time lecturers observe their lectures as planned. As per the learning process, I recommend that university governing councils should prioritise and enhance the capacity building fund targeting TVET related programme staff in faculties and/or schools holding TVET related programmes. Subsequently, faculties and/or schools deans should organise refresher training for all TVET related programme lecturers on the use of practical approaches.

5.3.3 Outputs from TVET Related Programmes in Universities. To further boost students' personal learning and research using (YouTube, AI & e-library), faculty and/or school deans in all universities should plan for and provide robust and fast internet in their compounds

at all times. NCHE and university academic registrars should strictly enforce annual observance of industrial training as mandatory in every academic year for all TVET related programmes.

5.3.4 Environment in Universities in which TVET Related Programmes Operate. To ensure provision of a facilitative environment to TVET related programmes operations in universities, I make three recommendations. First, Ministry of Education and Sports should put in place a deliberate policy to ensure effective management, funding and provision of TVET related programmes in public universities. The UOTIA Act (2001) is generic on university education, yet the TVET Act (2025) by its scope excludes TVET related programmes in universities. Secondly, University councils should put in place policies which enhance active participation of programme coordinators and students of TVET related programmes in decision making concerning their programmes. Thirdly, universities (through their academic registrars) should intensify their community engagement function and thereby enhance awareness creation on TVET related programmes in universities and its implication for employment opportunities and/or job creation

5.4 Contributions

In this study I examined TVET related programmes in public universities based on the four research objectives of the study (Section 1.3) My contributions of this study were two and these were theoretical contributions and policy contributions.

5.4.1 *Theoretical Contribution.* My study made a number of contributions to the growth of systems theory. It provided a platform for exposure of systems theory to readers of my work, hence wider adoption and use by future researchers in other fields. I also designed two data

collection instruments (Refer to Appendices C & D) based on the four aspects of systems theory which could be tailored by future researchers in other areas other than TVET related programmes, hence popularizing systems theory.

5.4.2 *Policy Significance.* Findings of this study made a number of contributions in regard to policies. This study provided the state of TVET related programmes in public universities in Uganda as guided by systems theory that is the state of its inputs, transformation mechanisms, outputs and the environment in which TVET related programmes in public universities operate. These findings provided a basis for reference in Uganda's effort to respond to a number of international conventions. For example sustainable development goal (SDG) number four seeks to ensure quality education by 2030 by substantially increasing the number of youths and adults who have relevant skills, including technical and vocational skills (United Nations [UN], 2015). Aspiration number six of the African Union Commission (AUC) in its "Agenda 2063" (AUC, 2015) seeks "an Africa whose development is people-driven, relying on the potential of African people, especially its women and youth, and caring for children" (p. 6).

Nationally, the study contributed to enrich the systematic and integrated planning, investment and provision of TVET related programmes which recognises the interractability of the four components of a system (i.e., inputs, transformation mechanisms, outputs and the environment). With respect to the TVET Act (2025) and the TVET Policy (MoES, 2019), which are silent on TVET related programmes in public universities, the study is of benefit in informing MoES in the design of better and inclusive TVET policies which encompass TVET related programmes in the public universities.

5.5 Limitations of the Study and Suggested Areas for Further Research

This study had a number of limitation despite its contributions as given in Section 5.5. For example, the study only included programme coordinators and students as participants to the study. Being qualitative, the study could have left out equally rich views on TVET related programmes from certain categories of stakeholders such as players from the industry, parents and representative from NCHE. The outcome of this could have been affected by Secondly, the study being qualitative could have left out key information that could have been obtained if it was quantitative of a mixed study. Thirdly, this study focused only on TVET related programmes in public universities, leaving out private universities. Based on these limitations, I recommend further efforts in the following areas:

i. Further studies should be conducted inclusive of other categories of stakeholders of TVET related programmes such as parents, industry players and representatives from National council for Higher Education.

ii. More studies should be conducted focusing on TVET related programmes in private universities. This is hoped to give a well-balanced picture of the TVET related programmes in universities in Uganda.

iii. More studies are needed which use either quantitative approach or mixed approach of research.

List of References

Adamsa, A. Z., Intsiful, E. B., Haruna, Z & Essumand, A. (2024). Examining public perception on technical and vocational education and training enrolment in Ghana. *International Journal of Training Research, 22*(2), 147–164. https://doi.org/10.1080/14480220.2023.2222943

Afeti & Adubra (nd). Skilling Africa: The paradigm shift to technical and vocational skills development. https://old.adeanet.org/en/system/files/adea_tvsd_paradigm_shift_paper.pdf

African Development Bank Group. (2018). Revitalizing technical and vocational education and training in Africa: Youth skills development for inclusive and sustainable growth. AfDB. *Journal of Vocational, Adult and Continuing Education and Training 1*(1). 10.14426/jovacet.v1i1.298

African Union Commission [AUC]. (2015). *Agenda 2063: The Africa we want* (popular version). https://au.int/sites/default/files/documents/36204-docagenda2063_popular_version_en.pdf

Agole, P., Kerre, B. W., Ochieng, D., & Okaka, W. (2022). Challenges confronting technical and vocational education and training in developing countries: A case of Uganda. *African Journal of Engineering, Science and Technology*, *9*(2), 45–56.

Aldossari, A. S. (2020). Vision 2030 and reducing the stigma of vocational and technical training among Saudi Arabian students. *Empirical Research in Vocational Education and Training*, 12(3), 1-24. https://doi.org/10.1186/s40461-020-00089-6

Atukwase, A. (2015). Development of vocational education in Uganda: The potential of internationalisation. *Ammattikasvatuksen Aikakauskirja*, *17*(2), 97–102. https://journal.fi/akakk/article/view/90108

Bonvin, J. M. (2019). Vocational education and training beyond human capital: A capability approach. In S. Mcgrath, M. Mulder, J. Papier, & R. Suart (Eds). *Handbook of vocational education and training: Developments in the changing world of work* (pp. 273-289). Springer Nature. 10.1007/978-3-319-94532-3_5

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27-40. 10.3316/QRJ0902027

Bridgen, S. (2017). Using systems theory to understand the identity of academic advising: A case study. *NACADA Journal*, *37*(2), 9–20. 10.12930/NACADA-15-038

Business, Technical, Vocational Education and Training [BTVET] Act (2008).

Buye, R. (2021). Organisational analysis tools and techniques: Critical reflection on the PESTLE analysis and other related techniques. 10.13140/RG.2.2.27060.78727

Clark, B. R.., Berkeley, and Angeles, L. (1983). The higher education system: Academic organization in cross-national perspective. *London Review of Education*, *8(3)*, 229–237. 10.1080/14748460.2010.515122

Casteel, A., & Bridier, N. L. (2021). Describing populations and samples in doctoral student research. *International Journal of Doctoral Studies*, *16*, 339-362. https://doi.org/10.28945/4766

Chih-Hui, L., & Sapphire, H. L. (2017). Systems theory. In R. S. Craig, & L. Laurie (Eds in Chief),

J. R. Barker, J. Keyton, T. Kuhn, & P. K. Turner (Ass. Eds). *The international encyclopaedia of organizational communication, (pp. 1-18).* John Wiley & Sons. 10.1002/9781118955567.wbieoc203

Chinedu, C. C., Wan-Mohamed, W. A., & Ajah, A. O. (2018). A systematic review on education for sustainable development: Enhancing TVET teacher training programme. *Journal of Technical Education and Training (JTET), 10*(1), 109-125. https://10.30880/jtet.2018.10.01.009

Connelly, L. M. (2016). Understanding research: Trustworthiness in qualitative research. *MEDSURG Nursing*, *25*(6), 435-436.

Cox, M. J., & Paley, B. (2003). Understanding families as systems. *Association for Psychological Science*, *12*(5), 193-196. https://doi.org/10.1111/1467-8721.01259

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.

Dakwa, F. (2015). The interview method. In C. Okeke, & M. van Wyk (Eds.), *Educational research: An African approach* (pp. 296-315). Oxford University Press Southern Africa.

Ddungu-Kafuluma, M. J. (2014). A review of the quality of technical teacher training in Uganda: Implication for global competitiveness. *African Journal of Education, Science and Technology*, *1*(4), 27-34. https://ajest.info/index.php/ajest/article/view/224

Dobrydina, T., Usvyat, N., & Shipilova, T. (2019). Information and communication technologies (ICT) in VET in Russia: New developments. In S. Mcgrath, M. Mulder, J. Papier, & R. Suart (Eds). *Handbook of vocational education and training: Developments in the changing world of work* (pp. 62-75). Springer Nature. https://link.springer.com/referencework/10.1007/978-3-319-94532-3

Dogara G., Saud M. S., Kamin Y., & Jwasshaka S. K. (2018). Meta-analysis on instructional methods employed and challenges at technical colleges in Nigeria. J*ournal of Advanced Research in Social and Behavioural Sciences, 12*(1), 45-53. www.akademiabaru.com/arsbs.html

Douse M., Uys P. (2019). TVET Teaching in the Time of Digitisation. In: McGrath S., Mulder M., Papier J., Suart R. (eds) *Handbook of Vocational Education and Training. Springer, Cham* (pp.1-16). Springer, Cham. https://www.researchgate.net/publication/330010966_TVET_Teaching_in_the_Time_of_Digitisation/link/5c29ef98458515a4c702ac79/download?

Education Policy Review Commission [EPRC]. (1989). *Education for national integration*. Ministry of Education and Sports.

Enamudu, G.P., Oladunmoye, E.O., Okoye, P. C. (2024). Strengthening TVET to meet industry needs in the changing world of work: Implications for counselling. *ISAR Journal of Arts, Humanities and Social Sciences*, 2(5), 23-28. https://isarpublisher.com/journal/isarjahss

Fàbregues, S., & Fetters, M. D. (2019). Fundamentals of case study research in family medicine and community health. *Family Medicine Community Health.* 10.1136/fmch-2018-000074

Featherston, C. R., & Doolan, M. (2012, July 22-26). *A critical review of the criticisms of system dynamics* [Paper presentation]. The 30th International Conference of the System Dynamics Society, St. Gallen, Switzerland.

French, W. L., & Bell, C. H. (1990). *Organization development: Behavioural science interventions for organization improvement* (4th ed.). Prentice-Hall International.

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework

method for the analysis of qualitative data in multidisciplinary health research. *Medical Research Methodology*, *13*, 1-8. http://www.biomedcentral.com/1471-2288/13/117

Gay, L. R., Mills, G. E., & Airasian, P. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson Education.

Jjuuko, R., Tukundane, C., & Zeelen, J. (2019). Exploring agricultural vocational pedagogy in Uganda: Students" experience. *International Journal of Training Research*, *17*(3), 238-251. 10.1080/14480220.2019.1685161

Johnson, R. A., Kast, F. E., & Rosenzweig, J. E. (1964). Systems theory and management. *Management Science*, *10*(2), 367-384. https://www.jstor.org/stable/2627306

Jwasshaka & Fadila (2020). Minimizing unemployment of graduates through technical education and training: Meta-analysis approach in Nigeria. Literature review. *International Journal of Academic Research in Business and Social Sciences, 10*(2). 10.6007/IJARBSS/v10-i2/6858

Kintu, D., Kitainge, K. M., & Ferej, A. (2019). An exploration of strategies for facilitating graduates" transition to the world of work: A case of technical, vocational education and training graduates in Uganda, *18(2), Advances in Research*. 10.9734/AIR/2019/v18i230087

Kirkpatrick, J., & Kirkpatrick, W. (2019). *An Introduction to the new world Kirkpatrick*. Kirkpatrick Partners. https://www.kirkpatrickpartners.com/wp-content/uploads/2021/11/Introduction-to-the-Kirkpatrick-New-World-Model.pdf

Kluve, J., Puerto, S., Robalino, D., Romero, J. M., Rother, F., Stöterau, J., Weidenkaff, F. & Witte, M. (2017). *Interventions to improve the labour market outcomes of youth: A systematic review*. Campbell Systematic Reviews. 10.4073/csr.2017.12

Maclean, R., & Lai, A. (2011). The future of technical and vocational education and training: Global challenges and possibilities. *International Journal of Training Research, 9*(12). 10.5172/ijtr.9.1-2.2

Makerere University Directorate of Research and Graduate Training [Mak DRGT]. (2024). *Graduate Handbook of Policies, and Guidelines and Procedures.* https://www.mak.ac.ug

Makinde, W. A., & Bamiro, T. O. (2022). Service quality of teaching vocational education and training (TVET) and student's satisfaction in Nigeria. *Journal of Pedagogy and Education Science (JPES), 2*(01), 0-25. 10.56741/jpes.v2i01.157

Matenda, A. (2019). *The role of technical and vocational education and training in women"s empowerment: A capabilities perspective* [Unpublished doctoral dissertation]. University of the Free State, South Africa

Mbarara University of Science and Technology Statute (1989).

Mbarara University of Science and Technology [MUST]. (2020). *Strategic plan 2020/2021-2024/2025.* https://www.must.ac.ug

McGrath, S., Ramsarup, P., Zeelen, J., Wedekind, V., Allais, S., Lotz-Sisitka, H., Monk, D., Openjuru, G. & Russon. J. (2019). Vocational education and training for African development: a literature review. *Journal of Vocational Education & Training*, https://doi.org/10.1080/13636820.2019.1679969

Ministry of Education and Sports [MoES]. (2011). *Skilling Uganda: BTVET strategic plan 2011 2020.* https://www.education.go.ug

Ministry of Education and Sports [MoES]. (2019). *The technical, vocational education and training (TVET) policy*. https://www.education.go.ug

Ministry of Education and Sports [MoES]. (2023). *Information on public universities admissions for 2023/2024 academic year.*

National Council for Higher Education [NCHE]. (2001). *Checklist of quality and universities capacity indicators for assessment of universities and programmes under the universities and other tertiary institutions act, 2001*. https://unche.or.ug

National Council for Higher Education [NCHE]. (2007). *Statutory instruments number 63: The university and other tertiary institutions (minimum entry requirements for admission to universities or other tertiary institutions) regulations.* https://unche.or.ug

National Planning Authority [NPA]. (2024). *Third national development plan (NDPIV), 2025/26-2029/30.* www.npa.ug

Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Pearson Education.

Odaet, C. F. (1990*). Implementing educational policies in Uganda*. World Bank discussion papers. Africa Technical Department Series No. 89.

Okinyal, H. F. (November, 2012). *Reforming the business, technical, vocational education and training (BTVET) sub-sector: Challenges, opportunities and prospects.* [Paper Presentation]. Uganda Vice Chancellors" Forum (UVCF).

Okumu, I. M., & Bbaale, E. (2018). Technical and vocational education and training in Uganda: A critical analysis. *Development Policy Review*, *37*, 735–749. 10.1111/dpr.12407

Okware, J. C., & Ngaka, W. (2017). Rationale and challenges of technical vocational education and training in Uganda. In C. U. Okolie (Ed), *Technical education and vocational training in developing nat*ions (pp. 26-44). IGI Global.

Oludolapo, J. O., Maria, O. O., Chiso, N. A, & Yinusa, J. O. (2020). Entrepreneurial soft skills and attitude of TVET students for wealth and job creation. *Vocational and Technical Education Journal, 2*(1), 2734-2697. https://acjol.org/index.php/votej/article/view/385

Oviawe, J. I., Uwameiye, R., & Uddin, P. S. O. (2017). Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st Century. *International Journal of Vocational Education and Training Research*, *3*(1), 7-14. 10.11648/j.ijvetr.20170301.12

Powell, L. & McGrath, S. (2019). Capability or employability: Orientating VET toward "real work". In S. Mcgrath, M. Mulder, J. Papier, & R. Suart (Eds), *Handbook of vocational education and training: Developments in the changing world of work, (pp. 368-392).* Springer Nature. 10.1007/978-3-319-49789-1

QSR International. (2014). *Nvivo for Mac* (version 10) [Computer software]. http://www.qsrinternational.com

Sannerud, A. R. (2019). Vocational pedagogy. In T. Halvorsen., K. S. Orgeret., & R. Krovel (Eds.), *Sharing knowledge, transforming societies: The Norhed Programme 2013-2020* (pp, 231-*248).* African Minds.

Shapin, S. (2022). Hard science, soft science: A political history of a disciplinary array. *History of Science*, *60*(3), 1–42. https://doi.org/10.1177/00732753221094739

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information, 22,* 63–75.

Sicherman, C. (2005). *Becoming an African university: Makerere 1922-2000.* Fountain.

Ssemwogerere, K. (2024, April 05). University: Why industrial product design is a compelling option. *New Vision*, p. 13.

Stahl, A. N. & King, J. R. (2020). Expanding approaches for research: Understanding and using trustworthiness in qualitative research. *Journal of Developmental Education, 44*(1), 26-28.

Statutory Instrument Supplement No. 22 (2007). Establishment of Busitema University.

Statutory Instrument Supplement No. 31 (2003). Establishment of Gulu University.

Statutory Instrument Supplement No. 34 (2015). Establishment of Soroti University.

Statutory Instrument Supplement No. 37 (2003). Establishment of Kyambogo University.

Technical, Vocational Education and Training [TVET] Act (2025).

Tripney, J., Hombrados, J., Newman, M., Hovish, K., Brown, C., Steinka-Fry, K, & Wilkey, E. (2013). *Technical and vocational education and training (TVET) interventions to improve employability and employment of young people in low-and middle-income countries: A systematic review*. The Campbell Collaboration. 10.4073/csr.2013.9

Tripney, J. S & Hombrados, J. G. (2013). *Technical and vocational education and training (TVET) for young people in low-and middle-income countries: A systematic review and meta-analysis.* Empirical Research in Vocational Education and Training, 5(3), 1-14. 10.1186/1877-6345-5-3

Uganda Bureau of Statistics [UBOS]. (2019). *Uganda national household survey report 2019/2020*. www.ubos.org

Uganda Education Commission. (1963). *Report of the Uganda Education Commission (Castle Commission)*. Government Printer.

United Nations [UN]. (2015). *Transforming our world: The 2030 agenda for sustainable development.* Sustainabledevelpment.un.org

United Nations Educational, Scientific and Cultural Organisation [UNESCO]. (1999, April). *Final report.* Second International Congress on Technical and Vocational Education. Seoul.

United Nations Educational, Scientific and Cultural Organisation [UNESCO]. (2001, September 19). *Revised recommendations concerning technical and vocational Education.* General Conference 31st session, Paris.

United Nations Educational, Scientific and Cultural Organisation [UNESCO] and International Labour Organisation [ILO]. (2003, December 8-11). *Implementing the UNESCO/ILO recommendations concerning technical and vocational education (Final report). Sub-regional seminar for West Africa on implementing the UNESCO/ILO recommendations for technical and vocational education and training.* Sub-Regional Seminar for West Africa, Kaduna, Nigeria.

Universities and Other Tertiary Institutions Act (2001).

Venatius, A. S., Musta amal, A. H., Subramaniam, M., Ekwok, O. B. & Abdullahi, I. M. (2020). Effectiveness of instructional models in teaching and learning technical skills: A systematic review and meta-analysis. *Palarch's Journal of Archaeology of Egypt/Egyptology*, *17*(7), 470-484.

von Bertallanffy, L. V. (1932). Theoretische biologie [Theory of biology]. https://www.scribd.com/document/162680096/BERTALANFFY-theoretische-Biologie-1932

von Bertalanffy, L. V. (1968). *General system theory: Foundations, development, applications.* George Braziller.

von Bertalanffy, L. V. (1972). The history and status of general systems theory. *The Academy*

of Management Journal, 15(4), 407-426. https://www.jstor.org/stable/255139

Wamala, A. (2023). *Technical vocational education and training (TVET), employment and poverty in Uganda* [Unpublished doctoral dissertation]. Makerere University, Kampala, Uganda.

Wang, O. Y. (2016). *Rethinking the role of technical and vocational education and training (TVET) in Southeast Asia: A human development approach*. https://www.academia.edu/31847133/Rethinking_the_Role_of_Technical_and_Vocational_Education_and_Training_TVET

Weber, M. (1949). *The methodology of the social sciences* (E. A. Shils & H. A. Finch, Trans.). Free Press.

Weber, R. (2004). The rhetoric of positivism versus interpretivist: A personal view (Editorial). *MIS Quarterly, 28*(1), i-xii. https://www.jstor.org/stable/25148621

Weckowicz, T. E. (2000). *Ludwig von Bertalanffy (1901-1972): A pioneer of general systems theory* [CSR Working Paper No. 89-2]. https://www.semanticscholar.org/paper/Ludwig-von-Bertalanffy

Yasin, R. M., Nur, Y. F. A., Ridzwan, C. R., Ashikin, H. T., & Bekri, R. M. (2013). Current trends in technical and vocational education research: A meta-analysis. *Asian Social Science, 9*(13), 243-251. 10.5539/ass.v9n13p243

Yi Shi1 & Bangpan, M. (2022). Young people's participation experiences of technical and vocational education and training interventions in low- and middle-income countries: A systematic review of qualitative evidence. *Empirical Research in Vocational Education and Training, 14(8). https://doi.org/10.1186/s40461-022-00136-4*

Appendices

Appendix A

Non-Traditional TVET Related Programmes in Public Universities

University	College/Faculty	Programme
Makerere	College of Engineering Design Art and Technology (CEDAT)	Bachelor of Science in Petroleum, Geoscience and Production
		Bachelor of Visual Communication, Design and Multimedia
		Bachelor of Science in Software Engineering
		Bachelor of Industrial Art and Applied Design
	College of Health Sciences (CHS)	Bachelor of Biomedical Technology
		Bachelor of Science in Biomedical Engineering
		Bachelor of Science in Biotechnology
		Bachelor of Optometry
		Bachelor of Cytotechnology
		Bachelor of Science in Speech and Language Therapy
	College of Agriculture and Environmental Sciences (CAES)	Bachelor of Animal Production Technology and Management
		Bachelor of Science in Food Science and Technology
		Bachelor of Science in Agricultural Engineering
		Bachelor of Agricultural and Rural Innovation
		Bachelor of Science in Human Nutrition

Mbarara	Faculty of Applied Sciences and Technology	Bachelor of Medical Engineering
		Bachelor of Petroleum Engineering and Environmental Management
	Faculty of Medicine	Bachelor of Physiotherapy
		Bachelor of Medical Laboratory Science
Kyambogo	Faculty of Engineering	Bachelor of Engineering in Automotive and Power Engineering
		Bachelor of Environment Science Technology and Management
		Bachelor of Science in Chemical and Process Engineering
		Bachelor of Mechatronics and Biomedical Engineering
	Faculty of Vocational Studies	Bachelor of Science in Textile and Clothing Technology
Busitema	Faculty of Engineering and Technology	Bachelor of Science in Polymer, Textile and Industrial Engineering
		Bachelor of Agricultural Mechanization and Irrigation Engineering
		Bachelor of Science Agro-Processing Engineering
	Faculty of Physical Sciences	Bachelor of Science in Mining Engineering
Gulu	Faculty of Environmental	Bachelor of Science in Biosystems Engineering

	Science	
	Faculty of Agriculture	Bachelor of Science in Food Bioscience and Agribusiness
Soroti	School of Engineering and Technology	Bachelor of Engineering in Electronics and Computer Engineering

Note. Sourced from Ministry of Education and Sports [MoES] (2023). *Information on public universities admissions for 2023/2024 academic year*.

Appendix B

Universities, TVET Related study programmes and study participants

University	**School/Faculty**	**TVET Related Academic Programmes (Unit of analysis)**	**Study Participants (Unit of observation)**
Busitema	Faculty of Engineering and Technology	Bachelor of Science in Polymer, Textile and Industrial Engineering	1 Coordinator 5 Students
		Bachelor of Agricultural Mechanization and Irrigation Engineering	1 Coordinator 5 Students
		Bachelor of Science Agro-Processing Engineering	1 Coordinator 5 Students
	Faculty of Physical Sciences	Bachelor of Science in Mining Engineering	1 Coordinator 5 Students
Gulu	Faculty of Environmental Science	Bachelor of Science in Biosystems Engineering	5 Students
	Faculty of Agriculture	Bachelor of Science in Food Bioscience and Agribusiness	1 Coordinator 5 Students
Kyambogo	Faculty of	Bachelor of Engineering in	1 Coordinator

	Engineering	Automotive and Power Engineering	5 Students
		Bachelor of Science in Chemical and Process Engineering	1 Coordinator 5 Students
		Bachelor of Mechatronics and Biomedical Engineering	1 Coordinator 5 Students
	Faculty of Vocational Studies	Bachelor of Science in Textile and Clothing Technology	1 Coordinator 5 Students
MUST	Faculty of Applied Sciences and Technology	Bachelor of Medical Engineering	1 Coordinator 5 Students
		Bachelor of Petroleum Engineering and Environmental Management	1 Coordinator 5 Students
Soroti	School of Engineering and Technology	Bachelor of Engineering in Electronics and Computer Engineering	1 Coordinator 5 Students
6 Universities		**13 Programmes**	**77 (12 programme coordinators and 65 students)**

Appendix C

Interview Guide for Programme Coordinators

East African School of Higher Education Studies and Development, College of Education and External Studies, Makerere University.

Date:……

……

Programme Coordinator for…….

School/Faculty:……..

University:……..

Dear Sir/Madam

I am carrying out a study to examine technical vocational education and training (TVET) Related Programmes in public universities in Uganda in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy in Educational Management of Makerere University. I have chosen you to participate in this study because you are a coordinator for…….. programme. I kindly request for your attention and commitment to this exercise, in which I will ask you questions in regard to the programme you coordinate.

In conducting this research, I am bound to the Makerere University Directorate of Research and Graduate Training Research "Research and Innovations Communication Strategy and Implementation Framework" (Mak DRGT, 2024) which completely protect the integrity and use of the information you will give me as well as your anonymity and identity. I will use the data you will provide exclusively for academic purposes and at no time, whatsoever, will I reveal your name or any identifying information. Should you wish to get any further clarification in line with this study, please contact Joreme Ojulun on tel. 0772999259 and/or email: ojulunjoreme@gmail.com

Thank you for cooperation.

Name: Joreme Ojulun Signature:…….

Objective One: To examine the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda

Research Question One: What is the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda?

A. Theme: Inputs	Guiding questions
Inputs to TVET (Students)	1. Can you give the number of students you have in your programme (those through direct entry and those through mature age entry) 2. In your assessment, do you have adequate number of students for your programme as planned? (If yes comment on possible reasons?, If not, comment on possible reasons?) 3. Can you give your comment on the general participation and performance of the students in the programme. 4. Are there any similarities and/or differences in the participation and performance of the students in the programme between those who were admitted through direct entry and those who were admitted through mature age entry? If yes, in your opinion, give possible reasons, If no, in your opinion, give possible reasons 5. Please give your opinion on what you think attracts students to apply to study your programme 6. Please give your opinion on what you think discourages students from applying to study your programme.

	7. In what ways do you propose that students" admission to this programme could be improved?
Inputs to TVET (Academic Staff)	1. What is the current staff/student ratio in your programme? 2. In line with your staff establishment, do you have adequate number of academic staff for your programme as planned? Please give your comment in terms of: a. PhD Holders b. Masters Holders c. Bachelors d. Higher Diploma 3. If staffing is inadequate, comment on possible reasons? How do you bridge the staffing gap to ensure sustained programme delivery?
Inputs to TVET (Finances)	1. Give your comment (in terms of percentage) in line with the amount of funding you receive for your programme in comparison to the amount you budget annually
Inputs to TVET (Education Facilities)	1. Do you have sufficient education facilities for your programme? 2. If not, briefly state how this affects your programme 3. Does your faculty/school have a library with relevant and diversity of books for your programme? 4. If yes, give your approximate Student/Library book ratio. If no, give reasons…. 5. Does your faculty/school have computers that are used by

	students taking your programme? 6. If yes, give your approximate Student/Computer ratio. If no, give reasons…. 7. Give your comment on access to internet by staff and students in your faculty/school. 8. If there is poor access to internet, please give (in your opinion) what you believe are the causal factors 9. What plans are on the ground to provide more (or may be better) education facilities (library, computers and internet) in your faculty/school? 10. Can you give suggestions on how to improve the provision of educational facilities library, computers and internet) to support your programme

Objective Two: To examine the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda

Research Question Two: What is the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda?

B. Theme: Transformation Mechanisms	Guiding questions
Transformation Mechanisms of TVET (Staff/Students Contact Hours)	1. In line with your programme teaching timetables, give average staff/student contact hours for your programme in a week. 2. Is your planned staff/student contact hours followed and

	achieved by all lecturers and students weekly? If not, what reasons are responsible for the non-achievement? 3. In line with the staff/student contact hours, what is your general assessment on the quality of the learning outcome for your programme? 4. In line with the staff/student contact hours, what is your general assessment on the curriculum coverage for your programme? 5. How do you plan to improve on the staff/student contact hours?
Transformation Mechanisms of TVET (Kirk Patrick"s Training Evaluation Model Level 2, Learning)	1. Give your professional assessment on the quality of the learning outcome so far gained by the students pursuing your programme in terms of their knowledge, skill, attitude, confidence, and commitment. 2. Comment on factors you believe could have contributed or hindered the level of learning outcome gained by the students pursuing your programme 3. What kind of learning approaches are used by lecturers handling your programme? 4. Give your comment on the effectiveness of the learning approaches being used by lecturers handling your programme in equipping students with competitive knowledge, technological expertise, hands-on practical skills and the right attitudes in theory future employment.

Objective Three: To examine the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda

Research Question Three: What is the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda?

C. Theme: Outputs	Guiding questions
Outputs from TVET: (Kirkpatrick"s Training Evaluation Model Level 3: Graduates" Behavior in Terms of Knowledge, Skills & Attitudes)	1. Give your professional assessment (your opinion) on the ability of the students pursuing your programme to apply what they learned later in their work life (their jobs). 2. Comment on factors you believe could have contributed (or may contribute) to your students" application of what they learnt from your programme 3. Comment on factors you believe could have hindered (or may hinder) your students from applying what they learnt from your programme

Objective Four: To examine the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda.

Research Question Four: What is the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda?

D. Theme: Environment	Guiding questions
Environmental Scan (Facilitating Environment)	1. What positive impact do you experience in support of your TVET programmes in the following dimensions: a. Political

	b. Economic c. Social d. Technological e. Legal f. Ethical
Environmental Scan (Inhibiting Environment)	2. What negative impact do you experience disadvantaging your TVET programmes in the following dimensions: a. Political b. Economic c. Social d. Technological e. Legal

Thank you for your corporation

Appendix D

Focus Group Discussion (FGD) Guide for Students

East African School of Higher Education Studies and Development, College of Education and External Studies, Makerere University.

Date:……..

Student for:

Programme…….

School/Faculty:……..

University:……..

Dear Sir/Madam

I am carrying out a study to examine technical vocational education and training (TVET) related programmes in public universities in Uganda in partial fulfilment of the requirements for the award of the degree of Doctor of Philosophy in Educational Management of Makerere University. I have chosen you to participate in this study because you are students for……..programme. I kindly request for your attention and commitment to this exercise, in which I will ask you questions in regard to the same programme.

In conducting this research, I am bound to the Makerere University Directorate of Research and Graduate Training "Research and Innovations Communication Strategy and

Implementation Framework" (Mak DRGT, 2024) which completely protect the integrity and use of the information you will give me as well as your anonymity and identity. I will use the data you will provide exclusively for academic purposes and at no time, whatsoever, will I reveal your name or any identifying information. Should you wish to get any further clarification in line with this study, please contact Joreme Ojulun on tel. 0772999259 and/or email: ojulunjoreme@gmail.com

Thank you for cooperation.

Name: Joreme Ojulun Signature:…….

<table>
<tr><td colspan="2">i. Objective One: To examine the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda
Research Question One: What is the state of students, academic staff, finances and education facilities, as inputs to TVET related programmes in public universities in Uganda?</td></tr>
<tr><td>A. Theme: Inputs</td><td>Guiding questions</td></tr>
<tr><td>Inputs to TVET (Students)</td><td>1. State the admission path you followed to be admitted to your current programme (direct entry, mature age entrance)
2. Give a honest assessment of yourself in terms of your capacity to handle your current programme
3. Describe what attracted you to pursue your current programme
4. Describe the challenges you face in handling the programme you are pursuing
5. In what ways do you propose the above challenges could be resolved?</td></tr>
<tr><td>Inputs to TVET (Academic Staff)</td><td>1. Comment on the availability and/or non-availability of lecturers to handle the various areas (subjects) within your programme.
2. By average state how your lecturer/student ratio
3. If some lecturers are not available in some areas, state how you cope up to bridge the gap</td></tr>
</table>

	4. Suggest ways you believe (in your opinion) the missing lecturers (if any) could be filled
Inputs to TVET (Education Facilities)	1. Do you have sufficient education facilities for your programme? 2. If not, briefly state how this affects your programme 3. Comment on the state of the library (libraries) you use in support of your programme in terms of adequacy and relevance of books 4. If there may be inadequacies or irrelevancies (of books), state how you cope to bridge the gap? 5. Does your faculty/school have computers that you use for learning? 6. If yes, give your approximate student/computer ratio. 7. Comment on your access to internet provided by the faculty/school 8. If there is poor access to internet, please state how you cope in order to access internet.
Objective Two: To examine the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda Research Question Two: What is the state of academic staff/student contact hours and learning as the transformation mechanisms of TVET related programmes in public universities in Uganda?	
B. Theme: Transformation Mechanisms	Guiding questions
Transformation Mechanisms of TVET (Staff/Students Contact Hours)	1. In line with the teaching timetable, give the average contact hours between you and your lecturers in a week. 2. Discuss factors that (a) negatively, (b) positively impact your contact hours with your lecturers

	3. Between theoretical and practical teaching/learning approaches, describe the ones you (as students) prefer to be used in your programme 4. Give your honest assessment on the teaching/learning approaches often used by lecturers in your programme 5. In line with what you have so far learnt from your programme, give an honest assessment of yourselves in terms of readiness for practical work in the field. 6. If you are not ready or half ready, what could be the contributing factors? 7. Suggest (in your opinion) what needs to be done (in terms of teaching and learning) to have students like you in the future to be very ready for practical work in the field.
Transformation Mechanisms of TVET (Kirk Patrick's Training Evaluation Model Level 2, Learning)	1. In your opinion, do you think you have gained the knowledge, skills, attitudes, confidence, and commitment you desired to learn from this programme? 2. In a scale of 1-10, how would you rate your knowledge, skills, attitudes, confidence, and commitment you have gained from this programme? 3. What is the biggest change you've noticed in yourself so far, in terms of knowledge, skills, attitudes, confidence, and commitment?

	4. Give your personal assessment. Do you feel as though you can apply what you learned to your work? Mention them. 5. Comment on factors (if any) you believe could have contributed or hindered your level of learning outcome gained from your programme 6. Are there any topics from your programme that you still don't understand? Mention them
Objective Three: To examine the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda Research Question Three: What is the state of students' behaviour as outputs from TVET related programmes in public universities in Uganda?	
C. Theme: Outputs	Guiding questions
Outputs from TVET: (Kirkpatrick's Training Evaluation Model Level 3: Graduates" Behavior in Terms of Knowledge, Skills & Attitudes)	1. Have you ever applied what you learnt from your programme in any of your engagements outside class? If so, state what you applied, when and where. 2. Do you have any noticeable changes in you in terms of your interpersonal relationships and people management. Mention them 3. If you haven't applied what you learnt, state factors (bottlenecks) you believe could have contributed (or you believe may contribute) to you not applying. 4. State what other thing you need to help you apply what

	you learned?
Objective Four: To examine the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda. Research Question Four: What is the political, economic, social, technological, legal and ethical state of the environment in which TVET related programmes operate in public universities in Uganda?	
D. Theme: Environment	Guiding questions
Environmental Scan (Facilitating Environment)	1. What positive impact do you experience in support of the TVET subjects you study? Use the following dimensions: a. Political b. Economic c. Social d. Technological e. Legal f. Ethical
Environmental Scan (Inhibiting Environment)	2. What negative impact do you experience disadvantaging you in the TVET subjects you study? Use the following dimensions: a. Political b. Economic c. Social

	d. Technological e. Legal

Thank you for your corporation

Appendix E

Consent Form for Participants

With limited empirical evidence on Technical, Vocational Education and Training Related Programmes in Public Universities in Uganda, Policy makers and managers of public universities in Uganda are at a risk of making uninformed policies and decisions on TVET related programmes for a number of reasons. There is scanty information on TVET related programmes in Uganda. There is no information on TVET related programmes in public universities covering all the four aspects of the programmes (i.e., inputs, transformation mechanisms, outputs and environment). The available literature on TVET focused on isolated aspects of TVET.

Joreme Ojulun, a student of Makerere University Kampala is conducting a study on the technical, vocational education and training in public universities in Uganda. The purpose of this study is to provide an in-depth understanding of the state of TVET related programmes in public universities in terms of inputs, transformation mechanisms, outputs and the environment in which TVET related programmes operates in universities. You have been chosen purposely as a participant in this study because of the role you play as …… in ……..... programme.

In conducting this research, Joreme Ojulun is bound to the Makerere University Directorate of Research and Graduate Training "Research and Innovations Communication Strategy and Implementation Framework*"* (Mak, DRGT, 2024) which completely protect

the integrity and use of the information you will provide as well as your anonymity and identity.

Participation in this study is completely voluntary. You have a right to withdraw at any time in which case any information you will have provided will be removed from the study unless you authorise otherwise. You may at any time refuse to answer any questions and may terminate the interview at any time without consequence, penalty and judgement. You may request that any information you have provided be eliminated from the report.

Declaration of Consent

I have read the information and understood the nature of the study explained to me. I agree to participate in the study and give consent to be audio-recorded during the interview.

Signature:……Name ……..……

Designation……..…….

Programme…….

School/Faculty:……..

University:……..

Date: ……..……

Appendix F

Introductory Letter to the Field

MAKERERE UNIVERSITY

P. O. Box 7062 Kampala-Uganda
www.eashesd.mak.ac.ug
Tel: 256 - 41 -532992

Cell: +256 - 782 - 464691
E-mail: eashesd.cees@mak.ac.ug
Twitter: @eashighered

COLLEGE OF EDUCATION AND EXTERNAL STUDIES
EAST AFRICAN SCHOOL OF HIGHER EDUCATION STUDIES AND DEVELOPMENT
Office of the Dean

17th March 2025

TO WHOM IT MAY CONCERN

Joreme Ojulun – Reg. No. 2018/HD04/876U is our PhD student who is collecting data for his dissertation titled: **"*Effectiveness of Technical, Vocational Education and Training (TVET) in Public Universities in Uganda: Application of Systems Theory*".**

We shall be grateful if you could render assistance to him in collecting the necessary data for his dissertation.

The East African School of Higher Education Studies and Development thanks you in advance for your assistance.

MAK. COLLEGE OF EDUCATION & EXTERNAL STUDIES
P. O. BOX 7062, KAMPALA UGANDA
17 MAR 2025
DEAN, EAST AFRICAN SCHOOL OF HIGHER EDUC STUDIES & DEVELOPMENT

Assoc. Prof. Joseph Kimoga
Coordinator PhD program

Appendix G

Communication to Vice Chancellors

College of Education and External Studies,

East African School of Higher Education Studies and Development,

P.O Box 7062,

KAMPALA.

22nd April, 2025

The Vince Chancellor,

……..

……..

RE: DATA COLLECTION

The attached introductory letter from the office of the Dean East African School of Higher Education Studies and Development (Makerere University) refers. My topic of study is titled; "Effectiveness of Technical, Vocational Education and Training in Public Universities in Uganda: Application of Systems Theory"

By this communication, I humbly request for your permission to collect data on the following ……. academic programmes in your university,

namely:……

……

•

Specifically, I wish to interface with the coordinators of these four programmes and 5 students (i.e., preferably the class coordinator and any other four students) for each of the four programmes.

Being systems theory driven study, the data required on the said academic programme will be on inputs to the programme, transformation mechanisms used, outputs from the programme and the environment in which the programme operates.

In conducting this research, I am bound to the "Makerere University Directorate of Research Training Graduate Handbook of Policies, and Guidelines and Procedures" (Mak DRGT, 2024) which completely protects the integrity and use of the information I will obtain from the respondents, as well as their anonymity and identity. I commit to use the data they will provide exclusively for academic purposes.

Thank you for your cooperation.

Name: Joreme Ojulun Signature: 

Reg. No. 2028/HD04/876

Appendix H

Nkumba Annual PhD Conference (2024) Programme

NKUMBA UNIVERSITY

ANNUAL PhD CONFERENCE 2024

Theme: "From Theory to Impact: Aiming for Transformative PhD Research to Shape Our World"

PROGRAMME OF ACTIVITIES

Presentations: 20 Minutes

Q and A: 15 Minutes

23rd August 2024

Plenary Session			
TIME	**ITEM**	**IN-CHARGE**	**DESIGNATION**
8:00 am	Arrival and Registration	DPSR	Secretariat
9:00 am	Introductory Remarks by Chairperson Organizing Committee	Assoc. Prof. Solomon M. Asiimwe	Director, DPSR
9:10 am	Keynote Address	Dr. Frank Pio Kiyingi	Academic Registrar, Nkumba University
Breakout Group A, [Prof. Andrew P. Yiga -Chair]			
Time	**Topic**	**Presenter**	**Discussant**
9:25 am	Monetary Rewards and Teacher Performance in Selected Secondary Schools in Central Region of Uganda	Muhamad Aisa [Nkumba University]	

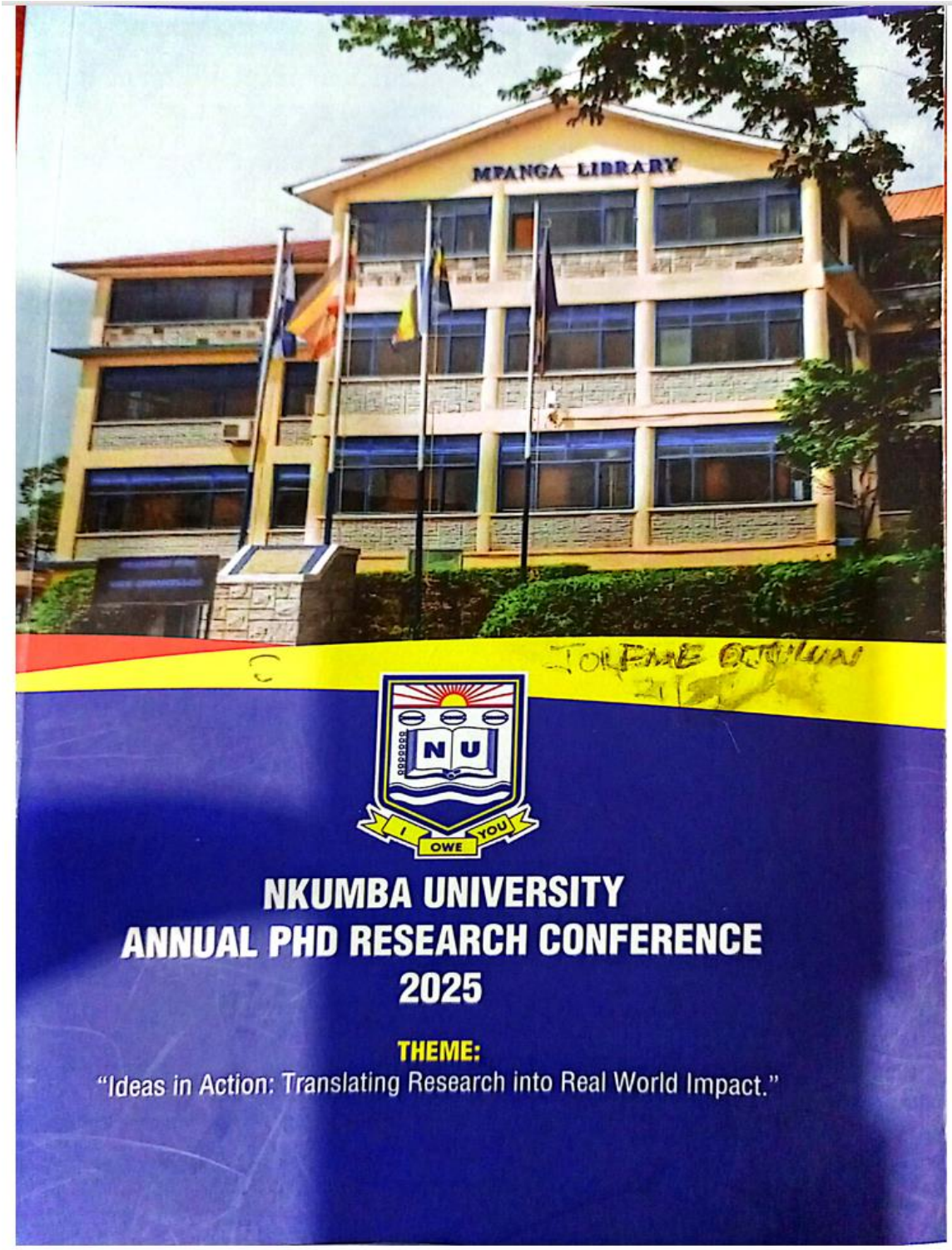
9:45 am	The Role of Individual Adaptability and its Dimensions in Fostering Psychological Well-being: A case of Employees from Small enterprises in Uganda	Agnes Tabala/Humprey Turinawe [Makerere University]	Dr. Charles Edaku
10:05 am	Structural equation model for a relationship between family support systems and Alcohol Addiction Recovery: Mediation Effect of Continuing Care Services	Kyazze Richard [Nkumba University]	
10:25 am	**Q and A**		
10:40am	**Break Tea**		
11:25am	Unveiling factors influencing choice of clean cooking solutions among households: A Systematic Review of Literature	Samuel Ocen [Makerere University Business School]	Dr. John Paul Kasujja
11:45 am	Knowledge production practices in universities and community engagement outcomes: A systematic literature Review	Steven Ssebale [Nkumba University]	
12: 05pm	Entrepreneurial Bahaviour Among Millennial Entrepreneurs	Yiga Sirajje [Makerere University Business School]	Dr. John Paul Kasujja
12: 25pm	Implementation of Thematic curriculum and integration of Social Studies Competencies in Uganda: A Case of Selected Primary Schools in Moyo Town Council, Moyo District	Anyanzo Phillip [Nkumba University]	
12: 45pm	A Critical Review of the [Nature of existence] at the "Garden of Eden" by "East of Eden", to establish the [Existential Identity (Obuzalilanwa)] and [Existential Scope of Education]	Kiyingi Martin [Nkumba University]	
I. 05 pm	**Q And A**		
I:20 pm	Exploring Curriculum Leadership Styles Utilised by Lecturers at Makerere University	Samuel Mukasa [Makerere University]	Prof. Francis Kasekende
I:40 pm	Understanding How Makerere University Deans Utilise their Psychological Capital Hope in Managing Conflicts***	Prossy Nalwadda [Makerere University]	

2:00pm	An analysis of the mediation of process analysis on relationship between purchasing function and financial management in Micro and small restaurants in KCCA markets in Kampala, Uganda	Rachael Kabuye Nansereko [Nkumba University]	
2:20pm	Effectiveness of information and Communication Technology (ICT's) in Teaching and Learning in Universities: A Literature review and Research Agenda	Waiswa Patrick [Makerere University]	
2:40pm	Effect of Gerontological services access on the welfare status of older persons in south western Uganda	Diana Aharimpisya [Nkumba University]	
2:55 pm	Q And A		
3: 10 pm	Lunch Break		
3: 40pm	Closing Remarks& Award of Certificates	Prof. Jude T. Lubega	Vice Chancellor
Breakout Group B,[Prof. Faustino Orach-Meza-Chair]			
9:25am	The influence of Agricultural in-puts Support on the Nutritional outcomes among Refugees Children 0-59 months in West Nile sub-Region of Uganda	Ecega Alfred Guli [Nkumba University]	Dr. Anne Abaho [Dean, SoSS]
9:45am	Pharmacotherapeutic Intervention and Perceived Sobriety in Rehabilitation Centres and Hospitals in Wakiso and Kampala Districts, Uganda	Celestine Lindrio [Nkumba University]	
10:05am	The Indigeneous Knowledge and Natural Conservation Aspects of Life of Baganda, the people of Uganda	Adolf Mbalangu [Nkumba University]	
10:25am	Q And A		
10:40am	Break Tea		
11:25am	Policy Implementation Mechanisms and Solid Waste Management in Urban Centres in Eastern Uganda	Eumu Benard [Nkumba University]	Dr. Frank Pio Kiyingi
11:45am	The Relationship Between Training Legislation and Personnel Development in Civil Aviation	Julius Othieno [Nkumba University]	

	Schools: A Survey of Literature		
12:05pm	Community Based Tourism Product Innovation and Economic Sustainability for Rural Community Well-being	Wale Sammie Chombo [Nkumba University]	
1:15pm	The Moderating Effect of Readiness to Change Jobs on the Relationship Between public Pension Scheme Provisions and Financial Well-being of Retiring Primary School Teachers in Wakiso District, Uganda	Samuel B. Kamusiime [Nkumba University]	Dr. Tadeo Rusoke
1:35pm	Technical, Vocational Education and Training (TVET) in Public Universities in Uganda: Application of Systems Theory	Ojulun Joreme [Makerere University]	
1:55pm	Community Radios Broadcasting services and Socio-economic Development: A case of selected communities in greater Mbarara District, Uganda	Sabiiti Mulema Posiano [Nkumba University]	
2:15pm	Examining the Influence of Structural Climate change adaptation factors on sustainable livelihood of women in agriculture in Busoga sub region, eastern Uganda	Kayemba Jonah Fred [Nkumba University]	
2:35pm	Collaborative Dynamics and Challenges in Blended learning course design: Insights from Makerere University Facculty	Joseph Watuleke [Makerere University]	
2:30pm	**Q And A**		
3:00pm	**Lunch Break**		
3:40pm	Closing Remarks & Award of Certificates	Prof. Jude T. Lubega	Vice Chancellor

Appendix I

Nkumba Annual PhD Conference (2025) Programme



THEME: Ideas in Action: Translating Research into Real World Impact

PROGRAMME OF ACTIVITIES
Presentations: 15 Minutes
21st August 2025

Plenary Session			
Time	**Item**	**In-Charge**	**Designation**
8:00Am	Arrival And Registration	Secretariat	Secretariat, DPSR
9:00Am	Remarks By Director Postgraduate School	Assoc. Prof. Solomon Asiimwe M. Asiimwe	Director, DPSR
9:10Am	Remarks By Vice Chancellor	Prof Jude T Lubega	Vice Chancellor
9:20Am	Keynote By Guest Of Honour	Dr Martin Patrick Ongol	Guest of Honour
Breakout Group A, [Prof. Andrew Peter Yiga-Chair]			
Time	Topic	Presenter	Session Chair
9:30 Am	The Dialogical Emotional Inter-Connectivity Regulation (Deir) Model: A Novel Framework For Enhancing School And Social Outcomes In Learners With Adhd Symptoms.	Josephine Ssirimuzaawo [Nkumba University]	Prof. Andrew Peters Yiga
9:45 Am	The Impact Of Sanitation Facilities And Diaper Disposal Practices On The Prevalence Of Diarrhoea Among Children Under Five In Gulu District, Uganda	Idiba Yoweri [Nkumba University]	

THEME: Ideas in Action: Translating Research into Real World Impact

12:15 Pm	Technical, Vocational Education And Training (Tvet) In Public Universities In Uganda: A Qualitative Empirical Study Based On Systems Theory	Ojulun Joreme, [Makerere University]	
12:30 Pm	Q And A		Session Chair
1:00 Pm	The Mediating Influence Of emotional Intelligence In The Relationship Between Academic Resilience And Effectiveness Incompetency-Based Learning Selected Schools In Ugandan Secondary Schools.	Nakacwa Florence Patricia [Nkumba University]	Prof. Andrew Peters Yiga
1:15 Pm	The Effect Of Cash-Based Assistance On Nutritional Outcomes Among Refugee Children 0-59 Months In The West Nile Sub-Region, Uganda.	Alfred Guli Ecega [Nkumba University]	
1:30 Pm	Adolescents'Attitudes, Perceptions, And Preferences For Srh Services In Busoga, Uganda: Psychosocial And Personal Influences On Service Utilization	Noah Robert Nyende [Nkumba University]	
1:45 Pm	Personal Growth On Depressive Symptoms Among Older Adults In Central Uganda	Ddumba matovu Pius [Nkumba University]	
2:00 Pm	Effects Of Policy Environment On Solid Waste Management In Urban Centres In Eastern Uganda	Benard eumu [Nkumba University]	
2:15 Pm	Assessing The Influence Of Internet Availability On Learning Enhancement Among Selected Universities In Kampala	Okee Jill Margaret [Nkumba University]	
2:45 Pm	Q And A		
3:15 Pm	Lunch Break		Secretariat

Appendix J

Concept Paper Accepted at Nkumba Annual PhD Conference (2024)

Technical, Vocational Education and Training (TVET) in Public Universities in Uganda: Application of Systems Theory

Ojulun J., & Bakkabulindi F. E. K.

East African School of Higher Education Studies and Development (EASHESD),

College of Education and External Studies (CEES), Makerere University.

Extended Abstract

Keywords: Technical, vocational, education, training, effectiveness, public universities

Background

Knowledge on the state of technical vocational education and training (TVET) in universities is important in guiding university managers and policy makers in effectively steering TVET in their institutions. However, in Uganda no literature gives a comprehensive account of TVET in public universities and the existing policy is equally silent on the same. Such a scenario renders policy makers and managers of public universities in Uganda vulnerable to making uninformed policies and decisions to the detriment of TVET. In this study, guided by systems theory, we intend to examine the effectiveness of TVET in public universities in regard to the four aspects of TVET (i.e., inputs, transformation mechanisms, outputs and the environment).We will employ a qualitative research approach and a case study design in which we shall examine a TVET programme. We shall purposively select a sample of TVET programme

coordinators and students as sources of data. We will employ thematic analysis based on the framework method of qualitative data analysis by Gale et al. (2013) for analyzing data. The outcome of this study will contribute to the systematic and integrated planning, investment and provision of TVET in universities and inform the design of better and inclusive TVET policies which encompass TVET in public universities.

Historical Perspective. Technical, vocational education and training (TVET) has been evolving over the years worldwide. Various terms have been used to describe what is now conceived as comprising TVET. These include "apprenticeship training, vocational education, industrial arts, technical education, technical/vocational education, occupational education, vocational education and training, career and technical education" (Maclean & Lai, 2011, p. 2). At the second International Congress on Technical and Vocational Education, held in the Republic of Korea in 1999, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) with the International Labour Organisation (ILO) jointly adopted the term *technical and vocational education and training* (UNESCO, 1999). This term has now become internationally accepted and is the term currently used in Uganda as well (Ministry of Education and Sports [MoES], 2019).

In Uganda, from the earliest years of British Protectorate (i.e., mid 1890s) until 1925 when a government department of education was set up, Uganda's formal education (inclusive of TVET) was "entirely in the hands of voluntary agencies, mainly Christian missionaries who founded [educational institutions] in many parts of the country" (Education Policy Review Commission [EPRC], 1989, p. 1). However, good educational facilities during the pre-

independence Uganda were available only to a small elite group, and oriented towards white collar jobs, while the masses remained largely illiterate or poorly educated. The products of education were mainly clerical and administrative personnel required by the Church and colonial administration (Okinyal, 2012). The TVET subsector was very small at the time and was designed to produce manual workers who were predominantly drawn from the underprivileged sections of society. This marked the beginning of social stigmatization of TVET in Uganda (Okinyal, 2012). According to Odaet (1990) the independence of Uganda in 1962 ushered in rapid changes including the immediate availability of posts for Ugandans in government employment and the expansion of educational opportunities. The structure of education in Uganda too was developed, "though the system laid great emphasis on formal education from the primary level through to university" (Odaet, 1990, p. 3). Up to 1963, no focused policy existed to specifically guide the development of the TVET subsector. In fact, the expansion of both primary and technical education was restricted in favour of secondary education (Okinyal, 2012).

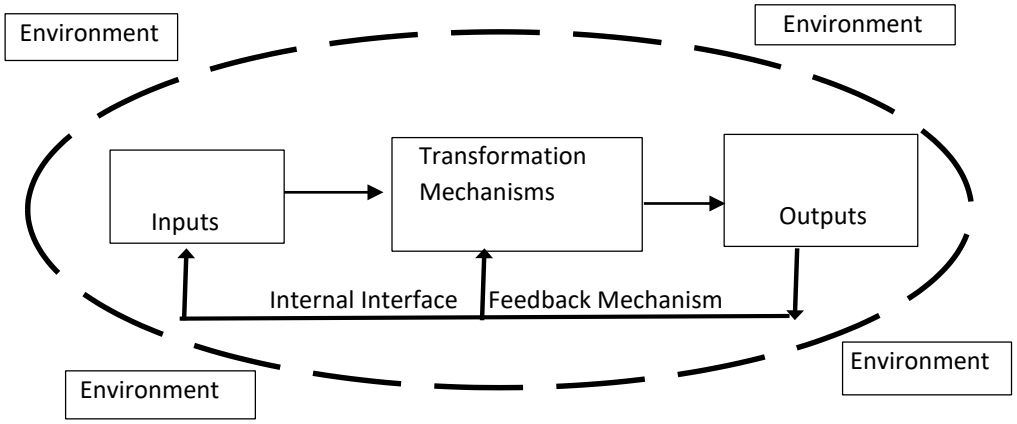
Nonetheless, from the time of pre-independence (1894) to date, some little and slow growth of the TVET subsector has been experienced. For example, on its website, Makerere University highlights its historical establishment as a technical school in 1922. In the same year, it opened its doors to the first 14-day students who began studying carpentry, building and mechanics (https://www.mak.ac.ug/about-makerere/historical-background). Sicherman (2005) provides the chronological growth of TVET in the Uganda Technical College then (now Makerere University). In 1923 a certificate in surveying started. In 1924, engineering and agricultural programmes began. In 1937, the De Lar War Commission recommended Makerere to become a higher college of East Africa, offering agriculture and engineering among other programs. In 1970, the Faculty of Technology was established. In the late 1980s, Makerere

University established a degree programme in surveying. The Government of Uganda, has since late 1980s put in place a number of development initiatives with a TVET component. Examples of such initiatives include, the enactment of the Business, Technical and Vocational Education and Training (BTVET) Act (2008); the institution of "Skilling Uganda: BTVET Strategic Plan, 2011-2020" (MoES, 2011); and the "Technical Vocational Education and Training (TVET) Policy" (MoES, 2019). The scope for these policy frameworks, however, is scanty on how public universities in Uganda conduct TVET. For example, the BTVET Act (2008) relates to community polytechnics, vocational training centres and institutes, technical institutes, technical colleges and specialised training institutions (pp. 7-8, Sections 5-9), meaning it is silent about universities.

Based on its importance, studies have been carried out on TVET. For example, at the international level Matenda (2019) investigated the role of TVET in empowering women. Using the case of one college in South Africa, she found out that TVET institutions had made strides in empowering women by increasing access for them to predominantly male fields (e.g., engineering). She, however, reported that women still found it "difficult to navigate the education system owing to challenges, such as male dominance in the learning environment, which [led] to feelings of alienation" (p. 248). Matenda (2019) pointed out limitations on her study worth the attention of researchers. Among them was that her case study was in one college in South Africa, meaning that her findings could not, therefore, be generalised.

At the local level, Wamala (2023) examined the relationship between TVET education attainment, employment and poverty in Uganda and found out that TVET education attainment was a key determinant of employment outcome for the Ugandan labour. Although Wamala (2023) did not point out limitations in his study, we note that he solely focused on the causal

relationship between TVET, employment and poverty. The state of effectiveness of TVET in



public universities in Uganda remains a gap. In summary, the gaps highlighted in the above studies are an indication of the need for more studies on TVET, hence this study.

Theoretical Perspective. We will apply systems theory (Figure 1) to examine the effectiveness of TVET in public universities:

Figure 1

Systems Theory

Note. Sourced from French & Bell (1990). Organisation development: Behavioural science interventions for organisation improvement (p. 53, Figure 5-1).

According to von Bertalanffy (1968) a system is "complexes of elements standing in interaction with the environment" (p. 33). He viewed a system as a linkage of inputs, a transforming mechanism (process) and flows of outputs or outcomes located in an environment. French and

Bell (1990) building on von Bertalanffy (1968) posit that every organisation (as an example of a system) maintains itself in a continuous inflow (of inputs) and outflow (of outputs), through a building up and breaking down of components (transformation mechanisms) located in an environment. Therefore, "each of the four components (inputs, transformation mechanisms, outputs and environment) needs to be effectively managed and linked if there is to be a healthy organisation" (French & Bell, 1990, p. 53). In this study, we are considering TVET as a system made up of inputs, transformation mechanisms and outputs located in a university environment, hence the application of systems theory.

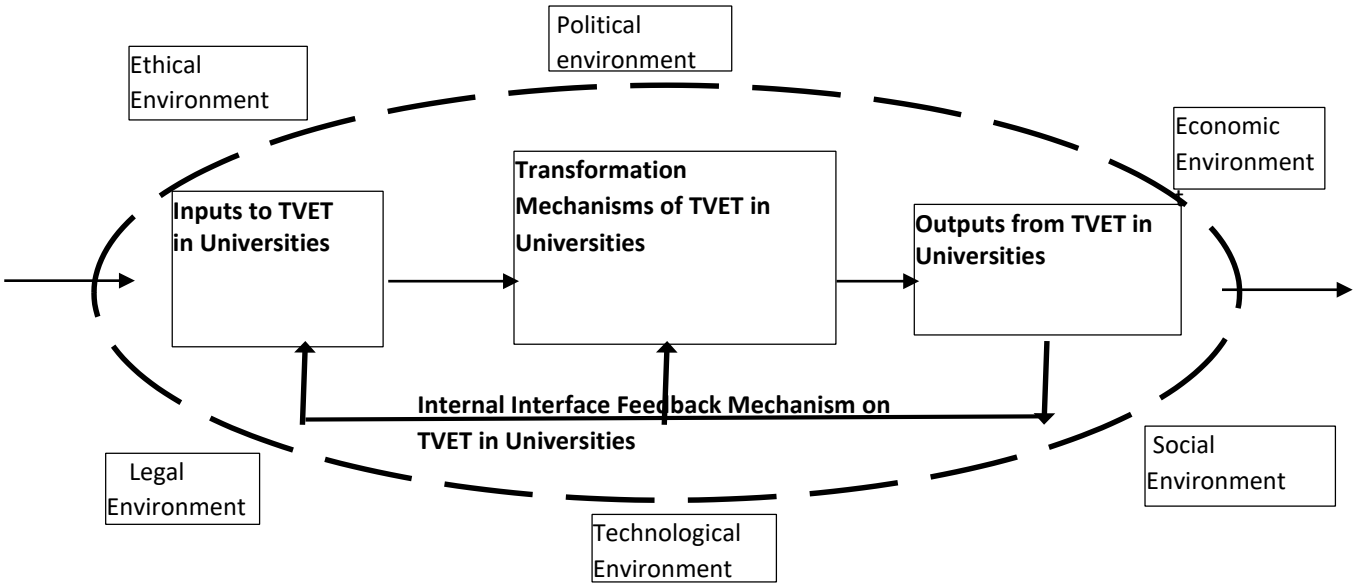
Conceptual Perspective. The key concept in this study is technical vocational education and training (TVET). United Nations Educational, Scientific and Cultural Organisation (UNESCO) and International Labour Organisation (ILO) (2003) define TVET as:

> those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (p. 12).

In Uganda, the Ministry of Education and Sports (MoES, 2019) defines TVET as, "non-academic technical education and practical training that develops the skills and knowledge of apprentices (learners of trades or crafts) working in different sectors of industry and trainees/students trained in different TVET institutions (TVET institutes, centres & schools)" (p. 57).

However, based on the systems theory, we have operationalised TVET in universities in this study in terms of inputs to TVET, transformation mechanisms of TVET, outputs from TVET and the environment in which TVET in universities operates as illustrated in Figure 2:

Figure 2



Systems Theory as Applied to TVET in Universities

Note. Adapted from Figure 1

von Bertalanffy (1968) defined each of the four components of a system, which we have operationalised in regard to TVET in universities (Refer to Figure 2). First von Bertalanffy (1968) defined *inputs* as the raw materials to a system for conversion. In this study, inputs to TVET denote students (National Council for Higher Education [NCHE], 2007), academic staff, finances and educational facilities (NCHE, 2001). Secondly, von Bertalanffy (1968) defined *transformation mechanisms* as the processes or conversion aspects of a system. Transformation mechanisms receive various inputs, convert them and export outputs. In this study, the transformation mechanisms refer to academic staff/student contact hours (NCHE, 2001) and the learning process (Kirkpatrick & Kirkpatrick, 2019). Thirdly von Bertalanffy (1968) defined

outputs as the system products or outcomes. In this study outputs from TVET in universities refer to the behaviour of graduates in terms of knowledge, skills and attitudes (Kirkpatrick & Kirkpatrick, 2019). Fourthly, von Bertalanffy (1968) defined *environment* as a surrounding that influences the functioning of the other three components (i.e., inputs, transformation mechanisms and outputs). Buye (2021) discoursed that the environment around organisations and/or systems exists in the form of political, economic, social, technological, legal and ethical (PESTLE) aspects. In this study therefore environment denotes the PESTLE atmosphere around TVET in universities.

Contextual Perspective. The context for this study is public universities in Uganda that offer TVET. According to the National Council for Higher Education (https://unche.or.ug/nche-20/) as of now, there are altogether ten public universities in Uganda. Examples of public universities in Uganda that offer TVET programmes are; Makerere, Mbarara University of Science and Technology (MUST), Kyambogo, Busitema, Gulu and Soroti. We briefly comment on the oldest (Makerere) and youngest (Soroti) of them as examples with regard to TVET. According to its website (https://www.mak.ac.ug/about-makerere/historical-background), Makerere is the oldest university in Uganda, first established in 1922 as a technical school. In January of the same year the school opened its doors to the first 14-day students who began studying carpentry, building and mechanics. To date, Makerere University has ten operational colleges. Among those that offer TVET is the College of Engineering, Design, Art and Technology.

Soroti University, by Statutory Instrument Supplement No. 34 (2015) became a fully-fledged public university. The university is located in Soroti City, seven kilometres north east of

Soroti City along Moroto Road. Soroti University has since expanded into three schools. Among those that offer TVET is the School of Engineering and Technology (www.sun.ac.ug).

However, gaps exist in TVET in Uganda, which are pointers to TVET being ineffective. For example, Jjuuko et al. (2019) in their qualitative case study of the methods used by lecturers of an agricultural college in Uganda reported poor pedagogical practices by lecturers. Okumu and Bbaale (2018) in their diagnostic study of the TVET sub-sector in Uganda, reported poor quality equipment, under and ill trained staff, limited adoption of a competence-based education and training curriculum, and supervision inadequacies of TVET institutions. Wamala (2023) reported a number of problems in the TVET sector, such as "inadequate teaching staff, lack of vital equipment, and limited participation by the private sector" (p. 31). The gaps raised above are pointers to the need for studies to be undertaken in TVET.

Statement of the Problem

UNESCO (2001) outlines the importance of TVET as:

> (a) an integral part of general education, (b) a means of preparing for occupational fields and for effective participation in the world of work, (c) an aspect of lifelong learning and a preparation for responsible citizenship, (d) an instrument for promoting environmentally sound sustainable development and (e) a method of facilitating poverty alleviation (p. 7).

Uganda's vision on TVET is "a coordinated, labour-market responsive TVET system, producing a skilled, high-quality, competent workforce that is employable and responsive to the national needs and is globally competitive to support Uganda's sustainable economic, social and environmental development" (MoES, 2019, p. 9). However, the state of TVET on the ground is

on the contrary as indicated by poor pedagogical practices by lecturers (Jjuuko et al., 2019); poor quality equipment, under and ill trained staff, limited adoption of a competence-based education and training curriculum, and supervision inadequacies of TVET institutions (Okumu & Bbaaale, 2018); inadequate teaching staff, lack of vital equipment, and limited participation by the private sector (Wamala, 2023).

Furthermore, the available literature on TVET in Uganda focuses on isolated aspects of TVET. For example, Okumu and Bbaaale (2018) concentrated on the problems affecting the sector, with no specific mention of TVET in universities. Wamala (2023) focused on TVET education attainment, employment and poverty in Uganda. No literature, therefore, gives the current comprehensive account covering all the four aspects (i.e., inputs, transformation mechanisms, outputs and environment) of TVET in universities. The state of TVET in public universities in Uganda is, therefore, not clear. If this gap persists, policy makers and managers of public universities in Uganda will be at a risk of making uninformed policies and decisions on TVET. In this study, guided by systems theory, we will examine the effectiveness of TVET in public universities in regard to the four aspects of TVET (i.e., inputs, transformation mechanisms, outputs and the environment).

Objectives

The general objective of this study is to examine the effectiveness of TVET in public universities in Uganda as guided by systems theory in terms of inputs, the transformation mechanisms, outputs and the environment. Hence the following are the specific objectives:

1. To examine the inputs to TVET in public universities in Uganda
2. To assess the transformation mechanisms of TVET in public universities in Uganda

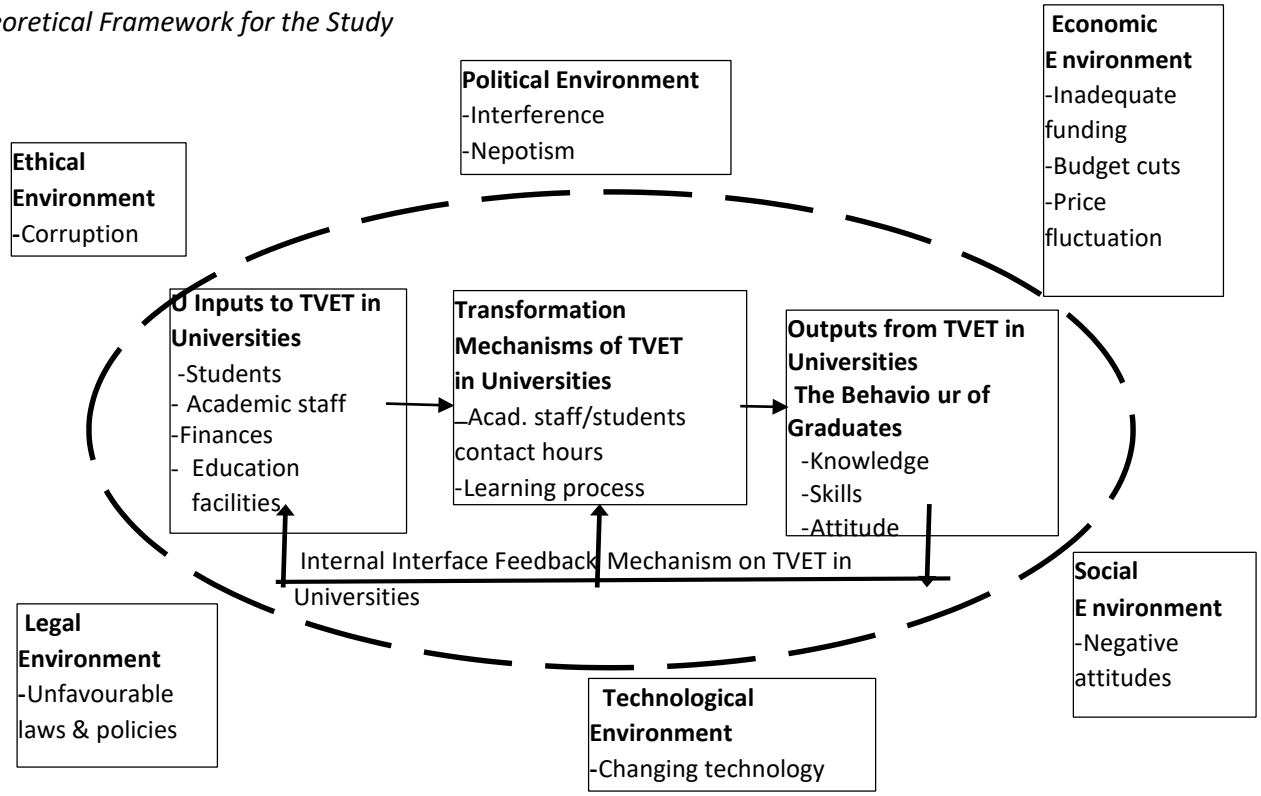
3. To examine the outputs from TVET in public universities in Uganda

4. To assess the environment in which TVET in public universities in Uganda operates

Theoretical Framework

F igure 3

Theoretical Framework for the Study



The theoretical framework guiding this study is as in Figure 3:

Note. Adapted from Figure 2

In Figure 3, we have operationalised inputs to TVET in public universities as students which we extracted from the "Minimum Entry Requirements for Admission to Universities" (National

Council for Higher Education [NCHE], 2007, p. 845) and as academic staff, finances and the education facilities, which we extracted from the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, pp. 877-878). We have operationalised the transformation mechanisms of TVET as staff/students contact hours which we extracted from the "Checklist of Quality and Universities Capacity Indicators" (NCHE, 2001, p. 877); and as the learning process, which we extracted from level two of Kirkpatrick's training evaluation model, titled *learning* (Kirkpatrick & Kirkpatrick, 2019, p. 4), which measures the degree to which learners acquire the intended knowledge, skills, and attitudes. We have operationalised outputs from TVET as the behaviour of graduates (measured in terms of knowledge, skills & attitudes) which we extracted from Kirkpatrick's training evaluation model level three titled, behaviour which measures "the degree to which participants [graduates] apply what they learned during training" (Kirkpatrick & Kirkpatrick, 2019, p. 4). In this case, we will assess how the TVET graduates are applying what they learnt. Finally, we have operationalised the environment in which TVET in universities operates as political, economic, social, technological, legal and ethical (PESTLE) which we extracted from Buye (2021, pp. 3-9). According to Buye (2021) environment provides both facilitating and inhibiting influences on organizational performance. He demonstrated PESTLE analysis as an effective technique for analyzing the influence of environment on organizations, hence its selection for use in this study.

Related Literature

Review of Literature Reviews. Researchers have interrogated parts of TVET in relation to the four research objectives of this study as exemplified by the following reviews carried out at global level. Tripney et al. (2013) reviewed literature on the effects of TVET interventions for

young people in developing countries so as to inform policy, practice, and research. They reviewed 26 articles published between 2000 and 2011 and examined the effects of five TVET interventions (i.e., technical education, vocation education, vocational training, on–the-job training and apprenticeship training). Using meta-analytic techniques, they found out that the effects of the interventions on young people had been positive in terms of paid employment, formal employment and self-earnings and had been negative on self-employment earnings. Tripney et al. (2013) pointed out two gaps on the studies they reviewed. First that, there had been overall scarcity of robust evidence, as had been indicated by the relatively few studies that met their inclusion criteria. Secondly that, only a very small proportion of the many TVET interventions then in operation in developing countries had been rigorously evaluated.

Tripney and Hombrados (2013) reviewed literature on the impact of 20 different TVET interventions for young people in low- and middle-income countries, three of which interventions were technical education, vocational education and vocational training. They reviewed 26 articles that they sourced from seven databases. Using meta-analysis, they found out that the overall mean effects of TVET interventions on overall paid employment, formal employment, and monthly earnings for the young people had been "small, positive, and significant" (p. 1). Tripney and Hombrados (2013) pointed out gaps to the effect that scarcity of research in TVET existed and that the studies they reviewed had "methodological shortcomings" (p. 10) and had not provided high quality evidence to help answer their review questions.

Kluve et al. (2017) reviewed literature on the impact of youth employment interventions on the labour market outcomes of young people and their business performance, one of which interventions was TVET oriented "training and skills development" (p. 27). They reviewed 113 articles that had been published up to January 2015, which they sourced from a wide range of

general and specialized databases. Using meta-analytic methodology, Kluve et al (2017) found out that overall, youth employment interventions had "increased the employment and earnings of those youth who [had] participate[d] in them" (p. 13). They pointed out two gaps on the studies they reviewed. First that the existing research had spread unevenly across the globe. While the evidence gathered, had been global in nature, capturing 31 countries from all regions of the world "slightly more than half of the evidence [had been] derived from… high-income countries" (p. 175). Secondly, the studies they reviewed had "concentrated on rather small-scale, NGO-implemented interventions and [lacked] evidence for larger, nationwide governmental programmes" (p. 175).

Review of Empirical Studies. In addition to reviews, individual studies have been carried out on various aspects of TVET. For example, Jjuuko et al. (2019) examined what they termed as "methodological dilemmas of agricultural education and training" (p. 238) in a public agricultural college in Uganda as a case. The study aimed at finding out how the college prepared "its students for the agricultural world of work" (p. 243). Using a qualitative study approach, they drew their findings using students' experiences. By use of thematic analysis approach enhanced by "atlas.ti qualitative data analysis software" (p. 244), Jjuuko et al. (2019) found out that in general, there had been "limited evidence to suggest effective preparation of students for the agricultural world of work" (p. 247). Lecture, mostly characterised by supply of handouts, had been the most common teaching-learning method used by lecturers as opposed to demonstration and farm practice method which integrated both theory and practice. According to Jjuuko et al. (2019) the poor pedagogical practices constituted a huge part of the failure of TVET education.

Okumu and Bbaale (2018) undertook a diagnostic study of the TVET sub-sector in Uganda. By use of thematic and content analyses, they found out that financing and planning constraints had resulted in "poor quality equipment, under and ill trained staff, limited adoption of a competence-based education and training curriculum, and supervision inadequacies of TVET institutions" (p. 735). They also revealed that Uganda's educational structure was generally characterized by what they termed as *the degree syndrome* where individuals enrolled at university for a sense of achievement, even though university education was more theoretical than practical.

Sannerud (2019) undertook a study to find out whether a research based master's degree programme in vocational pedagogy that had been established at Kyambogo University (KyU) in 2009, had played its role of building research capacity among TVET students. From the quality of the master's theses produced, Sannerud (2019) found out that the TVET graduates had methodological inadequacies. He highlighted the need for further advanced training among the TVET graduates.

In summary, the review of related literature provided evidence to the effect that researchers investigated some parts of TVET (e.g., inputs, transformation mechanisms, outputs and the environment). However, there exist gaps which our study will address. For example, the studies we reviewed had been carried out in earlier periods and in different contexts. Secondly, none of the studies provided an account of effectiveness of TVET in public universities in Uganda. We will address this gap by undertaking a qualitative study on the effectiveness of TVET in public universities in Uganda. We will apply systems theory to examine the four aspects of TVET that is, inputs to TVET, transformation mechanisms of TVET, outputs from TVET and the environment in which TVET operates in public universities.

Methodology

Research Paradigm. Our study will be informed by the interpretivist world view in which researchers do "not accept the view of a stable, coherent [and] uniform world. Interpretivists argue that, all meaning is situated in a particular perspective or context, and, since different people and groups have different perspectives and contexts, there are many different meanings in the world, none of which is necessarily more valid or true than the other (Gay et al., 2012). Ontologically, in the context of this study, we subscribe to the position that social reality is "fluid and fragile" (Neuman, 2014, p. 104). People construct social realty as they "interact with others in ongoing processes of communication and negotiation… Social reality is largely what people perceive it to be; it exists as people experience it and assign meaning to it (p.104). Epistemologically, in this study, we subscribe to the standpoint of Weber (2004) that "the knowledge interpretivists build reflects their particular goals, culture, experience and history…. [Therefore], knowledge is built through social construction of the world'' (p. vi). Based on our ontological and epistemological stances, we will, therefore, interpret the state of effectiveness of TVET in public universities in Uganda from the lenses of the university stakeholders closest to TVET.

Study Participants. In this subsection, we present the unit of analysis and the unit of observation as outlined below:

Unit of Analysis. Our unit of analysis will be a non-traditional hard science academic programme. An academic programme is a set of prescribed courses that a student registers for in order to qualify for an academic award such as a degree (e.g., Bachelor of Visual Communication, Design and Multimedia) (http://www.cedat.mak.ac.ug/). A hard science is a field of natural or physical science in which aspects of the universe are investigated by means of hypotheses and experiments involving rigorous scientific methods (Shapin, 2022). In this study a hard science is a university programme, designed to equip students with work ready

(employable) skills (i.e., competitive knowledge, technological expertise, hands-on practical skills and the right attitudes) in handling the various sectors of economic and social life.

Within the family of hard sciences, we have anchored this study on non-traditional TVET programmes and left out the traditional hard science programmes (e.g., bachelor's degrees in civil engineering; mechanical engineering; electrical engineering). The non-traditional hard science academic programmes are relatively new programmes designed by universities. Examples of such programmes are Bachelor of Science in Petroleum, Geoscience and Production attainable at Makerere University; and Bachelor of Medical Engineering attainable at Mbarara University of Science and Technology. Using the "Information on Public Universities Admissions for 2023/2024 Academic Year" (Ministry of Education and Sports [MoES], 2023), we have extracted thirty one non-traditional hard science TVET programmes from six public universities (Appendix A). These will be our units of analysis in this study.

Unit of Observation. Our units of observation shall be a programme coordinator and a student. A program coordinator is part of faculty with assigned duties to assist with the operations of an academic program (https://www.tarleton.edu/cosm/program_coordinators). A programme coordinator will be our priority because he/she has an all-round insight on a TVET programme. By mandate a programme coordinator plans, coordinates and monitors implementation of an academic program. He/she keeps a program on schedule within a stated budget and is overall accountable for a programme. In the event that a TVET programme does not have a coordinator, we will take on the corresponding head of department (HoD) as a second alternative voice, since an academic programme belongs to a department. In the worst scenario where a TVET programme does not have a coordinator and the pertinent unit does not have a department, we will take on a faculty/school dean as a third alternative voice. Beyond the

programme coordinator, we will interview a student, who is the main beneficiary of a TVET programme. In the learning process, students actively participate in classroom discussions and assignments and consistently align their behaviour to the planned TVET programme learning outcomes, hence they will be effective voices for this study.

Methods of Data Collection. We will employ two methods to collect data, that is, interviewing, and focus group discussion:

Interviewing. We will conduct interviews with the programme coordinators. Interviews involve "unstructured and generally open-ended questions that are few in number and intended to elicit [specific] views and opinions from the participants" (Creswell, 2014, pp. 241-242). Interviews with the programme coordinators will help us to enlist in-depth information on the respective TVET programmes (Creswell, 2014). Interviews will provide us with the flexibility to tailor probing questions to the coordinators. Interviews will also avail us the opportunity to observe the body language/non-verbal cues of the participants. We will use an interview guide designed based on the four research objectives of this study to collect data.

Focus Group Discussions. We shall also conduct focus group discussions (FGDs) with students of the respective programmes given that students are more numerous than programme coordinators (Gay et al., 2014). Besides FGDs will afford us the advantage of on the spot cross-checking of facts as the students will be verifying each other's responses. We will use an FGD guide designed based on the four research questions of this study to collect data from the students.

Data Management. We will employ the framework method (Gay et al., 2013) for analyzing data. The framework method uses both deductive and inductive thematic analysis approaches. Our study being theory-driven, has the themes already predetermined (i.e., inputs,

transformation mechanisms, outputs and the environment). We will employ the seven analysis stages suggested by Gale et al. (2013) to analyze data obtained from interviews and FGD. The stages are; transcription, familiarization with the interviews, coding, developing a working analytical framework, applying the analytical framework, charting data into the framework matrix and interpreting the data as detailed below.

Under transcription stage, we will do a verbatim transcription of the data, but with a focus on the content as our primary interest. In the second stage (i.e., familiarization with the interviews) we will further internalize all the data sets (from interviews and FGD) using the audio recording and/or transcripts and any contextual or reflective notes that we recorded during the interview. In stage three that is, coding, we will carefully read the transcripts line by line, while applying a paraphrase or label (a 'code') that describes what we perceive in the passage as important. Data coding aims to classify all of the data so that it can be compared systematically with other parts of the data set. In stage four (development of a working analytical framework) we will group the codes together into the already predetermined categories (themes) which we will then clearly define, thus forming a working analytical framework.

In stage five, we will apply the analytical framework by indexing subsequent transcripts using the existing categories (themes) and codes. We will assign each code a number or abbreviation for easy identification. In stage six (charting data into the framework matrix), we will use a spreadsheet to generate a matrix and chart the data into the matrix. Charting involves summarizing the data by category (theme) from each transcript. While charting, we will ensure to retain the original meanings of the participants and also include references to interesting or illustrative quotations. Finally, we will implement stage seven, where we will interpret the data

based on the four predetermined themes (i.e., inputs, transformation mechanisms, outputs and the environment) before finally writing up the findings.

Potential Contribution to Knowledge

The study will contribute to the systematic and integrated planning, investment and provision of TVET which recognises the interractability of the four aspects of TVET (i.e., inputs, transformation mechanisms, outputs and the environment). The study will also provide a platform for exposure of systems theory to readers of our work, hence wider adoption and use of systems theory by future researchers in other fields.

References

Buye, R. (2021). Organisational analysis tools and techniques: Critical reflection on the PESTLE analysis and other related techniques. 10.13140/RG.2.2.27060.78727

Business, Technical, Vocational Education and Training [BTVET] Act (2008).

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage.

Education Policy Review Commission [EPRC]. (1989). *Education for national integration*. Ministry of Education and Sports.

French, W. L., & Bell, C. H. (1990). *Organization development: Behavioural science interventions for organization improvement* (4th ed.). Prentice-Hall International.

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multidisciplinary health research. *Medical Research Methodology, 13*, 1-8. http://www.biomedcentral.com/1471-2288/13/117

Gay, L. R., Mills, G. E., & Airasian, P. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson Education.

Jjuuko, R., Tukundane, C., & Zeelen, J. (2019). Exploring agricultural vocational pedagogy in Uganda: Students' experience. *International Journal of Training Research*, *17*(3), 238-251. 10.1080/14480220.2019.1685161

Kirkpatrick, J., & Kirkpatrick, W. (2019). *An Introduction to the new world Kirkpatrick*. Kirkpatrick Partners. https://www.kirkpatrickpartners.com/wp-content/uploads/2021/11/Introduction-to-theKirkpatrick-New-World-Model.pdf

Kluve, J., Puerto, S., Robalino, D., Romero, J. M., Rother, F., Stöterau, J., Weidenkaff, F. & Witte, M. (2017). *Interventions to improve the labour market outcomes of youth: A systematic review*. Campbell Systematic Reviews. 10.4073/csr.2017.12

Maclean, R. & Lai, A. (2011). The future of technical and vocational education and training: Global challenges and possibilities. *International Journal of Training Research, 9*(12). 10.5172/ijtr.9.1-2.2

Matenda, A. (2019). *The role of technical and vocational education and training in women's empowerment: A capabilities perspective* [Unpublished doctoral dissertation]. University of the Free State, South Africa

Ministry of Education and Sports [MoES]. (2011). *Skilling Uganda: BTVET strategic plan 2011 2020.* https://www.education.go.ug

Ministry of Education and Sports [MoES]. (2019). *The technical, vocational education and training (TVET) policy.* https://www.education.go.ug

Ministry of Education and Sports [MoES]. (2023). *Information on public universities admissions for 2023/2024 academic year.*

National Council for Higher Education [NCHE]. (2001). *Checklist of quality and universities capacity indicators for assessment of universities and programmes under the universities and other tertiary institutions act, 2001*. https://unche.or.ug

National Council for Higher Education [NCHE]. (2007). *Statutory instruments number 63: The university and other tertiary institutions (minimum entry requirements for admission to universities or other tertiary institutions) regulations.* https://unche.or.ug

Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches* (7th ed.). Pearson Education.

Odaet, C. F. (1990*). Implementing educational policies in Uganda*. World Bank discussion papers. Africa Technical Department Series No. 89.

Okinyal, H. F. (November, 2012). *Reforming the business, technical, vocational education and training (BTVET) sub-sector: Challenges, opportunities and prospects.* [Paper Presentation]. Uganda Vice Chancellors' Forum (UVCF).

Okumu, I. M., & Bbaale, E. (2018). Technical and vocational education and training in Uganda: A critical analysis. *Development Policy Review, 37,* 735–749. 10.1111/dpr.12407

Sannerud, A. R. (2019). Vocational pedagogy. In T. Halvorsen., K. S. Orgeret., & R. Krovel (Eds.), *Sharing knowledge, transforming societies: The Norhed Programme 2013-2020* (pp, 231*248)*. African Minds.

Shapin, S. (2022). Hard science, soft science: A political history of a disciplinary array. *History of Science*, 60(3), 1–42. https://doi.org/10.1177/00732753221094739

Sicherman, C. (2005). *Becoming an African university: Makerere 1922-2000.* Fountain. Statutory

Statutory Instrument Supplement No. 34 (2015). Establishment of Soroti University.

Tripney, J., Hombrados, J., Newman, M., Hovish, K., Brown, C., Steinka-Fry, K, & Wilkey, E. (2013). *Technical and vocational education and training (TVET) interventions to improve employability and employment of young people in low- and middle-income countries: A systematic review*. The Campbell Collaboration. 10.4073/csr.2013.9

Tripney, J. S & Hombrados, J. G. (2013). *Technical and vocational education and training (TVET) for young people in low– and middle–income countries: A systematic review and metaanalysis.* Empirical Research in Vocational Education and Training, 5(3), 1-14. 10.1186/1877-6345-5-3

Uganda Bureau of Statistics [UBOS]. (2019). *Uganda national household survey report 2019/2020*. www.ubos.org

United Nations Educational, Scientific and Cultural Organisation [UNESCO]. (1999, April). *Final report.* Second International Congress on Technical and Vocational Education. Seoul.

United Nations Educational, Scientific and Cultural Organisation [UNESCO]. (2001, September 19). *Revised recommendations concerning technical and vocational Education.* General Conference 31st session, Paris.

United Nations Educational, Scientific and Cultural Organisation [UNESCO] and International Labour Organisation [ILO]. (2003, December 8-11). *Implementing the UNESCO/ILO recommendations concerning technical and vocational education (Final report). Subregional seminar for West Africa on implementing the UNESCO/ILO recommendations for technical and vocational education and training,* Kaduna, Nigeria.

von Bertalanffy, L. V. (1968). *General system theory: Foundations, development, applications.* George Braziller.

Wamala, A. (2023). *Technical vocational education and training (TVET), employment and poverty in Uganda* [Unpublished doctoral dissertation]. Makerere University, Kampala, Uganda.

Weber, R. (2004). The rhetoric of positivism versus interpretivist: A personal view (Editorial). *MIS Quarterly*, *28*(1), i-xii. https://www.jstor.org/stable/25148621

Appendix K

Extended Abstract Accepted and Presented at Nkumba Annual PhD Conference (2025)

Technical, Vocational Education and Training (TVET) in Public Universities in Uganda: Empirical Study Based on Systems Theory.

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Extended Abstract

Keywords: Technical, vocational, education, training, effectiveness, public universities

Introduction

UNESCO (2001) outlines the importance of Technical, Vocational Education and Training (TVET) among others as; a means of preparing for occupational fields and effective participation in the world of work. In Uganda, the Ministry of Education and Sports (MoES) put in place a policy that anticipates; a world-class TVET system that delivers the most preferred TVET graduates, creates employment, and contributes to the country's sustainable economic, social and environmental development (MoES, 2019), hence repositioning training institutions (e.g., public

universities) as centers for TVET. Therefore, knowledge on the state of TVET in universities is important in guiding university managers and policy makers.

However, TVET in Uganda is both wanting and unclear as exemplified by the studies we reviewed (Okinyal, 2012; Okumu & Bbaaale, 2018; Jjuuko et al., 2019); Wamala, 2023). Besides, literature that gave a comprehensive account of TVET in public universities was scanty, yet the existing policy (MoES, 2019; TVET Act, 2025) was equally silent about the same. This paper is an empirical study based on systems theory, in which we examined TVET in public universities in Uganda in terms of its inputs, transformation mechanisms, outputs and the environment in which TVET operates.

Study Objectives

The general objective was to examine the state of TVET in public universities in Uganda as guided by systems theory. Hence the following were the specific objectives:

i. To examine the state of inputs to TVET in public universities in Uganda
ii. To examine the state of the transformation mechanisms of TVET in public universities in Uganda
iii. To examine the state of outputs of TVET from public universities in Uganda
iv. To examine the state of the environment in which TVET operates in public universities in Uganda.

Research Questions

i. What is the state of inputs to TVET in public universities in Uganda?

ii. What is the state of the transformation mechanisms of TVET in public universities in Uganda?

iii. What is the state of outputs from TVET in public universities in Uganda?

iv. What is the state of the environment in which TVET in public universities in Uganda operates?

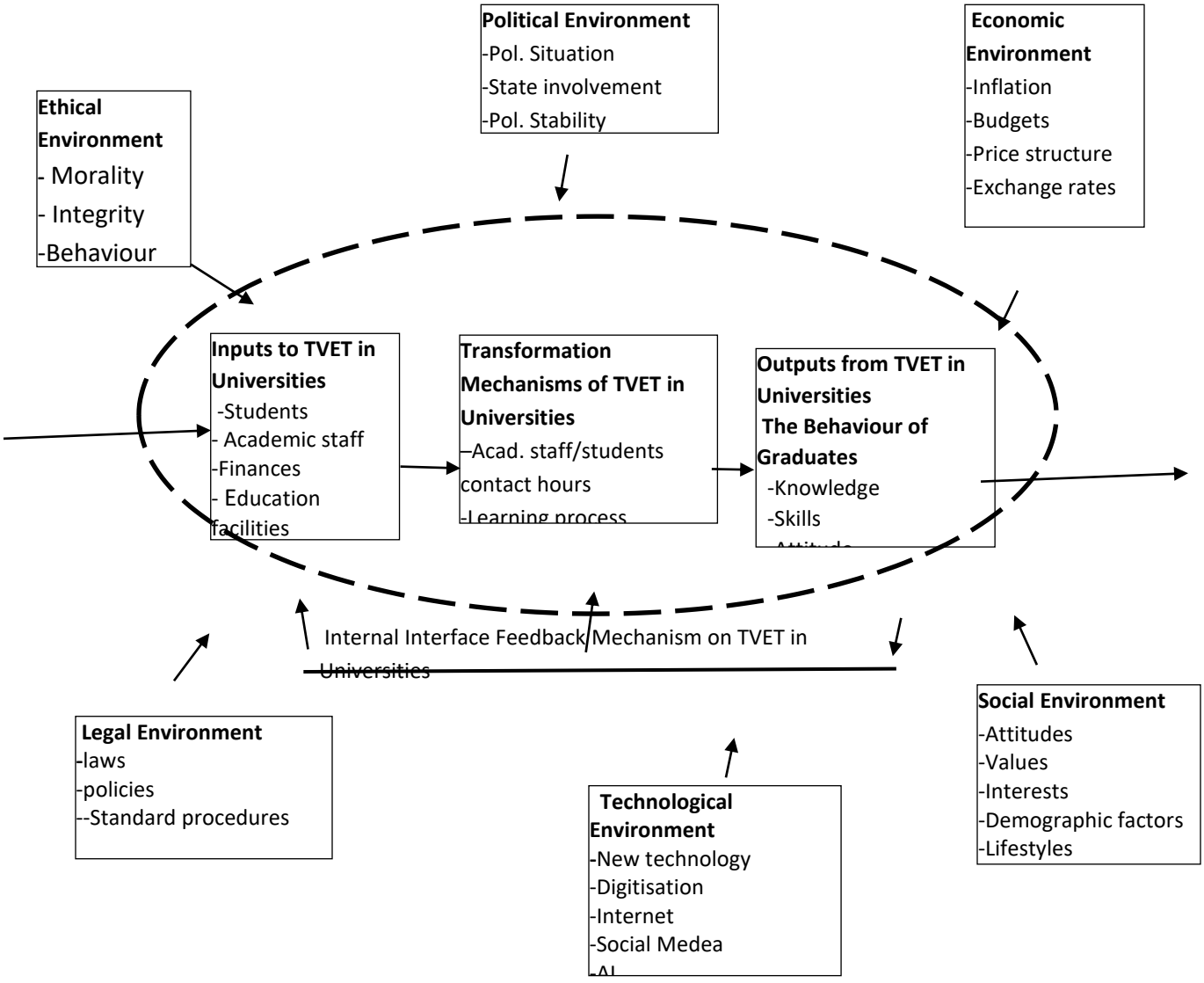
Literature Review

Theoretical Review

Systems theory was founded by Professor Karl Ludwig von Bertalanffy (1901-1972). von Bertalanffy (1968) viewed a system as a linkage of inputs *(raw materials)*, a transforming mechanism *(process)* and flows of outputs *(products)* located in an environment. Gradually, many developments accrued on the systems concept as it was embraced and applied by other researchers (Johnson et al., 1964; Cox & Paley, 2003; Bridgen, 2017). Systems theory (Figure 1) is therefore a formal theory, a basis on which we relied for selecting it to underpin this study.

Figure 1

Theoretical Framework Operationalizing TVET in Public Universities



Note. Sourced (*and modified*) from French & Bell (1990). Organisation development: Behavioural science interventions for organisation improvement (p. 53, Figure 5-1).

In this study, we considered TVET as a system in a public university (Ref. Figure 1) and operationalised inputs to TVET as students [NCHE], 2007), academic staff, finances and the education facilities" (NCHE, 2001). We operationalised the transformation mechanisms of TVET as staff/students contact hours (NCHE, 2001) and as the learning process (Kirkpatrick & Kirkpatrick, 2019). We operationalised outputs from TVET as the behaviour of graduates (Kirkpatrick & Kirkpatrick, 2019) and the environment in which TVET operated as political, economic, social, technological, legal and ethical [PESTLE)] (Buye, 2021).

Related Literature

There are related studies in empirical literature which have interrogated TVET in Uganda, some of which we reviewed. Okinyal (2012); Okware and Ngaka (2017); Okumu and Bbaale (2018) and Wamala (2023) reported poor infrastructure; negative attitudes towards TVET; low levels of entrepreneurship skills among TVET graduates; poor quality equipment and under/ill trained staff. Jjuuko et al.(2019); Okumu and Bbaale (2018) and Okinyal (2012) reported poor pedagogical practices by lecturers, irrelevant courses from TVET institutions, limited adoption of a competence-based education and training curriculum and supervision inadequacies. Wamala (2023) reported limited participation by the private sector.

From the reviews, we identifies three key gaps. First, all the studies had been carried out in earlier periods and in different contexts. Secondly, none of the studies gave a comprehensive coverage of TVET. Thirdly, none of the studies provided an account of TVET in public universities in Uganda. We addressed this gaps by undertaking an empirical qualitative study and examined the state of TVET in public universities in Uganda based on systems theory.

Method

This study was informed by the interpretivist world view (Gay et al., 2012). We employed a case study design (Fetters, 2019) because it facilitated an in-depth understanding of TVET in universities. We conducted the study in five public universities in Uganda that offered TVET, while focusing on a TVET programme as a unit of analysis; and a programme coordinator & a student as units of observation. We used interview guide and focus group discussion guide to collect data from the coordinators and students respectively and employed thematic analysis based on the framework method of qualitative data analysis by Gale et al. (2013) for analyzing data.

Results/Findings of the Study

The findings of the study revealed that most students were motivated and enthusiastic about their TVET studies. Most educational facilities provided by the universities were insufficient and technologically not up to date due to low funding to universities. Most universities employed assistant lecturers to teach; very few senior lectures and no professors. There was weak pedagogy by lecturers and weak participation of students in TVET programmes. However most students were confident and ready for the world of work. The key legal instruments guiding TVET in Uganda were in place, but were silent on TVET in public universities. Literature on TVET in universities was very scanty.

Conclusion and Recommendations

Based on the findings, we made six conclusions. TVET in public universities was adversely affected by; low funding, insufficient educational facilities and use of poor and outdated

equipment. Universities employed low skilled staff who predominantly used theoretical as opposed to practical teaching approaches. The products (students) from TVET were confident and ready for the world of work. There was lack of a specific policy to guide TVET in universities. University (internal policies) were stringent on active participation of students. There was very scanty literature on TVET in public universities.

Based on the above conclusion, we have made a number of recommendations; government should put in place a deliberate policy to facilitate the management, funding and provision of TVET in public universities. All plans, investments and provisions of TVET in public universities, should be done in a systematic, integrated and responsive way, considering in inputs, transformation mechanisms, outputs and the environment. Managers of public universities should put in place policies which enhance active participation of students in their programmes. There is need for more studies to be done on effective operations of TVET processes in universities.

List of Key References

Buye, R. (2021). Organisational analysis tools and techniques: Critical reflection on the PESTLE analysis and other related techniques. 10.13140/RG.2.2.27060.78727

for organization improvement (4th ed.). Prentice-Hall International.

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multidisciplinary health research. *Medical Research Methodology*, *13*, 1-8. http://www.biomedcentral.com/1471-2288/13/117

Jjuuko, R., Tukundane, C., & Zeelen, J. (2019). Exploring agricultural vocational pedagogy in Uganda: Students' experience. *International Journal of Training Research*, *17*(3), 238-251. 10.1080/14480220.2019.1685161

Kluve, J., Puerto, S., Robalino, D., Romero, J. M., Rother, F., Stöterau, J., Weidenkaff, F. & Witte, M. (2017). *Interventions to improve the labour market outcomes of youth: A systematic review*. Campbell Systematic Reviews. 10.4073/csr.2017.12

Ministry of Education and Sports [MoES]. (2019). *The technical, vocational education and training (TVET) policy*. https://www.education.go.ug

Okinyal, H. F. (November, 2012). *Reforming the business, technical, vocational education and training (BTVET) sub-sector: Challenges, opportunities and prospects.* [Paper Presentation]. Uganda Vice Chancellors' Forum (UVCF).

Okumu, I. M., & Bbaale, E. (2018). Technical and vocational education and training in Uganda: A critical analysis. *Development Policy Review*, *37*, 735–749. 10.1111/dpr.12407

United Nations Educational, Scientific and Cultural Organisation [UNESCO]. (2001, September 19). *Revised recommendations concerning technical and vocational Education.* General Conference 31st session, Paris.

von Bertalanffy, L. V. (1968). *General system theory: Foundations, development, applications.* George Braziller.

Appendix L

Certificate of Participation at Nkumba Annual PhD Conference (2024)

Appendix M

Certificate of Participation at Nkumba Annual PhD Conference (2025)

Appendix N

Data Collection Schedule

SUMMARY OF THE DATA COLLECTION EXERCISE

TARGET PARTCIPANTS FOR EACH PROGRAMME: (Programme Coordinator and Five (5) students of the same programme (Preferably class coordinator and any other 4 students)

UNIVERISTY	**Faculty/School**	**PROGRAMMES**	**NO. Participants**		**DATES**	**REMARKS**
			Prgrm Cord	**Students**		
Soroti	School of Engineering and Technology	Bachelor of Engineering in Electronics and Computer Engineering	1	5	Wednesday April 23, 2025	Achieved as planned
Kyambogo	Faculty of Engineering	Bachelor of Engineering in Automotive and Power Engineering	1	5	Thursday April 24, 2025	Achieved as planned
		Bachelor of Environment Science Technology and Management	Nil	Nil	Thursday April 24, 2025	The Programme is non- Existent
		BSC in Chemical and Process Engineering	1	5	Monday April 28, 2025	Achieved as planned
		Bachelor of Mechatronics and Biomedical	1	5	Tuesday Aril 29, 2025	Achieved as planned

		Engineering				
	Faculty of Vocational Studies	BSC in Textile and Clothing Technology	1	5	Friday April 25" 2025	Achieved as planned
Busitema	Faculty of Engineering and Technology	BSC in Polymer, Textile and Industrial Engineering	1	5	Wednesday April 30, 2025	Achieved as planned
		Bachelor of Agricultural Mechanization and Irrigation Engineering	1	5	Wednesday April 30, 2025	Achieved as planned
		BSC Agro-Processing Engineering	1	5	Thursday May 1, 2025	Achieved as planned
	Faculty of Physical Sciences	Bachelor of Science in Mining Engineering	1	5	Thursday May 1, 2025	Achieved as planned
Gulu	Faculty of Environmental Science	Bachelor of Science in Biosystems Engineering	1	5	Friday May 23, 2025	Achieved as planned
	Faculty of Agriculture	Bachelor of Science in Food Bioscience and Agribusiness	Nil	5	Friday May 23, 2025	The Coordinator was out of the country
MUST	Faculty of Applied Sciences and Technology	Bachelor of Medical Engineering	1	5	Tuesday May 27, 2025	Achieved as planned
		Bachelor of Petroleum Engineering and	1	5	Wednesday	Achieved as

		Environmental Management			May 28, 2025	planned
	Faculty of Medicine	Bachelor of Physiotherapy	Nil	Nil	Not achieved.	It was not possible to meet students and programme coordinators for these programmes
		Bachelor of Medical Laboratory Science	Nil	Nil		
Makerere	College of Engineering Design Art and Technology (CEDAT)	Bachelor of Science in Petroleum, Geoscience and Production	Nil	Nil	Not conducted. I achieved saturation levels.	I dropped all the programmes at Makerere university due to saturation
		Bachelor of Visual Communication, Design and Multimedia	Nil	Nil		
		Bachelor of Science in Software Engineering	Nil	Nil		
		Bachelor of Industrial Art and Applied Design	Nil	Nil		
	College of Health Sciences (CHS)	Bachelor of Biomedical Technology	Nil	Nil		
		Bachelor of Science in Biomedical Engineering	Nil	Nil		

		Bachelor of Science in Biotechnology	Nil	Nil		levels.
		Bachelor of Optometry	Nil	Nil		
		Bachelor of Cytotechnology	Nil	Nil		
		Bachelor of Science in Speech and Language Therapy	Nil	Nil		
	College of Agriculture and Environmental Sciences (CAES)	Bachelor of Animal Production Technology and Management	Nil	Nil		
		Bachelor of Science in Food Science and Technology	Nil	Nil		
		Bachelor of Science in Agricultural Engineering	Nil	Nil		
		Bachelor of Agricultural and Rural Innovation	Nil	Nil		
		Bachelor of Science in Human Nutrition	Nil	Nil		
TOTAL INTERVIEWED			**12**	**65**		