INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA

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DECLARATION

Declaration by the Candidate

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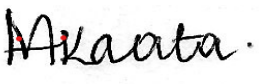
Signature: …  Date: 30th October, 2025

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Declaration by the Supervisors

The thesis, under our supervision, has been prepared and is now ready for examination, with our approval as university supervisors.

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DEDICATION

I hereby dedicate this PhD thesis in honor of my departed grandmother, Jajja Iraya Kasajja, my parents, the late Hamisi Bweze and late Rehema Kyakuwaire for their investment in me; my dear wife, Dr. Hajjat Safinah Kisu Museene, our children; Mugobya Fauza Kisu, Mbeiza Taqiyya Kyakuwaire, Wambuzi Zaheed Waiswa, Ibra Wako Kisu and Bweze Luqman Zhafar, for the support, encouragement, and prayers during my Ph.D. academic journey.

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ABSTRACT

Globally, there are opportunities and challenges in the workplace because of the growth of digital technologies. New job responsibilities and organizational structures create new demands on corporate human resource procedures, which influence talent management and staff development procedures across all organizations. Instructors encounter numerous obstacles in staying current with emerging digital innovations and in enhancing their abilities to implement technology-supported teaching. The main objective of the study was to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda. Specifically, this study focused on four competences, that is, classroom management, pedagogical, assessment and evaluation, and online digital gadgets competence. To achieve a comprehensive understanding of the research phenomenon, a mixed-methods approach was employed. The Taro Yamane formula was used to determine sample sizes: 184 instructors from a population of 339, 406 trainees from 4,145, and 36 administrators from 38. Stratified sampling using probability proportional to size was applied, followed by simple random sampling within each stratum. To ensure regional representation, three institutions were selected from the Central region, two from the Eastern region, and one each from the Northern and Western regions. The quantitative data was analyzed with the aid of Stata version 18 using Chi-squares, ANOVA, correlations, and the structural equation model. The qualitative data was analyzed thematically with the aid of NVivo version 14. Online digital gadgets utilization competence was strongly positively correlated to online teaching effectiveness (*cor* = 0.8113*), suggesting that higher competence in using digital tools greatly enhances effective online teaching in TVET institutions. Similarly, online teaching effectiveness showed strong positive correlations with classroom management (*cor* = 0.6917*), pedagogical competences (*cor* = 0.6581*), and online assessment and evaluation competence (*cor* = 0.7450*), highlighting that instructor competences collectively support online teaching effectiveness. From the SEM results, a unit increase in online digital gadgets utilization competence leads to a 56% improvement in online teaching effectiveness (coefficient = 0.557, $p < 0.001$), highlighting the vital role of having tech-savvy instructors. Similarly, a unit increase in online assessment and evaluation competence results in an 18% improvement ($p < 0.001$), while pedagogical competences contribute a 12% improvement ($p = 0.008$), and classroom management competences yield a 12% improvement ($p = 0.002$) in online teaching effectiveness. These findings emphasize that all instructor competences significantly and positively influence online teaching effectiveness in TVET institutions, with online digital gadgets competence exerting the greatest effect. Based on these findings, it is strongly recommended that TVET institutions develop and implement targeted capacity-building programs to continuously train instructors in digital gadgets utilization, ensuring they acquire and maintain high levels of technological competence to effectively deliver and manage online teaching. For future research, a similar study needs to tackle the online learner's required competences to strike a balance between instructor training and effective delivery. This study established a fourfold approach of creating innovations in the TVET institution which aim at structuring informal vocational education, guaranteeing TVET access and inclusion for vulnerable groups, youth employment (matching industry demands and skills), enforcing private-public partnerships, strengthening the digital and ecological transition of TVET, aligning local training with economic realities, developing skills to reinforce quality, professionalizing the training of trainers, and strengthening the management capacities of TVET stakeholders.

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ACRONYMS AND ABBREVIATIONS

AE	Assessment and Evaluation
AECT	Association for Educational Communications and Technology
ANOVA	Analysis of Variance
ATD	Association for Talent Development
BTVET	Business, Technical, and Vocational Education and Training
CBET	Competence-Based Education and Training
CBT	Competence-Based Training
CFA	Confirmatory Factor Analysis
COVID-19	Coronavirus Disease of 2019
CPDT	Competency Profile for Digital Teacher
CRM	Classroom Management Competence
CTTE	Certificate in Technical Teacher Education
CVTI	Certificate in Vocational Training instructor
DOSTE	Department of Science and Technical Education
GTZ	German Development Cooperation
HEIs	Higher Education Institutions
ICT	Information and Communications Technology
ILO	International Labor Organization
JICA	Japanese International Development Cooperation
MoES	Ministry of Education and Sports
MUELE	Makerere University Electronic Learning Environment
NCDC	National Curriculum Development Center
NVivo	Non-Verbal Interpretation Verification Outputs
ODG	Online Digital Gadgets competence
OER	Open Educational Resources
OL	Online learning and teaching
OLC	Online Learning Consortium
PED	Pedagogy competence

PhD	Doctor of Philosophy
SCT	Social Cognitive Theory
SEM	Structural Equation Model
SLT	Social Learning Theory
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan Africa
TAM	Technology Acceptance Model
TDC	Teacher Digital Competence
TEELS	Teacher Education E-learning System
TEs	Teacher Educators
TI	Technical Institute
TIET	Teacher Instructor Education and Training
TPACK	Technological Pedagogical and Content Knowledge
TTE	Technical Teacher Education
TTI	Teacher Training Institutions
TVE	Technical and Vocational Education
TVET	Technical and Vocational Education and Training
UCU-REC	Uganda Christian University Research Ethics Committee
UHPAB	Uganda Health Professions Assessment Board
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEVOC	International Centre for Technical and Vocational Education and Training
UVTAB	Uganda Vocational and Technical Assessment Board
VTC	Vocational Training College
VTI	Vocational Training Institute
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1 Introduction

This study is an investigation of the influence of instructor competences on effective online teaching in TVET institutions in Uganda. Particularly, by competence, this study looked at the ability/skills of a Technical and Vocational Education and Training (TVET) trainer/instructor to conduct teaching online adequately and effectively, as it is conventionally done physically Diao and Qu (2024). This term is often interchangeably mistaken for competencies as utilized by Minghat, Ana, Jamaludin, Mustakim and Shumov (2020), referring to the possession of the knowledge, skills, and behaviors needed to perform a task or role effectively and to a high standard. TVET plays a crucial role in economic growth and competitiveness by equipping trainees with market-ready skills. The COVID-19 pandemic has accelerated this transformation, with Ugandan TVET institutions integrating online teaching for accessibility and flexibility. The effectiveness of online teaching depends on the competence of the trainers in transitioning from traditional physical to online teaching. Therefore, this chapter provides an overview of the study, including its background, problem statement, purpose, objectives, hypotheses, research questions, justification, assumptions, scope, limitations, theoretical frameworks, and operational definitions.

1.2 Background to the Study

Globally, studies show that instructors in TVET institutions possess specific competences required to deliver effective online teaching. These competences include digital competence in online instructional management (Wannapiroon, Nilsook, Jitsupa, &

Chaiyarak, 2022), evaluation of online teaching (Thomas & Graham, 2019), knowledge competences, professional skills, professional attitude skills, and personality dimension (Dehghani, Sheikhi Fini, Zeinalipour, & Rezaei, 2020), as well as social, ethical, managerial, personal, technological, pedagogical, and supervisory competences (Anane, 2013; Aslami, Esmaeili, Saeidipour, & Sarmadi, 2016). The introduction of Competence-Based Training (CBT) as a mode of delivery in TVET institutions can address these competences (Anane, 2013). CBT provides outcome-based qualifications, prepares individuals for self-employment, and meets the demands of industry for skilled workers.

Regionally, several studies, for instance, Bolliger and Halupa (2021); Liu, Zhao and Su (2022); R. Mutebi, B. Kerre and J. Mubichakani (2023), reveal that instructor competences play a key role in the efficiency of online teaching in TVET. For instance, Misra (2011) revealed that TVET trainers in Europe are always overweighed by peers in general education as communities prioritize academic credentials more highly. Additionally, Omar, Jie, Puad and Ismail (2022) maintained that the development of skills of the trainers to the level of the general instructors of higher education institutions is the solution to existing challenges. Harteis (2009) stressed that this development of various competences is built upon a solid institutional establishment. Good instructors are key to successful and high-quality online learning experiences in the vocational education and training sector (Romanova, Petrenko, Romanov, Kupriyevych, & Antoniuk, 2022). The perceptions of English instructors about online teaching, including technical, pedagogical, and institutional problems, were explored, adding relevant knowledge to the literature (Şener, Ertem, & Meç, 2020). Becker and Spöttl (2019) emphasized that vocational training success relies on trainees' experience and logical content structuring,

emphasizing the importance of design in learning processes and putting the learner at the center. In Asia, studies have shown that instructors who are highly competent in using e-learning technologies for teaching influences learning outcomes (Omar, Jie, Puad, & Ismail, 2022). Instructors' digital competence in online instructional management through synchronous online learning significantly enhances abilities in course content analysis, online class management, and instructional media development (Wannapiroon, Nilsook, Jitsupa, & Chaiyarak, 2022). While most of the studies show that instructor competences have a positive influence on the quality of online teaching (Sholikhun, Soraya, Siswanto, & Wafirah, 2022). Other studies indicate a negative influence (Alawamleh, Al-Twait, & Al-Saht, 2020; Kordrostami & Seitz, 2022). In the United States of America, studies revealed that confident trainers were more prepared (Bolliger & Halupa, 2022). The roles of online instructors include being facilitators, course designers, course delivery experts, subject matter experts, and mentors (Martin, Budhrani, Kumar, & Ritzhaupt, 2019). These roles require specific competences in areas such as course class management, pedagogical, assessment, and handling of e-learning platforms (Aimiuwu, 2019; McCalman, 2014).

In Sub Saharan Africa (SSA), instructors in technical and vocational education and training institutions in Africa need specific competences to deliver quality online teaching. These competences include a strong knowledge of the subject content (Mukasa, Simiyu, & Wanami, 2020; Oroni, Manasi, & Wepukhulu, 2023), the ability to promote experiential and constructive learning and teaching (Anane, 2013; Oroni, Manasi, & Wepukhulu, 2023), and proficiency in using technology for online instruction (Anane, 2013). In addition, instructors should possess social, ethical, managerial, personal, and pedagogical competences to effectively engage with students in an online learning

environment (Ali & Akayuure, 2016). It is also important for instructors to have access to adequate instructional equipment and materials (Aslami, Esmaeili, Saeidipour, & Sarmadi, 2016). To ensure the development of these competences, institutions should provide ongoing training and support for instructors (Aslami, Esmaeili, Saeidipour, & Sarmadi, 2016). A study conducted in Botswana revealed that there are significant gaps in preparedness of the TVET institutions in implementing online teaching (Hondonga, Chinengundu, & Maphosa, 2021). In South Africa, a study conducted to analyze the training needs of TVET instructors found that the strategies formulated to implement the training methods such as online learning faced difficulty in implementation due deficiencies in the financial and personal support (Zinn, Raisch, & Reimann, 2019). As Grijpstra and Papier (2015) put out, poor working conditions, low status, limited professional development, and support in African teaching professions, including irregular pay, crowded classrooms, and lack of pedagogical support, hinder quality basic education.. In Nigeria, a study aimed at building the e-teaching capacity of the TVET instructors to cushion the effects of COVID-19 found that there were substantial competences for effective e-teaching planning as well as some necessary skills for operating and troubleshooting which was paramount in enhancing the quality of online learning (Bakare, Oviawe, Nwachukwu, Anoure, Anayo, & Maghalu, 2020). In addition, Obe, Madu and Onah (2021) stressed that innovative ICT programs are essential in TVET programs in public universities in Enugu state (Obe, Madu, & Onah, 2021).

Due to its price and flexibility in comparison to school-based learning, online learning has occasionally enhanced access and enrollment chances (Gannon). However, many nations and TVET institutions have yet to integrate online technology into the delivery of TVET programs, despite significant attempts (UNESCO, 2020). In addition to being a

health risk, the COVID-19 pandemic caused many students to postpone finishing their coursework and entering the workforce (WHO, 2020). Besides, the TVET policy highlighted that the current hiring practices for TVET instructors focus primarily on academic qualifications while ignoring their practical experience or industry expertise (MoES, 2019). Yet the practical proficiency of TVET instructors is essential for imparting practical skills to students and preparing them for real-world work environments. If TVET instructors lack these essential practical competences, their ability to deliver effective online teaching to students is compromised. Consequently, this study sought to address the lack of understanding about the specific instructor competences that influence effective online teaching in TVET institutions in Uganda.

In Uganda, TVET institutions play a crucial role in equipping learners with practical skills that enhance job market competitiveness and drive economic growth. With the advent of digital technologies, online teaching has become a viable mode of instruction. This paradigm shift necessitates a comprehensive understanding of the competences required by instructors to deliver effective online education. In Uganda, the integration of online teaching into TVET programs presents a unique context that requires investigation to ensure the maintenance of educational quality, which is deemed viable if the instructor's competences are known and, where possible, enhanced (Mbanga, 2017). While studies in Uganda indicate that instructor competence significantly influences the quality of online teaching in TVET institutions, existing research primarily highlights general factors such as course design, communication, and time management competence (Ochwo, Mugizi, & Kasule, 2023). However, there remains a limited understanding of how specific instructor competences such as pedagogical adaptability, assessment skills, and digital platform

utilization individually and collectively impact effective online teaching in TVET institutions. This study seeks to bridge this gap by providing a more comprehensive analysis of the relationship between instructor competence and the effectiveness of online teaching. Therefore, experiential and constructive learning strategies are more suitable for training effective technical teachers and instructors in Uganda. (Mukasa, Simiyu, & Wanami, 2020). Furthermore, the establishment of a regulatory structure to oversee quality assurance throughout the entire TVET sub-sector, the development and operationalization of a TVET qualifications framework and registry system, and the implementation of a TVET policy action plan are recommended to improve the quality of technical teachers and instructors in Uganda (Mukasa, Simiyu, & Wanami, 2020). Moreover, TVET educators in Uganda have shown a high level of competence in using various e-learning technologies, although there is a need for more customized technologies and professional training for instructors (Konayuma, 2015). Overall, the majority of instructors in TVET institutions in Uganda are using ICT tools in teaching and learning, indicating their preparedness and capacity to utilize these tools (Konayuma, 2015). Another study maintained that online training in TVET institutions offers opportunities for instructors and trainees to gain experience using web-based tools and technologies, efficient time management, and extended geographical access to education (Alla-Mensah, Fakoush, McGrath, & Wedekind, 2019). On the other hand, Mutebi and Ferej (2023) emphasized difficulties, including the absence of an all-encompassing policy framework for digital training and restricted availability of internet connectivity, and quality assurance concerns, as some of the impediments to fully harnessing the potential of online learning in TVET. Another study stressed that improving the status of instructors, as advocated by various international and national bodies, becomes a

significant lever for enhancing educational standards (Grollmann, 2008). Most studies have shown that the competence of TVET instructors influences task execution, career progression, and the quality of graduates (Chakroun, 2019; Sern, Hamisu, & Salleh, 2018). In light of this, Becker and Spöttl (2019) noted that competent TVET instructors are vital for fostering trainee skills development. Furthermore, contemporary and innovative instructor competences can serve as a guide for TVET partners, offering insights into the pivotal role of instructors, their career aspirations, and ongoing educational needs (Chakroun, 2019). Distinguishing TVET education from general education, Becker and Spöttl (2019) emphasized that TVET educators require distinct skills compared to their counterparts in general education. This distinction necessitates recognizing the key competences that set TVET instructors apart from their counterparts teaching in other levels of education (Wagiran, Pardjono, Suyanto, Sofyan, Soenarto, & Yudantoko, 2019). Duncan (2016), on the other hand, highlighted three pivotal aspects of instructor competences, that is to say, technical expertise and skills, pedagogical prowess, and existing industry experience. Ismail, Hassan, Bakar, Hussin, Hanafiah and Asary (2018) outlined three main components of a TVET instructor: personal characteristics and professionalism, teaching, learning, and training expertise, and technological and creative skills. Jafar, Saud, Hamid, Suhairom, Hisham and Zaid (2020) categorized instructor competences into technical competence, encompassing instructional preparation, execution, assessment, classroom management, and subject matter mastery, and non-technical competences, which encompass research, critical thinking, communication, professional development, and leadership skills. Similarly, Wagiran, Pardjono, Suyanto, Sofyan, Soenarto and Yudantoko (2019) specified the core competences of TVET instructors, including pedagogic knowledge, content expertise,

and educational technology skills. Anane (2013) noted that there is a need for a shift in teaching, evaluation, and certification methodologies, employing various facilitation methods such as direct instruction, discussions, small groups, problem-solving, and research, to enhance the effectiveness of online teaching for instructors.

The Technical and Vocational Education and Training (TVET) Act was enacted to establish a comprehensive institutional framework for promoting, coordinating, regulating, and delivering technical and vocational education and training in Uganda. The Act provides for the establishment of the TVET Council and the Sector Skills Expert Committee, and outlines procedures for the registration, accreditation, and licensing of TVET providers and trainers. It further defines governance structures for TVET institutions, establishes TVET Assessment Boards, and supports the development of a national TVET qualifications framework and curricula. Additionally, the Act introduces a Skills Development Fund to ensure sustainable sector financing. It repeals earlier laws such as the Business, Technical, Vocational Education and Training Act (Cap. 244), the Management Training and Advisory Centre Act (Cap. 253), the Hotel and Tourism Training Institute Act (Cap. 249), and the Uganda Wildlife Research and Training Institute Act (Cap. 261), thereby consolidating and harmonizing the regulatory landscape for skills development in Uganda. Under this Act, a TVET trainer is defined as a person who possesses competence in a specific vocational trade, occupation, or profession and is duly registered and licensed by the TVET Council to transfer skills to learners or trainees. This designation replaces the previously used term “instructor,” which was common during the inception of this study. The change in nomenclature reflects a shift toward a more professional and internationally aligned standard for teaching staff in

TVET institutions, emphasizing their hands-on, industry-relevant role in skills development.

TVET instructor competence in Uganda is a topic of concern. A study conducted in Uganda found that 63% of instructors had the capacity to use ICT tools in teaching and learning, with 53% having basic skills, 38% having intermediate skills, and 9% having advanced skills in ICT use (Kim, Shin, Woo, & Kim, 2019). Limited ICT infrastructures in TVET institutions in Uganda have been identified as a major challenge (Kiplimo, 2020). Additionally, Okumu and Bbaale (2019) revealed that poor quality equipment, under-trained staff, and limited adoption of a competence-based education and training curriculum were contributing factors to the limited ICT infrastructure (Bagumisiriza, 2017). According to the TVET policy in Uganda, the integration of online learning in Technical and Vocational Education and Training (TVET) institutions varies depending on factors such as technology infrastructure, government policies, curriculum development, instructor training, quality assurance, student access, and industry partnerships (Mutebi & Ferej, 2023; Okumu & Bbaale, 2019). Many TVET institutions worldwide have embraced online learning to some extent, often in a blended learning format, to provide trainees with the skills and digital competences needed in the modern world of work.

1.3 Statement of the Problem

Technical and Vocational Education and Training (TVET) has traditionally emphasized hands-on and practical learning. This has fostered a perception among learners and instructors that online learning is incompatible with TVET. While the COVID-19

pandemic forced TVET institutions to adopt online learning modalities, utilizing platforms like Moodle and Zoom, many have subsequently abandoned this approach despite its demonstrated potential for remote instruction. According to UNESCO (2022), only about 18% of TVET institutions in low-income countries managed to offer fully remote training during the pandemic. However, during the post-pandemic, a significant number of these institutions reverted to traditional in-person classes due to challenges such as limited digital infrastructure, inadequate access to technology, and insufficient digital literacy among educators and students. The International Labor Organization attributes this to the insufficient preparedness of low-income countries such as Uganda to respond to the constraints that resulted from the crisis.

Existing research attributes this decline to various factors, including inadequate internet infrastructure, a scarcity of relevant digital applications, the practical-centric nature of TVET instruction, and limited digital literacy among instructors. For instance, Omar, Zahar and Rashid (2020) emphasized that instructors' knowledge, skills, and attitudes play a central role in determining their overall competency, with knowledge identified as the most critical component. Diao and Qu (2024) demonstrated that structured training programs significantly improve teaching competences, showing measurable gains in teacher capability through pre- and post-training evaluations. Chi, Tu and Minh (2020) focused on the development of IT using competence frameworks, showing their positive impact on instructional quality and student learning outcomes. Qiong, Noordin, Azmi, Nasir and Arsat (2024) found that most TVET educators lacked sufficient digital competences, largely due to limited resources, time constraints, and resistance to change. Lee, Atherton and Crosling (2022) echoed the need for strengthening digital competences

to align with the technological demands of the Fourth Industrial Age. Omar, Jie, Puad and Ismail (2022) expressed concern that online learning may erode certain competency attributes typically fostered in conventional face-to-face environments. Collectively, these studies show substantial attention to defining, developing, and evaluating both competences (practical abilities and digital skills) and competencies (underlying knowledge, attributes, and attitudes). However, few studies have concentrated on the influence of instructor competence on effective online teaching in TVET institutions, revealing a key gap in the current research. Therefore, this study sought to address the gap in understanding the relationship between instructor competences and effective online teaching.

1.4 Purpose of the Study

The purpose of this study was to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.

1.5 Main Objective

The main objective of this study is to evaluate the readiness of TVET institutions for a new digital transformation which emphasizes digital integration in all areas of learning and business.

1.6 Specific Objectives

The specific objectives of this study were as follows: -

i) To determine the influence of TVET instructor classroom management competences on effective online teaching in TVET institutions in Uganda.
ii) To establish the influence of TVET instructor pedagogical competences on effective online teaching in TVET institutions in Uganda.
iii) To assess the influence of instructor assessment competences on effective online teaching in TVET institutions in Uganda.
iv) To analyze the influence of instructor utilization of digital platforms competences on effective online teaching in TVET institutions in Uganda.

1.7 Research Hypotheses

Based on the specified objectives, the following null hypotheses will be tested: -

i) $H_0$1**:** TVET instructor online classroom management competences have no influence on effective online teaching in TVET institutions in Uganda.
ii) $H_0$2**:** TVET instructor pedagogical competences are not related to online teaching effectiveness in TVET institutions in Uganda.
iii) $H_0$3**:** TVET instructor assessment competences do not influence effective online teaching in TVET institutions in Uganda.
iv) $H_0$4**:** TVET instructor competences in utilizing digital teaching platforms do not influence effective online teaching in TVET institutions in Uganda.

1.8 Justification of the Study

Conventionally, online teaching has been integrated to enhance universities and higher institutions of learning; however, it has not been implemented in TVET institutions. It is

sometimes believed that since TVET is fundamentally practical, it might make it a hurdle to teach and instruct online, but in some countries in Africa, such as South Africa (Denhere & Moloi, 2021; Zinn, Raisch, & Reimann, 2019), in Nigeria, TVET online learning has been enhanced through the TVET fund aimed at promoting online teaching among the TVET institutions (Obi, Eze, & Ogochukwu, 2020). While these studies have indicated that online instruction is paramount to the transmission of skills and delivery of knowledge between the instructors and the learners, the competences of the instructors in effectively utilizing the online platforms to offer and deliver effective online teaching have been overlooked. In this regard, Jafar, Saud, Hamid, Suhairom, Hisham and Zaid (2020) maintained that TVET institutions must invest in technology for learning. Other studies simply emphasized the need to embrace teacher competences by building information technology competence frameworks in online teaching to enhance the learning capacity of learners (Chi, Tu, & Minh, 2020). In Kenya, Muyaka, Wawire and Munene (2020) noted that a lack of sufficient training is one of the limitations of effective online teaching in Kenyan universities. Sisimwo, Kiplagat and Ochieng (2023) found that ICT infrastructure is one of the key drivers of e-learning in TVET institutions in Uasin Gishu County. Also, Kiplagat, Musembi and Nyakongo (2022) revealed that instructional methods are very crucial in the implementation of competency-based education and training. Currently, Uganda is implementing a competence-based curriculum from lower secondary to upper secondary (Najjuma, 2024). However, the success of this implementation largely depends on the competences of instructors at training institutions. Without adequately trained instructors, trainees may not fully grasp or effectively engage with the new curriculum. It was against this background that the study sought to evaluate the effect of various instructor competences on effective online teaching and learning in

TVET institutions in Uganda. In addition, while studies in Uganda have highlighted the need for effective online teaching in TVET institutions (Charles, Song, & Djaya, 2023; Mutebi & Ferej, 2023), no studies have evaluated the various instructor competences in effective online teaching and learning.

1.9 Significance of the Study

Findings from this study are expected to benefit various stakeholders by identifying the critical instructor competences necessary for effective online teaching in TVET institutions. The study will contribute to improving the quality of education by highlighting key areas where investment is needed to strengthen online instruction.

For instructors, the findings will inform professional development initiatives tailored toward enhancing their competences for effective online teaching. Trainees will benefit from improved instructional delivery, leading to better learning outcomes. TVET institutions can utilize the study's recommendations to refine their online teaching strategies, ensuring alignment with industry needs. Additionally, the Ministry of Education and Sports (MoES) will gain insights into critical instructor competences that require investment to establish and sustain effective online education in TVET institutions. The findings will also aid policymakers and educational administrators in formulating guidelines and strategies to enhance effective online teaching and curriculum development. To sum up, the study findings are a vital addition to not only the body of knowledge, but also to future researchers in the field of Technical and vocational education and training. Surprisingly, this study established a fourfold approach of creating innovations in the TVET institution which aim at structuring informal vocational

education, guaranteeing TVET access and inclusion for vulnerable groups, youth employment (matching industry demands and skills), enforcing private-public partnerships, strengthening the digital and ecological transition of TVET, aligning local training with economic realities, developing skills to reinforce quality, professionalizing the training of trainers, and strengthening the management capacities of TVET stakeholders.

1.10 Assumptions of the Study

This study made the following assumptions:

i) Instructor competences, particularly technological proficiency, pedagogical adaptability, and effective communication skills, play a critical role in the effectiveness of online teaching and learning in TVET institutions.
ii) TVET institutions in Uganda are committed to enhancing online teaching by supporting instructors in improving their competences.
iii) Instructors and administrators can objectively and accurately describe their pedagogical and ICT experiences, providing reliable data for this study.
iv) Instructor competences significantly influence student learning outcomes in online settings within TVET institutions.

1.11 Scope and Limitations of the Study

1.11.1 Scope of the Study

This study focused exclusively on seven government-aided TVET institutions in Uganda that offer certificate courses and examined whether instructor competences influenced

effective online teaching. The study took place in seven selected government-aided TVET institutions across different regions of Uganda to ensure a more representative sample. These institutions included: Nakawa Vocational Training College, Lugogo Vocational Training Institute, and Ntinda Vocational Training Institute from the Central Region, Iganga Technical Institute from the Eastern Region, Minakulu Technical Institute from the Northern Region, and Nyamitanga Technical Institute from the Western Region. The Jinja Vocational Training Institute in the Eastern region was used for the pilot study to assess the reliability and validity of the study instruments. Particularly, Uganda has 142 government-aided TVET institutions, including 42 skills development centers (which offer junior certificate courses), 85 vocational training institutions (which offer national certificate courses), and 15 colleges (which offer national diploma courses). Therefore, this study focused on seven government-aided TVET institutions in Uganda that offer certificate courses to capture diverse geographic and institutional perspectives. Preliminary investigations showed that these institutions had the necessary conditions for conducting the study.

1.11.2 Limitations and mitigations of the Study

The findings from this study were specific to the Ugandan TVET context and were not easily generalized to other countries due to cultural, technological, and infrastructural differences. To mitigate this, findings from this study were specific to the Ugandan TVET context and could not be easily generalized to other countries due to cultural, technological, and infrastructural differences. To mitigate this limitation, the study focused on a range of institutions from various geographical locations within Uganda, ensuring a diverse representation of teaching contexts. While the findings were specific

to the Ugandan context, they provided valuable insights that could inform future studies in similar contexts, especially in Sub-Saharan Africa. Future research could replicate this study in other countries with similar infrastructural and cultural settings to assess the applicability of the findings in different educational environments.

Variability in instructor competences posed a challenge due to the wide range of competences resulting from diverse educational backgrounds, teaching experiences, and access to professional development opportunities. This variability made it difficult to identify specific competences that uniformly influenced effective online teaching. To address this variability, the study designed and implemented a competence framework that covered a wide range of skills, from basic to advanced levels, to account for differences in instructor competences. The study ensured that instructors' varied skill levels were considered, and the analysis focused on identifying general trends rather than making comparisons of individual competences. Additionally, the study considered factors such as professional development opportunities to provide a more comprehensive view of the role of competences in effective online teaching.

Technological limitations, such as internet connectivity and digital tools, significantly affect the effectiveness and feasibility of online teaching and certain pedagogical strategies among instructors and institutions. To mitigate this limitation, the study focused on TVET institutions that possessed a minimum level of internet connectivity, including low bandwidth options, to assess online teaching effectiveness in low-resource settings. Furthermore, the study considered the varying digital tools and technological infrastructure available to each institution and considered the potential impact of these factors on online teaching outcomes. By selecting institutions with varying levels of

resources, the study aimed to provide a more realistic view of the challenges faced by institutions with limited technological support while ensuring that the recommendations could be applicable across different resource settings.

1.12 Theoretical Framework

The Social Cognitive Theory (SCT), originally known as the Social Learning Theory (SLT) in the 1960s by Albert Bandura, has evolved into a comprehensive framework that holds immense relevance for the study at hand. Social Cognitive Theory posits that learning takes place within a social context, characterized by dynamic and reciprocal interactions among the individual, their environment, and their behavior (Luszczynska & Schwarzer, 2015; Schunk, 2012). This theory was necessary for this study since it focuses on TVET learning and assumes that instructors' competences have a major influence on learning. What sets SCT apart is its focus on the profound influence of social factors, both external and internal, on behavior, reinforcing the understanding that behavior is not solely driven by personal traits but is also shaped by the environment in which it occurs. Social Cognitive Theory acknowledges that individuals acquire and maintain behaviors through intricate interplays of past experiences, expectations, and social reinforcements (Bandura, 2009). This intricate interplay underscores the significance of the theory in understanding the complex landscape of online learning and the competences needed for effective online teaching.

In the context of this study, SCT's principles align harmoniously with the exploration of TVET instructors' competences on effective online teaching. The theory's construct of self-efficacy, encompassing individuals' beliefs in their capabilities, offers an insightful

lens through which to examine how instructors' confidence influences their ability to manage online classrooms, incorporate digital tools, design assessments, employ diverse teaching methods, and meet the diverse needs of students within the virtual environment. The application of SCT helps unravel how variations in self-efficacy levels correspond to the adoption of innovative and effective teaching strategies, thus directly influencing instructors' competences.

Observational learning, another pivotal component of SCT, becomes particularly relevant when analyzing how TVET instructors acquire competence in online teaching. The theory asserts that individuals can learn through observing and modeling behaviors exhibited by others. Thus, understanding how instructors learn from their peers or experts who excel in online teaching becomes a crucial aspect of this study. By examining the influence of observational learning on instructors' ability to manage online classrooms, apply teaching methods, and create inclusive learning environments, Social Cognitive Theory (SCT) offers a framework to explore how instructors may adopt and apply effective practices. While this study does not specifically focus on how instructors acquire competences, it evaluates how their competences, particularly in classroom management, pedagogical skills, evaluation, assessment, and the use of digital platforms, affect their ability to teach effectively in online TVET settings. This approach helped to understand how instructors utilize their existing competences in shaping their online teaching practices.

Furthermore, SCT's emphasis on environmental factors resonates with the context of online learning. The online teaching environment, technological infrastructure, available resources, institutional support, and the diverse characteristics of students collectively shape TVET instructors' choices and practices. The application of SCT allows an

exploration of how these environmental factors influence instructors' decision-making processes, behaviors, and ultimately their competences in delivering effective online education.

The social cognitive theory's foundational concepts of self-efficacy, observational learning, environmental influences, and behavioral practices offer a rich framework for the examination of TVET instructors' competences in the realm of online education. By studying these constructs into the fabric of the study, SCT serves as a guiding light, illuminating the pathways through which instructors learn, develop, and apply their competences in online teaching, ultimately contributing to effective online teaching.

1.13 Conceptual Framework

The figure shows how the independent variables affect the dependent variables through the intervening variables, as seen below**:**

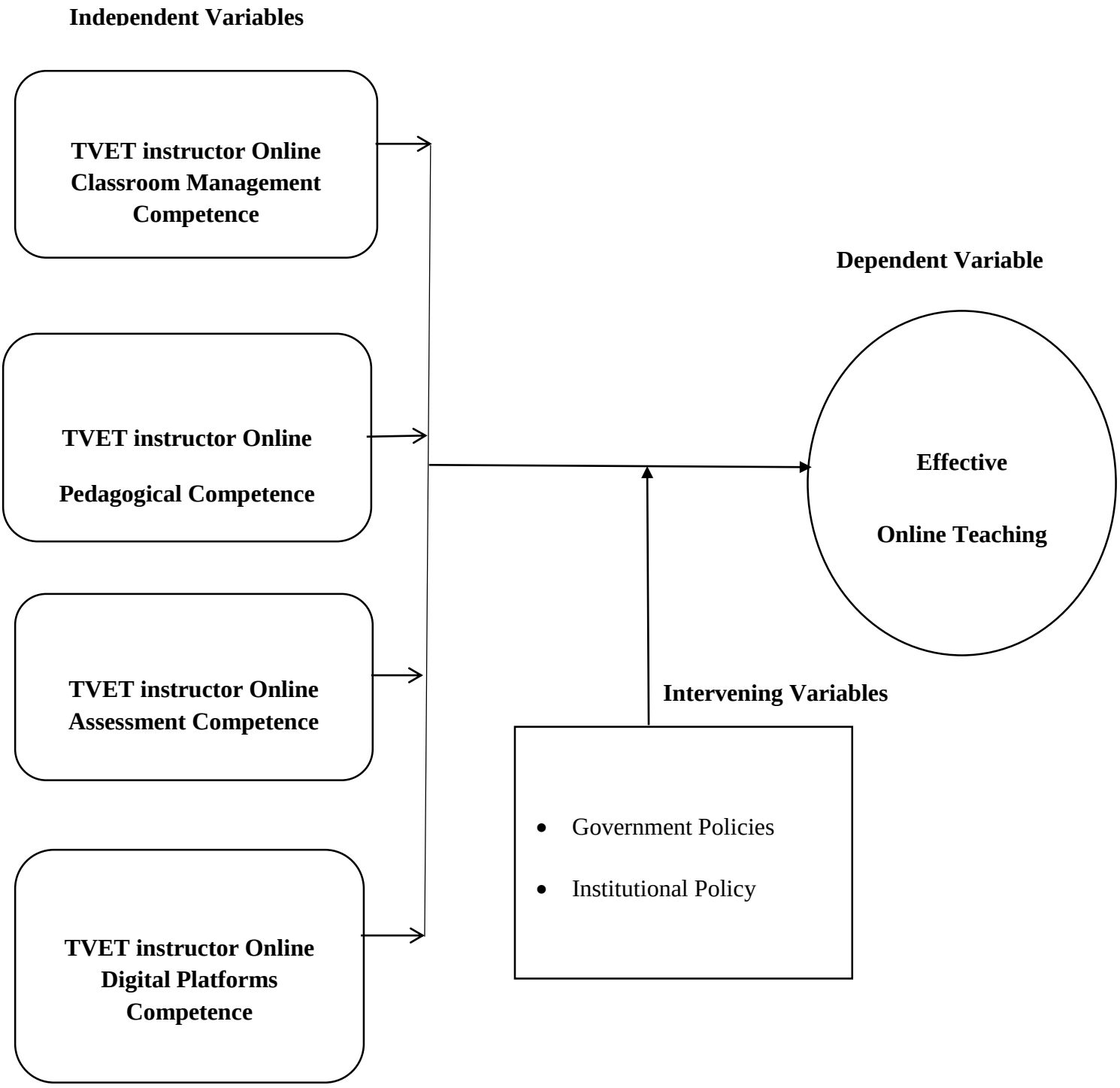


Figure 1. 1: Conceptual Framework for this study

From the conceptual framework above, the outcome variable is effective online teaching in TVET institutions in Uganda. The independent variables are multifaceted; they include the classroom management aspect, which covers the venue setting of the classrooms, the gadgets installed to aid the instruction, such as the projectors, internet infrastructure, availability of laptops, and smartphones. The second independent variable was pedagogical skills, such as the ability to plan a learning program, interact and manage the learning process, and teaching effectiveness in delivering online learning in TVET institutions. The assessment and evaluation independent variable looks at the trust levels of users with different behavior patterns (Huang, 2023). It also covers the aspect of reflection and development by incorporating various forms of online teaching, such as online Moodle platforms customized for various institutions. Lastly, evaluation also entails the ability of the instructor to have inclusive practice, which aids the trainees to have full access and participation in the learning process. Fourthly, the independent variables will involve the application and utilization of various online platforms such as Google Meet, Moodle, Zoom, YouTube, Big Blue Button, as well as Edmodo. Against these independent variables, the study presumes that the dependent variable is related to the independent variable through the interventions of the institutional structure/policies and government policies.

1.14 Operational Definition of Terms

1.14.1 Instructor Competences

In this study, instructor competence looked at the skill and ability to effectively manage online classrooms, apply pedagogical strategies, evaluate student performance, and use digital tools to enhance online teaching in TVET institutions.

1.14.2 Online Teaching

In this study, online teaching refers to the process of instructing people using virtual platforms. Live classes, webinars, video conferences, and other online resources are all used in this kind of instruction. The purpose of the online programs is to make learning easier and improve comprehension.

1.14.3 Classroom Management

In this study, classroom management implied the structure and the setting of the learning environment to blend the previous traditional physical training with online learning.

1.14.4 Pedagogical Skills

Pedagogical skills in Technical and Vocational Education and Training (TVET) institutions refer to the specialized knowledge, competences, and teaching strategies employed by educators and instructors to facilitate effective learning experiences for students pursuing vocational and technical education

1.14.5 Evaluation of Learning Processes

This study employed a quasi-experimental methodology will be employed. This means that two different groups must be found and chosen in the TVET setting. The trainees in the first group - referred to as the treatment group - will be those who have participated actively in online learning. The trainees in the second group, referred to as the control group, will employ conventional teaching methods. This methodology made it possible to conduct a comparative analysis, providing insights into the influence and efficacy of online teaching and learning at TVET institutions.

1.14.6 Learning platforms

In this study, online learning platforms are digital, web-based environments designed to facilitate and support the delivery of educational multimedia content and the interaction between instructors and learners in a virtual or remote setting. These platforms are used to provide a wide range of educational experiences, from formal courses in traditional academic institutions to professional development and lifelong learning opportunities through synchronous and asynchronous interactions.

1.14.7 Technical and Vocational Education and Training (TVET)

TVET as elements of the educational process that include, on top of general education, the study of technologies and related sciences as well as the acquisition of knowledge, attitudes, and practical skills.

1.14.8 Effective Online Teaching

An effective online TVET learning combines traditional teaching skills, technical expertise, and digital literacy to adapt vocational training for the digital era, ensuring that learners acquire the necessary skills for employment.

1.15 Chapter Summary

This chapter introduced the research topic, gave the background, problem statement, purpose, objectives, research questions, justification, assumptions, scope, limitations, conceptual framework, literature review, methodology, data analysis, and conclusions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers the overview of online teaching, digital competences in teacher education, and empirical literature review with a focus on the study objectives, chapter summary, and the literature gaps as follows.

2.2 Overview of Online Teaching

Throughout the last ten years, a considerable transformation has occurred towards digitalizing education worldwide, as noted by the European Union in 2013 and Farrell et al. in 2007. This transformation has been particularly marked by a growing interest in incorporating digital technology into educational settings. This interest has been driven by the belief that digital technologies hold substantial potential for enhancing the quality of education, as indicated by Toit in 2015, UNESCO in 2009, and Trucano in 2005.

Uganda is investing in digital integration through government, development partners, and private individuals to enhance school access to digital tools and technology-driven teaching methods, as documented in various reports. The rapid advancement of digital technologies is transforming art and design education, requiring a focus on developing instructors' digital competence (TDC) to effectively incorporate technology into teaching practices. This shift raises questions about the aesthetic aspects of art and necessitates a shift in teaching methods to accommodate this new dimension.

2.3 Digital Competence in Teacher Education

Digital competence involves operational, informational, and strategic skills. Effective use of digital technology in teaching requires knowledge in technology, pedagogy, and content. Instructors' digital competence (TDC) is best developed when they understand and apply technological, pedagogical, and content knowledge (TPACK), a theoretical framework formulated by Mishra & Koehler (2006).

The development of Technology-Driven Development (TDC) is a global priority in teacher education programs, with European governments implementing reforms and policies. Academic studies highlight its importance in European contexts. In Africa, instructors must be trained in using digital technologies effectively and addressing digital inequalities to enhance digital competence.

Uganda's National ICT Policy for education outlines a curriculum framework and teacher training for digital technology integration, emphasizing the role of instructors in education reform and the need for TDC alignment. The policy recognizes the pivotal role of instructors in implementing education reform initiatives and shows the need to develop TDC aligned with the curriculum to maximize the effective use of digital tools.

Despite Uganda's acknowledged strides, alongside other countries, in integrating digital technology into teacher education, its practical application is still in its preliminary stages. This is due to obstacles like the lack of robust policies, fundamental infrastructure (power, devices, internet), monetary provisions, and educator proficiency (Gillwald, Mothobi,

Ndiwalana, & Tusubira, 2019). For almost ten years, investigations in Uganda have persistently underscored a disparity between the accessible technology in classrooms and instructors' aptitude to employ this technology in teacher preparation initiatives (Baylor & Ritchie, 2002; Davidson, 2012). These studies reveal restricted utilization of digital technology in Uganda's teacher education programs, with most educators lacking the requisite digital prowess to use available digital assets as pedagogical instruments (Bagarukayo, 2018; Hennessy, Harrison, & Wamakote, 2010). Within the particular realm of art and design pedagogy in Uganda, documented research is scarce on how teacher educators (TEs) cultivate digital competence. Consequently, it is imperative to explore how art and design TEs foster digital competence (TDC) within teacher training institutions (TTIs) in Uganda, especially given the existing impediments. The subsequent segment will delve into current discussions concerning the progression of TDC in teacher education.

2.4 Empirical Literature Review

This subsection of the literature review looks at the empirical studies done on essential competences and skills for effective online teaching in TVET institutions; Levels of delivering online education in TVET institutions; the connection between instructors' competences and effective online teaching as well as the perceptions of instructors' competences among TVET institutions will be indicated in the specific objectives as follows.

2.4.1 Instructor classroom management competences and online teaching

The fourth industrial revolution, also known as the digital age, is characterized by widespread globalization and technological advancement. this modernization has impacted various aspects of society, including vocational education. The incorporation of technology into vocational education has shifted traditional learning methods towards technology-driven approaches. To effectively cater to future human capital needs and align with the technological advancements of the digital era, TVET instructors must enhance their digital competences (Lee, Atherton, & Crosling, 2022). This study explored digital competency frameworks that can aid TVET instructors in supporting learners within the context of digital transformation.

To aid students in achieving their learning objectives, recognizing their strengths and weaknesses, and enhancing the overall effectiveness in online teaching, a variety of comprehensive competency standards for TVET instructors have been established across different national contexts (Andersson & Köpsén, 2015). For instance, in Malaysia, Ismail, Hassan, Bakar, Hussin, Hanafiah and Asary (2018) conducted research that identified three primary components within TVET instructor competency standards: personal qualities and professionalism, pedagogical skills, and technological innovation. The role of TVET instructors is extensive and constantly evolving. Their responsibilities extend beyond curriculum delivery to educating students on career management (Lee, Atherton, & Crosling, 2022). This involves guiding to facilitate students' transition from school to the workforce. As such, TVET instructors must comprehend and stay updated on changes in their institution's curriculum and industry requirements (Zulkifli, 2018).

Technical proficiency encompasses competences like classroom management, student engagement, fostering career development, leveraging technology, and achieving subject matter expertise, all of which hold paramount importance in contemporary TVET education. This proficiency spans instructional planning, delivery, and assessment. With the widespread use of smart devices by students from an early age, educators are faced with challenges (Ally, 2019). In the realm of TVET, instructors are tasked with meticulous planning and preparation of instructional activities to effectively address the learning needs of this generation (Zulkifli, 2018). Moreover, they must tailor the learning experience for each student Ally (2019), integrating instructional content digitally through approaches like e-learning (Smolyaninova & Bezyzvestnykh, 2019). This involves employing up-to-date technology to offer personalized learning experience, often facilitated through digital instructional content delivered via e-learning platforms.

TVET educators are required to find an equilibrium between their technical proficiencies and non-technical abilities. In the dynamic landscape of technological advancements, lifelong learning has emerged as a pivotal competency for the career progression of TVET instructors. This is driven by the frequent shifts in technology that demand the acquisition of new skills sets. To cater to the unique requirements of each student and foster an environment conducive to learning, TVET instructors need to demonstrate creativity in constructing learning materials that cater to a diverse array of learner abilities. A resourceful TVET teacher is not only adept at crafting innovative learning resources but also actively participates in revamping the curriculum by integrating technological components and leveraging technological tools to augment the learning experience (Duran, Yaussy, & Yaussy, 2011; Guthrie, 2010). These soft skills are indispensable for

instructors in maintaining a harmonious equilibrium between their technical and non-technical proficiencies, thereby enhancing the learning journey of their students.

Industries seek assurance that educators possess the latest skills and comprehensive comprehension of the field, prerequisites for delivering high-quality instruction (Guthrie, 2010). Instructors must establish a profound grasp and effective communication with the industry regarding the essential traits expected from graduates. This communication should be a reciprocal process, where the industry collaborates closely with TVET instructors to establish an ongoing program aimed at aiding and accelerating curriculum design, encompassing the skill sets directly relevant to industry demands.

Educators within TVET institutions need to design instructional content that nurtures the growth of 21st-century skills in their students. These skills enable students to actively engage in problem-solving, and collaborative teamwork, and adeptly navigate digital platforms (Kale & Goh, 2014). To achieve this, educators require suitable guidance and professional development opportunities to adeptly infuse these skills into their teaching methods (Lambert & Gong, 2010; Wood, Harms, Lowman, & DeSimone, 2017). As stated by Duran, Yaussy and Yaussy (2011), collaborative student efforts utilizing their 21st-century competences were linked to improved academic accomplishments. Therefore, the integration of technology holds significant importance for TVET instructors, allowing them to effectively provide education through electronic means in the digital era.

Wannapiroon, Nilsook, Jitsupa and Chaiyarak (2022) conducted a study in Thailand to examine the effectiveness and vocational instructors' satisfaction with an online

instructional management system, developed using synchronous online learning. The research, involving 2,233 vocational instructors across various regions, demonstrated that instructors' digital competence significantly improved after utilizing the system ($p<0.01$). This enhanced competence encompassed a wide array of skills crucial for online teaching, including content analysis, video conferencing, online class and resource management, activity development, instructional media creation, and online assessment. These findings highlight the potential of well-designed synchronous online learning platforms to bolster the digital capabilities of vocational educators, preparing them for contemporary instructional demands.

Lawal and Sain (2024) investigated the e-learning technology expertise of Technical and Vocational Education Training (TVET) educators in delivering curriculum at higher education levels, also considering the influence of gender on these competencies. Utilizing a descriptive survey, the study found that TVET educators generally possessed a high level of competence in using various e-learning technologies, including projectors, PowerPoint, online networking sites, learning objects, and web-based instruction, with average mean scores exceeding 3.5. However, a significant gap was identified in their ability to use smart (electronic) boards for instruction, with only 31.2% demonstrating expertise and an average mean score of 1.96. Furthermore, the study revealed a statistically significant difference in e-learning technology competence between male and female TVET educators (t-calculated (12.702) > t-tabulated (1.960) at the 0.05 significance level). In conclusion, Lawal et al. (2021) recommended increasing the availability of customized e-learning technologies for TVET courses in higher education and providing professional training to educators on their effective use.

Wang, Wang, Stein, Liu and Chen (2019) developed and validated an instrument, grounded in Activity Theory, to assess the online teaching competencies of beginning online instructors within the context of the online teaching process. The study involved 89 novice online instructors in China and utilized confirmatory factor analysis, descriptive statistics, and regression to examine the instrument's validity and analyze the findings. The research confirmed that Activity Theory effectively modeled the practical aspects of online teaching, and the developed instrument proved to be reliable. The findings indicated that Chinese beginning online instructors require further development in their online teaching competencies, particularly in preparing for online instruction and conducting meaningful assessments of student learning. Interestingly, while gender and age did not significantly impact online teaching competencies, instructors' educational level and prior online teaching and learning experience were found to have a significant influence. A key takeaway from the instructors' perspectives was that designing and organizing online teaching and evaluating student performance posed the most significant challenges when transitioning traditional courses to an online format. The study also offered implications for practice and recommendations for future research.

Previous research has identified various factors influencing teacher resilience, including teacher competence and age-related differences. However, the specific interplay between teacher competence, teacher resilience, and their impact on students' online learning outcomes in emergent online teaching contexts, particularly with age as a moderator, has been less explored. To address this gap, Liu, Zhao and Su (2022) conducted a large-scale study with 159,203 participants, examining instructors' perceptions of student online learning outcomes. Their findings revealed that teacher competence in online teaching

was positively associated with perceived online learning outcomes. Also, that instructor resilience also has a positive relationship with instructors perceived online learning outcomes. These findings suggest the critical importance of strengthening instructors' online teaching competence and resilience prior to engaging in online instruction. The study further advocates for intervention strategies tailored to enhance teacher resilience and well-being through competence development, offering specific recommendations for different age groups of instructors to foster their online teaching competence and resilience.

Bolliger and Halupa (2021) examined the preparedness of faculty at two private U.S. universities for the sudden shift to emergency remote or online teaching during a pandemic. Their findings indicated that instructors generally felt somewhat ready for online teaching tasks, expressing the most confidence in course communication and the least in time management. Notably, significant differences in readiness were observed based on prior online teaching experience and the number of years spent teaching online. Instructors who reported higher confidence in online teaching were also found to be more prepared for the transition. This study offers valuable insights for online instructors, professional development providers, and administrators, highlighting the importance of robust support and training to ensure quality online course delivery.

Martin, Budhrani, Kumar and Ritzhaupt (2019) conducted a survey with 141 online instructors to investigate the various roles they adopt and the competencies they perform in designing and delivering online courses. The study categorized online instructor roles into eight types: Subject Matter Expert, Course Designer and Developer, Course Facilitator, Course Manager, Advisor/Mentor, Assessor/Evaluator, Technology Expert,

and Lifelong Learner. The findings revealed that instructors reported utilizing all these roles, with overall categorical means for all roles rated above 4.00. The study further discussed the highest and lowest rated competencies within these roles, bridging the gap between research and practical application in online teaching. Notably, online instructors who participated in training and collaborated with instructional designers reported performing these competencies more frequently. This research provides valuable insights for online instructors, instructional designers, and administrators involved in developing and delivering online learning, and in providing professional development opportunities for online instructors.

Assessment in Technical and Vocational Education and Training (TVET) plays a crucial role in providing specific feedback on student achievement, thereby enhancing teaching quality and enabling students, educators, and stakeholders to take informed action. Despite its importance, systematic reviews of this topic are scarce. To address this, a recent systematic review, guided by PRISMA criteria and drawing from Web of Science, Scopus, and Google Scholar, identified 29 relevant publications from 2015 to 2021 out of an initial 78. The selected articles were evaluated using the Mixed Methods Appraisal Tool (MMAT). The findings indicate a prevalent use of competency-based assessment techniques to evaluate student learning outcomes in TVET, suggesting that prioritizing student competency development is highly recommended (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001).

bin Yusof and bin Ahmad Muhammad (2023) sought to bridge a gap in the literature concerning the instructor's role in enhancing students' affective engagement, both with peers and the instructor, within online learning environments. This inquiry held particular

significance for marketing students, given their future roles in consumer engagement, and was amplified by the widespread shift to online higher education during the pandemic. While the influence of instructor competence in designing and facilitating online courses had been previously explored, Yusop et al. (2022) established that this competence has an indirect positive effect on students' perceptions of online learning quality. Crucially, this relationship is mediated by the level of student engagement through communication with peers and instructors. The research underscores the importance of an instructor's affective engagement skills as a key contributor to marketing students' perceptions of educational quality and provides practical recommendations for instructors delivering online courses.

Kordrostami and Seitz (2022) investigated the instructor's role in fostering students' affective engagement with peers and the instructor in online classes, particularly relevant given the widespread shift to virtual higher education. Employing a methodology that established an indirect relationship, their study found that instructor online competence positively influenced students' perceptions of online learning quality. This relationship was notably mediated by student engagement through communication, underscoring that instructors' affective engagement skills are crucial contributors to students' perceived quality of online learning. The research offers practical guidelines for instructors delivering online courses.

Ochwo, Mugizi and Kasule (2023) investigated the relationship between lecturers' digital teaching competencies and their self-efficacy in online classes. The correlational study, involving 327 academic staff from four public universities, specifically examined how competencies in course design, technical skills, course communication, and time

management influenced self-efficacy related to instructional methods, student management, and student engagement. Data collected via self-administered questionnaires were analyzed using structural equation modeling (PLS-SEM). The findings indicated that course design, course communication, and time management competencies all had a positive and significant influence on lecturers' self-efficacy in online classes.

Niazi, Iqbal and Jamil (2025) investigated the abilities of tutors in facilitating both live online learning sessions (Tuweb UT) and self-paced learning through the Silayar UT Learning Management System (LMS), which incorporates an independent learning program. Using an ex post facto design with descriptive statistics, the study analyzed data from 185 tutors across 340 online classes within an undergraduate program during the 2022 registration term. The findings confirm the tutors' capacity to prepare and plan for online tutoring, implement the tutoring unit (SAT) as a learning service, and weave relevant skills and module characteristics into their tutoring style. The study also showed that tutoring assignments were matched with competence levels, and engagement in both live online sessions and the LMS (Silayar UT) was high, with an average attendance of 93.03%.

Liu, Zhao and Su (2022) investigated how teacher competence in online teaching and teacher resilience predict instructors' perceptions of student online learning outcomes. Their study, which involved a large dataset of 159,203 participants, used correlation analyses and a moderated-mediation effect test. The findings showed a positive relationship between teacher competence in online teaching and perceived online learning outcomes. Similarly, teacher resilience was also positively linked to instructors perceived

online learning outcomes. The study further revealed that teacher resilience partially mediated the connection between teacher competence in online teaching and perceived online learning outcomes. Additionally, instructors' age was found to moderate both the direct and indirect relationships between teacher competence in online teaching and perceived online learning outcomes. These results suggest that instructors should enhance their teaching competence and resilience before engaging in online instruction.

Usman, Arafah, Marhum, Munir and Tadeko (2024) investigated several relationships concerning instructor competence, e-learning training methods, and training effectiveness. Their study explored whether instructor competence influenced training effectiveness and motivation, if e-learning methods impacted training motivation, and if training motivation mediated the effects of both instructor competence and e-learning methods on training effectiveness. The research also considered whether instructor competence influenced the adoption of e-learning training methods by employees. The findings indicated that instructor competence had a positive and significant effect on training effectiveness. Furthermore, instructor competence also demonstrated a positive and significant impact on training motivation when e-learning training methods were used.

Güneş and Adnan (2023) investigated online English as a Foreign Language (EFL) students' perception of the roles and competencies of their instructors. The study involved eight students enrolled in a basic English course online at a Turkish state university. Qualitative data, gathered through semi-structured interviews, were analyzed using content analysis techniques with NVivo software. Findings indicate that students view online EFL instructors primarily as facilitators and leaders. They identified numerous

essential competencies, including effectively delivering content, employing diverse teaching methods, activities, and materials, fostering interaction, ensuring student participation, seamlessly integrating technology, providing and receiving feedback, capturing attention, cultivating an open and friendly learning environment.

Cruz and Kim (2023) investigated the connection between transformational leadership behaviors of Physical Education (PE) instructors and student satisfaction in online PE classes. Their research aimed to predict student satisfaction with the class, their PE teacher, and their health and fitness based on the instructor's leadership style. The study also explored these relationships separately for male and female students. A total of 448 university students, aged 18 to 22 (228 male, 220 female), participated. The results revealed a positive relationship between the transformational leadership behaviors of PE instructors and students' satisfaction with online PE classes.

Kelly and Cuccolo (2024) surveyed college students regarding their online learning experiences following the transition to Emergency Remote Teaching (ERT), focusing on the strategies students valued in online instructors. Their findings reinforced prior research, indicating that students particularly appreciated instructors who demonstrated flexibility and empathy during this transitional period between ERT and post-pandemic learning. Additionally, the study showed that students valued engagement (with their instructor, course content, and peers), flexible course design, clearly organized learning management systems, and regular communication.

2.4.2 Instructor pedagogical competences on online teaching effectiveness

A civil and building construction program was launched in South Africa in 2007 under the Technical Vocational Education and Training (TVET) system to tackle skill shortages in areas such as carpentry, roofing, plumbing, and bricklaying. Despite this, the TVET sector has faced challenges in equipping students with practical abilities in these trades. This research explored how students perceive the relevance and effectiveness of the civil and building construction curriculum in South African TVET colleges. Using a mixed-methods case study approach across two institutions, 130 students were selected through purposive and convenience sampling. Data was gathered via a targeted questionnaire. The results emphasized the urgent need to update the curriculum to better match current industry requirements. It emphasizes the necessity of revising and updating the curricula to better match the evolving requirements of the industry (Nkwanyane, Makgato, & Ramaligela, 2022).

Educational institutions with a focus on skills have been training students in English communication within the automotive industry. However, there appears to be a lack of substantial research on the specific communication skills required by employees within the Malaysian automotive sector. Consequently, this study aims to gather insights from experts within the automotive field to ascertain their expectations concerning the technical communication proficiency of graduates. By employing an interpretive qualitative approach, the study conducted interviews with five experts hailing from diverse backgrounds within the automotive industry. These experts were chosen based on specific criteria, ensuring their experience in supervising graduate interns. Thematic analysis was applied to the interview transcripts. The findings illuminated several key

points raised by industry experts. Substantially, they emphasized the insufficient language proficiency in technical communication among graduates, highlighting the necessity for transferable skills relevant to technical communication (Ramamuruthy, Alias, & DeWitt, 2021). Additionally, experts underscored the importance of collaboration between the industry and educational institutions to develop instructional modules geared toward technical communication within the automotive sector. Consequently, the study suggests that institutions centered on skills should collaborate closely with the industry to discern its present requirements, thus better equipping graduates for the demands of the workplace.

Yamada and Otchia (2021) conducted a study investigating the disparities in perceptions regarding employable skills among technical and vocational education and training (TVET) instructors and students, focusing on the garment sector in Ethiopia. The researchers developed a questionnaire and administered it to 162 students and 53 instructors enrolled in garment-related programs across seven TVET colleges in Addis Ababa, the capital city of Ethiopia. The study's findings revealed distinct viewpoints between instructors and students. While instructors tended to emphasize the significance of practical skills, students expressed a desire for a more comprehensive approach that includes both practical and managerial skills, along with entrepreneurship skills. These differing expectations were influenced not only by individuals' awareness of labor market conditions but also by their perception of the effectiveness of the education and training system itself.

Salleh, Kadir, Jamaluddin and Puad (2022) explored how Technical and Vocational Education (TVE) instructors’ intentions to integrate technology into their teaching are

affected by their personal beliefs. The study proposed that these beliefs are influenced by how useful instructors perceive the technology to be, how easy it is to use, and their confidence in using it (self-efficacy). To explore this, a series of workshops aimed at enhancing technology integration in instruction was organized for technical and vocational instructors as part of their professional development. In these workshops, participants engaged in planning, designing, and developing 21st-century learning activities that incorporated technology. Data was collected through a questionnaire distributed to participating TVET instructors. The study revealed that the proposed modified TAM model effectively explains 52% of instructors' beliefs about self-efficacy and 40% of the variance in intention. Notably, the positive outcome of the technology-enriched instruction professional development program was that it equipped instructors with a common language and skills, addressing their concerns related to integrating technology into their lessons.

Abd Karim and Mustapha (2022) carried out a study that focused on investigating how TVET (Technical and Vocational Education and Training) students perceive the use of digital mind maps as a tool to enhance their learning of technical skills within Malaysian higher learning institutions. Online questionnaires were developed to assess the extent of digital mind map usage among the TVET students. The collected data were subjected to descriptive and inferential statistical analyses, including measures such as frequency, percentage, mean, standard deviation, and Pearson correlation. The questionnaire also incorporated three open-ended questions, with the qualitative responses analyzed using thematic analysis. Findings indicated that a majority of TVET students held a positive perception of the effectiveness of digital mind maps in their learning process.

Abdullah, Salleh, Sulaiman and Kamarrudin (2022) set out to assess the significance of employability skills among trainers in the Technical Vocational Education and Training (TVET) trainer training program, differentiating between experienced and novice trainers. This investigation stemmed from concerns raised by some employers regarding the insufficient employability skills of TVET graduates, leading to challenges in meeting the current employment requisites and professional expectations of industries. The skills in question encompass various attributes such as people management, communication, interpersonal interactions, teamwork, professionalism, knowledge and principles, problem-solving, and decision-making. The study employed a ranking approach to evaluate the importance of 25 specific abilities/items across eight primary constructs of employability skills. Each item was scored on a scale ranging from 1 to 5. The results revealed divergent rankings of employability skills between experienced and novice trainers. Notably, communication skills, teamwork skills, self-discipline skills, and interpersonal skills were uniformly considered highly important, ranking within the top 4 highest skills by both experienced and novice trainers. Conversely, leadership skills, learning skills, and conceptual skills were mutually rated as having relatively lower importance, according to assessments from both experienced and novice trainers.

Ramaligela (2022) aimed to investigate the way students perceive assessment practices in Technical and Vocational Education and Training (TVET) colleges. Employing a quantitative case study approach, the study utilized questionnaires to gauge students' perceptions of assessment practices. The sample selection involved a random sampling method, resulting in a total of 194 students (105 males and 89 females) drawn from four TVET colleges located in the Limpopo Province. The data collected underwent analysis

using an Excel spreadsheet, which allowed for the determination of both specific and overall percentages of students' perceptions, aligned with the four principles of the participatory assessment of teaching and institution (PATI) framework. The theoretical framework of assessment legitimacy was employed to provide a conceptual lens. To uncover student perceptions, the study exposed participants to a set of nine questions. The findings of the study revealed that classroom assessments conducted by lecturers lacked content validity and failed to incorporate real-life experiences and contexts. Nonetheless, the lecturers demonstrated an ability to assign a variety of assessment tasks to students.

Magruder and Kumar (2017) addressed the growing demand for quality online instructors, which has accompanied the rapid expansion of online courses. They highlighted that effective online instruction necessitates distinct pedagogical approaches and often requires faculty to adapt their teaching practices, making professional development crucial. Despite calls for systematic online teaching preparation and the availability of various certification programs, a consistent institutional approach to faculty development in online teaching remains elusive, although best practices have been suggested. Recognizing that each e-learning context is unique and a standardized training model might not suit all institutions or disciplines, their study focused on synthesizing the major roles and competencies essential for online teaching from existing literature. It also explored the ongoing debate between a technology-focused versus a pedagogy-focused approach in training decisions.

Tanis (2020) investigated the importance of several factors for effective online teaching and learning. The study involved 14 college faculty and 111 alumni from the same graduate program, who responded to a 45-item Likert survey and two open-ended

questions. The study found that the most important factor for both faculty teaching online and alumni learning online was maintaining high expectations for student performance, integrity, and professionalism. Alumni particularly valued meaningful interaction with instructors over interactions with peers or course materials.

Smith, Clark and Blomeyer (2005) addressed the need for effective distance learning, emphasizing that its success is measured by the quality of learning outcomes, with learner-centered programs and competent instructors being crucial. Recognizing that teaching online demands specific skill sets, the study identified and described 51 competencies essential for online instructors. Furthermore, Smith outlined an instructor-training program designed to meet three of the twenty-four benchmarks for excellence recommended by the Institute for Higher Education Policy.

Borup and Evmenova (2019) investigated the effectiveness of a 6- to 7-week professional development course aimed at enhancing the knowledge, skills, and dispositions of education faculty for effective online teaching. The increasing demand for qualified online instructors in K-12 and higher education necessitates that colleges of education prepare their pre- and in-service instructors by providing them with firsthand exposure to quality online instruction. The study found that while course content and assignments improved faculty knowledge and skills, the delivery methods and online teaching strategies modeled by the course instructor had a greater impact on faculty perceptions and attitudes toward online learning.

2.4.3 Instructor assessment and evaluation competences on online teaching effectiveness

Albrahim (2020) brings attention to the essential skills and competences essential for instructing online courses within higher education. The study commences by providing an overview of the challenges associated with online learning and teaching. A comprehensive review and analysis of pertinent literature was conducted to pinpoint the specific skills and competences that educators require to effectively navigate online learning environments. These identified proficiencies are organized into six distinct categories: pedagogical skills, content skills, design skills, technological skills, management and institutional skills and social and communication skills.

The global outbreak of the Coronavirus disease 2019 (COVID-19) severely disrupted the education system worldwide, necessitating an abrupt and unanticipated shift to emergency online teaching and learning. The effectiveness of this transition heavily relies on the capabilities and adaptability of educators, who need to adjust their pedagogical approaches and assume new roles in the virtual setting. Within this context, Ally (2019) conducted a study to evaluate the preparedness of instructors in higher education institutions (HEIs) to navigate online education, utilizing the online teaching readiness competences model. The study involved administering a structured questionnaire to gather data from 296 instructors across various HEIs in India. The questionnaire consisted of 29 constructs, assessed through a five-point Likert scale. The research methodology comprised two main steps. First, a first-order confirmatory factor analysis (CFA) was conducted using IBM AMOS-26 software. The initial model was built around five constructs, with the outcomes used to evaluate the model's fitness and construct validity.

Subsequently, a second step involved employing structural equation modeling (SEM) for path analysis of the proposed model. The findings of the study indicated that the instructors within Indian HEIs possess adequate technical competences to handle online education. However, it was observed that the levels of course design competences, communication competences, and time management competences among these educators were insufficient for effectively managing online education.

According to König, Jäger-Biela and Glutsch (2020), the learning process is evolving to become adaptive and tailored to the unique needs of individual learners. This transformation is made possible by the emergence of technologies like artificial intelligence and the Internet of Things. The significance of this study lies in its contribution to the future of education. It identifies the influential factors that are shaping the landscape of education and endeavors to create a comprehensive competency profile for the digital educators of the future. To achieve this, the research engaged in focus groups and interviews involving education experts from six different countries. The aim was to pinpoint the forces that will drive education's evolution in the future and to define the essential competences that digital educators will require to be effective in their roles. The outcome of this effort is the development of the Competency Profile for the Digital Teacher (CPDT), a resource that can be harnessed for training and guiding the digital educators of the future.

Daumiller, Rinas, Hein, Janke, Dickhäuser and Dresel (2021) investigated inter-individual differences in how faculty adapted to the abrupt shift from face-to-face to online teaching during the COVID-19 pandemic. The researchers analyzed longitudinal data from 80 faculty members, including their achievement goals from the semester

before the shift, and their attitudes, burnout, and engagement during the initial semester of enforced online teaching. Additionally, the study incorporated 703 student ratings of these faculty members' teaching quality. The results showed that faculty members' learning approach goals were positively associated with viewing the shift to online teaching as a beneficial challenge and useful for their competence development. In contrast, performance (appearance) avoidance and work avoidance goals are related to perceiving the change as threatening.

Vonderwell and Boboc (2013) examined the use of formative assessment techniques by two instructors in their graduate-level online courses, emphasizing how effective assessment can enhance an instructor's understanding of student needs and foster learner-centered online environments. The authors noted that evaluating student learning takes on a distinct meaning in online settings due to the lack of physical proximity. Citing Garrison (2011), they highlighted that assessment strategies strongly signal what is important and how students should approach learning. The study offered suggestions for designing online assessment activities to improve teaching and learning by leveraging student learning data.

Tang, Gu and Xu (2022) addressed the heightened focus on online teaching and instructors' digital competence (DC) brought about by the COVID-19 pandemic, acknowledging the lack of a standardized measuring framework for teacher DC. Their study aimed to construct a reliable self-evaluation framework for in-service instructors' digital competence, specifically during online teaching. They collected data from 1,342 instructors with online teaching experience and employed exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and item analysis for data analysis. The

results showed that the developed evaluation framework was consistent with the collected data. CFA further confirmed a good model fit for the 10 relevant factors within the instructors' DC framework.

Bangert (2008) recognized that traditional student evaluations of teaching often fail to adequately assess the constructivist practices crucial for effective online instruction. To address this, the study aimed to develop and validate a student evaluation instrument specifically designed to provide online instructors with meaningful feedback on their online teaching. This instrument, the Student Evaluation of Online Effectiveness (SEOTE), was based on Chickering and Gamson's (1987) Seven Principles of Effective Teaching. Eight hundred and seven students enrolled in Web CT courses at a mid-sized university in the western United States completed the SEOTE. An exploration factor analysis of a randomly selected subsample of responses yielded four interpretable factors: student-faculty interaction, active learning, time on task, and cooperation among students. A subsequent confirmatory factor analysis on the second subsample confirmed that this hypothesized four-factor model provided a good fit for the data.

Thomas and Graham (2019) propose a more effective system for evaluating online faculty, emphasizing that such evaluations are crucial for measuring and enhancing the quality of online teaching. They highlight the challenges faced by colleges and universities in developing effective online teacher evaluations, including issues related to organizational structure, institutional governance, faculty and administrator attitudes, and potential budget constraints. By integrating case studies and theoretical insights, their work offers practical solutions aimed at overcoming these challenges and promoting efficient and effective evaluations of online teaching.

Hidayat (2020) investigated the influence of instructors' assessment literacy on their current assessment practices and, subsequently, on learners' writing outcomes in an English as a Foreign Language (EFL) context. The study aimed to understand the extent of this impact. To gather data, researchers used a instructors' assessment literacy inventory and a Writing Competence Rating Scale (WCRS), involving ten EFL instructors and seventy-five male junior EFL undergraduate students. The findings indicated that instructors' assessment literacy had a statistically significant positive effect on learners' writing achievements. Furthermore, the study concluded that instructors' assessment awareness leads to the design of effective and motivating assessment environments.

Iskandarova, Yusif-zada and Mukhtarova (2024) highlights that evaluation is a vital component of instructional programs, signifying a true commitment to the educational system's implementation and engagement. The author emphasizes that different assessments are suited for varying learning needs and student abilities, acknowledging that no evaluation is without limitations. Key advantages of assessment include validity, reliability, and objectivity, as it reflects student performance and accomplishments, which can fluctuate based on enthusiasm, motivation, competence, and ability. The selection of assessment methods is crucial for enhancing students' desire to complete tasks and for instructors to ascertain if learning goals have been met. Instructors must be creative, engaging, and innovative in managing assessment tasks to ensure students are enthusiastic about all types of exams, including traditional ones.

Popova and Jones (2021) investigated chemistry instructors' approaches to developing representational competence in their students, defined as the ability to use disciplinary

representations for learning, communication, and problem-solving. Despite the recognized importance of this skill for student success in chemistry, the researchers noted a scarcity of studies examining instructors' methods. The study involved interviewing thirteen chemistry instructors from eleven different U.S. universities about their intentions to develop, teach, and assess student representational competence. The findings revealed that most instructors do not explicitly aim to develop these skills. However, a closer look at their instructional and assessment practices indicated that most instructors were, without conscious intent, likely to teach and assessing several representational competence skills in their courses.

Popova and Jones (2021) also found that some chemistry instructors acknowledged their limited knowledge regarding effective teaching about representations. A majority of these instructors expressed a strong desire for professional development opportunities. They sought to learn about how experts and novices differ in conceptualizing representations, evidence-based practices for teaching about representations, and methods for assessing student mastery of representational competence skills. This finding has clear implications for designing professional development initiatives for chemistry instructors. Such training should help instructors become aware of relevant learning theories, including constructivism, dual-coding theory, the information processing model, and Johnstone's triangle.

Frey and Lane (2021) investigated how students' perceptions of instructor non-accommodation influence their evaluations of instructors, extending the concept of communicative adaptability as an indicator of overall communication competence to the classroom context. Applying communication accommodation theory (CAT), the study

found that, even when controlling for students' expected grades, perceptions of non-accommodation related to an instructor's content knowledge and student support negatively affected both instructor credibility and communication competence. In contrast, perceptions related to the appropriateness of an instructor's nonverbal responsiveness and verbal delivery did not have significant effects on these evaluations.

Gatlin-Nash, Hwang, Tani, Zargar, Wood, Yang, Powell and Connor (2021) conducted an ad hoc randomized controlled trial to evaluate instructors' perceptions of student academic performance. Twenty-eight instructors were randomly assigned to receive training on using assessment to guide literacy instruction (Assessment-to-Instruction, A2i) or to a control group receiving Math PALS training. Instructors rated the academic competence of 446 students. The results indicated that A2i instructors' ratings of student academic competence did not vary by socioeconomic status (SES) and correlated more strongly with students' actual literacy and mathematics assessment scores compared to control instructors. Control instructors, in contrast, generally underestimated the academic competence of lower SES students, with this underestimation being more pronounced in more affluent schools. The study found that instructors' ratings of students' academic competence predicted reading and mathematics outcomes.

Zabalaga-Haberman, Amici, Gritton, Stratford and Lee (2020) aimed to fill a gap in the research concerning the instructor's role in boosting students' emotional connection with both their classmates and the instructor in online courses. This was especially relevant for marketing students, who will need to engage consumers through various communication channels, and became even more critical as the pandemic pushed most higher education online. While previous studies examined how instructor competence influences the

design and delivery of online classes, this research established that an instructor's online competence has an indirect positive effect on students' perception of their online learning quality. This connection, they found, is facilitated by how actively students communicate with their peers and instructors in class.

2.4.4 Instructor utilization of digital tools competence on online teaching

Dumbiri and Nwadiani (2020) investigated the competence of TVET instructors in public institutions in Khartoum State, Sudan, alongside associated challenges and opportunities. Using an explanatory sequential mixed-methods design, they gathered data from 815 participants across 12 TVET institutions, including students, instructors, and administrators, supplemented by policy documents. Data analysis involved both descriptive and inferential statistics for quantitative data and narrative interpretation for qualitative data. The study concluded that TVET teacher competence was satisfactory and that instructors effectively delivered training, with no significant differences observed in perceptions of competence among instructors from various institutions. Moreover, the research revealed that TVET instructors effectively and competently delivered training.

Hondonga, Chinengundu and Maphosa (2021) examined how ready and prevalent online teaching platforms were among Botswana's Private Tertiary Education Providers (BAPTEP) during the COVID-19 pandemic. Their quantitative study, involving 119 participants from four BAPTEP colleges, highlighted the unique difficulties faced by Technical and Vocational Education and Training (TVET) in a developing country transitioning to online learning. The results showed significant gaps in preparedness across institutions, lecturers, and students. Most BAPTEP institutions did not have the necessary e-learning infrastructure, and most lecturers were not adequately prepared or trained for emergency remote teaching. Additionally, many students faced obstacles like limited internet access, lack of personal devices, and insufficient training in using online

learning platforms. These findings emphasize the complex challenges developing nations encounter when moving to online TVET instruction.

Abdullah, Salleh, Sulaiman and Kamarrudin (2022) conducted a systematic review to emphasize the vital role of Technical and Vocational Education and Training (TVET) in cultivating a highly skilled workforce in Malaysia. They argued for a necessary re-evaluation of the current TVET system to better influence and enhance the broader TVET ecosystem. This re-evaluation, according to their findings, should encompass several key areas: governance and management, instructor training, curriculum and pedagogical approaches, collaboration with social partners, and innovative TVET delivery strategies involving both private and public sector participation.

Pangeni and Karki (2021) explored the adoption of Information and Communication Technology (ICT) in Nepal's Technical and Vocational Education and Training (TVET) sector, noting its slow integration despite ICT's transformative potential in education. Their study examined e-learning pilot projects at three technical schools under the Council for Technical Education and Vocational Training (CTEVT). Using a mixed-methods approach that included 152 survey responses, two focus group discussions, and 10 individual interviews, the researchers found that e-learning holds promise as an innovative pedagogical approach for TVET when combined with ICT. However, the study also revealed a significant need for more support for both instructors and schools, specifically in terms of training and ICT infrastructure, to enable the effective design, development, and implementation of e-learning courses locally.

According to the Kenyan Journal of Technical and Vocational Education and Training (KJ-TVET), the TVET Authority is entrusted with several responsibilities, including advising and providing suggestions to the Cabinet Secretary on training-related matters. It is tasked with enhancing the accessibility and pertinence of training programs, aligning them with the broader national socio-economic development plans and policies. The Authority's role extends to developing a training system that caters to both the formal and informal sectors, as well as gathering, analyzing, and sharing training-related information. It should also ensure the quality and relevance of training programs and collaborate with national and county governments, along with public and private sectors, on training-related issues (Katam & Otieno, 2021).

Martin, Budhrani, Kumar and Ritzhaupt (2019) investigated faculty readiness for online teaching, defining it by instructors' attitudes toward the importance of online teaching competencies and their self-assessed ability in those areas. The study examined the validity and reliability of faculty responses to an online instrument and factors influencing their perceptions. Using descriptive statistics and item-level means, the researchers found that faculty generally rated the importance of competencies in course design, course communication, and technical skills higher than their ability in these areas. Conversely, for time management, faculty rated their perceived ability higher than their attitude toward its importance. A MANOVA revealed significant differences based on gender, years of online teaching experience, and delivery methods regarding faculty perceptions of the importance of online teaching competencies.

Aidoo, Macdonald, Gyampoh, Baah and Tsyawo (2022) examined the competencies of Ghanaian instructors in delivering online lessons, acknowledging the difficulties of

shifting from face-to-face to online instruction, especially for those new to the format. The researchers investigated how instructors in disrupted schools use information and communications technology (ICT) in their classrooms, which vary significantly from traditional settings, and explored factors influencing their online instruction competence. Data was collected in 2021 from instructors at three teacher training colleges in Ghana using a questionnaire. The results indicated that instructors possessed adequate knowledge of ICT, and this knowledge was strongly correlated with ICT usage. Regression analysis revealed that instructors could achieve competence and effectively teach online courses through sufficient knowledge, regular ICT use, and institutional technical support.

Kassymova, Tulepova and Bekturova (2023) investigated master students' perceptions of their digital competence in using information communication technologies (ICT) for both learning at university and teaching English as a Foreign Language (EFL) in an online education context. The study aimed to identify the frequency, expertise, and satisfaction levels in their ICT use. The sample consisted of 49 master's students in Kazakhstan who attended distant evening classes at a private university while simultaneously working as English instructors during the day. The findings showed that most respondents were digitally competent. However, a group of master's students scored low on ICT skills necessary for teaching and recognized the need for improvement.

Stritto, Aguiar, Underhill, Turk, Lohry-Smith and Lamantain (2025) aimed to pinpoint the most crucial skills for successful online teaching, recognizing that despite increased opportunities for online learning in higher education, variations in teaching quality persist. They acknowledged that some instructors might be new to online teaching or lack

adequate support for virtual learning environments. To address this, the researchers interviewed 33 instructors, each with a decade or more of online teaching experience at a highly ranked online institution. Participants were asked to identify the most valuable skills for online instructors. Six major themes emerged from their responses. These themes were then discussed about established frameworks in online education, including the Community of Inquiry (COI) framework, the faculty readiness framework, and the Technology Acceptance Model.

McGee, Windes and Torres (2017) conducted a preliminary Delphi study to address the lack of systematic and codified methods for instructors to develop online teaching skills in higher education. Recognizing the varied perceptions of online course functionality among administrators, staff, instructors, and students, the researchers sought to identify effective institutional strategies. Through a study of expert online instructors, 11 institutional strategies were identified as most supportive of online teaching skill development. Among these, training, external support, and prolonged experience emerged as the three most valuable areas.

Elsayary (2023) investigated the impact of a 10-week blended learning upskilling training program on K-12 instructors' digital competence in the United Arab Emirates. The study aimed to determine if the instructors' digital competence improved beyond the intermediate level, aligning with the World Bank Report's 2021 Digital Skills Action Plan, which advocates for enhanced digital skills in students and advanced digital competencies for instructors. The training program focused on developing higher levels of skills, attitudes, and knowledge in areas such as digital citizenship, communication and collaboration, critical thinking, creativity, and technology use. Using a sequential mixed-

methods approach with both online surveys and Zoom focus group discussions, the study found that the upskilling program effectively developed instructors' digital competence.

Kassymova, Tulepova and Bekturova (2023) investigated master's students' perceptions of their digital competence in using Information and Communication Technologies (ICT) for both their university studies and for teaching English as a Foreign Language (EFL) online. The study, involving 49 master's students in Kazakhstan who were simultaneously studying and working as English instructors, aimed to uncover gaps in their digital competence development. Using an online survey, the research found that while most participants were digitally competent, a group scored low on ICT skills essential for teaching and acknowledged the need for improvement.

Santos, Sampaio, Londral and Perelman (2025) conducted a scoping review to map the current understanding of digital competencies among higher education professors in Europe. Their review, which synthesized information from 14 selected publications out of an initial 1,568, found that while professors were generally aware of the digital tools provided by their institutions, these tools saw limited actual use. The review noted extensive use of Learning Management Systems (LMS), though primarily for administrative tasks rather than for direct teaching and learning activities. The researchers also identified a positive correlation between professors' level of digital competence and their pedagogical approach, specifically a focus on student knowledge construction and the development of open educational resources.

Zaripov, Mirzaliev, Delov and Maxammadiyev (2024) explored the crucial role of digital competence in educator development, its influence on the educational process, and its

effect on learning efficiency in contemporary settings. Their study analyzed key aspects of education's digital transformation, offering strategies for effectively implementing digital technologies in learning. The researchers stressed the importance of keeping pace with rapid information technology developments and integrating them into education to ensure high-quality specialist training. They identified significant obstacles educators face when learning digital tools and suggested solutions. The study clarified that digital competence involves not just technological knowledge, but also the ability to use these tools effectively to solve problems and achieve educational goals.

Marnita, Nurdin and Prihatin (2023) investigated the digital literacy competence of elementary school instructors in the Gandapura District and its influence on teacher learning management. They define this competence as an educator's sufficient ability to use digital technology and communication tools for accessing, using, and evaluating digital learning processes, which is crucial for helping today's Generation Z students actively and creatively construct new knowledge. The study, which sampled elementary school instructors engaged in thematic learning, used a data reduction technique on observations, interviews, and documentation for analysis. The findings showed that public elementary schools in Gandapura District had instructors with varying levels of understanding of digitalization, low, medium, and high.

Bergum Johanson, Leming, Johannessen and Solhaug (2023) investigated variations in first-year preservice instructors' professional competence in digital sharing and communication tools, applying social constructivist learning theory. Their study used questionnaires administered to 395 preservice instructors at two Norwegian universities in late 2019. Through correlation and multiple regression analysis, the results showed that

students' attitudes toward and experiences with virtual communication solutions were the primary factors contributing to their competence in digital interaction and communication. While present, the students' mastery of and emotional engagement with virtual collaboration tools had a less significant impact on their digital competence.

Bojórquez-Roque, Garcia-Cabot, Garcia-Lopez and Oliva-Córdova (2024) conducted a systematic literature mapping and review to explore how the digital competencies of university students are developed through a digital learning ecosystem. This ecosystem integrates three key components: virtual learning environments, digital learning tools, and learning methodologies. Their methodology involved searching the Web of Science (WoS) and Scopus databases, yielding an initial 5,652 articles published between 2001 and 2023. After applying inclusion and exclusion criteria, they performed a comprehensive systematic mapping and review. Their findings identified the geographic distribution of relevant scientific publications, the educational areas where these competencies have been addressed, and the universities involved.

Montilla, Rodriguez, Aliazas and Gimpaya (2023) investigated the effect of instructors' pedagogical digital competence on student academic motivation and performance within physical education. Their findings indicated that instructors had high proficiency in pedagogical digital competence, which included technical, content, and pedagogical knowledge. The study also found that students showed high academic motivation and generally satisfactory performance in physical education. A moderate to strong relationship was observed between instructors' pedagogical digital competence and student academic motivation, suggesting that strong digital skills in instructors can enhance student engagement and motivation.

Dong and Tabajen (2024) explored the role of digital leadership among university instructors and its influence on students' learning effectiveness. Their mixed-methods study, which gathered data through surveys and interviews with both educators and students, assessed key aspects of digital leadership: technical expertise, innovative teaching methods, promotion of digital literacy, data-driven decision-making, and ethical technology use. The findings revealed that instructors showed moderate competence in technology and teaching methods but excelled in fostering digital literacy and ethical technology use. However, the study identified room for improvement in data-driven decision-making, a crucial area for boosting learning effectiveness.

2.5 Gaps in Literature

This study is aimed at examining the influence of instructor competence on effective online teaching and learning in TVET institutions in Uganda. However, this sub-section is an examination of the findings from previous studies and how they could show potential gaps regarding the influence of instructor competences on effective online teaching as follows.

There is a need for harmonization of the digital competency frameworks and local context. While Lee et al. (2022) underscored the need for digital competences in TVET instructors, there is a gap in understanding how these frameworks are adapted and implemented within the specific context of Uganda. This study seeks to explore the localization of digital competency frameworks to suit Uganda's technological landscape and educational needs. Also, the findings by Andersson and Köpsén (2015) on the global initiative towards setting comprehensive competency standards for TVET instructors

highlighted a gap in how these standards are applied and measured in Uganda. This reveals that there is still a need for studies that assess the implementation of these standards and their influence on effective online teaching in Uganda.

Difficulty in incorporating technological innovation in pedagogy was revealed. For instance, Ismail et al. (2018) identified technological innovation as a key component of instructor competence. This study will explore the extent to which TVET instructors are integrating technological innovations into their teaching practices and the challenges they face in this integration.

Linking industry-specific knowledge and workforce preparation appears to be problematic. For example, Zulkifli (2018) emphasized the importance of industry-specific knowledge for vocational instructors. This presents a potential research gap that exists in understanding how Ugandan TVET instructors acquire and update this knowledge and its effect on students' readiness for the workforce.

Concerning personalized learning experiences, the importance of tailoring the learning experience to individual students, as discussed by Ally (2019), suggests a gap in research on personalized learning strategies in Ugandan TVET institutions and their effectiveness in improving teaching quality.

There are also challenges in connecting online learning accessibility and training. About this, Hondonga et al. (2021) revealed challenges faced by students in adapting to online learning environments. This highlights a research gap in Uganda regarding the accessibility of online learning resources, internet connectivity, and the adequacy of instructor and student training in online teaching and learning tools.

Misalignment with new economy skills was posited by Salleh and Sulaiman (2020) who underscored the need to align TVET with 21st-century skills. There is a gap in understanding how Ugandan TVET institutions are reforming their curricula and teaching practices to meet the demands of the new economy and the challenges encountered in this process.

Also, teacher adaptation to online teaching was concealed by König et al. (2020) and Daumiller et al. (2021) who discussed the adaptation of instructors to online teaching. In Uganda, this study will put focus on identifying the specific competences that influence successful adaptation to online teaching in TVET institutions and how these competences can be developed. Lastly, assessment practices in online learning have not been attained. For instance, Ramaligela (2022) criticized the lack of content validity in assessments. There is a notable gap in research on effective assessment practices in online TVET education in Uganda, particularly in ensuring assessments are reflective of real-life scenarios and competences. Addressing these gaps through targeted research can contribute to the development of policies and practices that enhance the effectiveness of online teaching in TVET institutions in Uganda, ensuring that they are equipped to meet the evolving demands of the digital era.

2.6 Chapter Summary

This sub-section provides a literature summary of the studies undertaken by various scholars on the influence of effective online teaching among TVET institutions as can be seen below.

Lee et al. (2022) emphasized the necessity of aligning digital competences with the advancing technological landscape to prepare future human capital effectively. This need for advanced digital proficiencies among instructors is echoed by Andersson and Köpsén (2015), who highlight the global initiative towards setting comprehensive competency standards, aiming to enhance the instructional quality and fulfill learning objectives in TVET. Further, Ismail et al. (2018) identify core components of TVET instructor competences, including personal qualities, professionalism, pedagogical skills, and technological innovation, underlining the multifaceted nature of effective teaching in vocational education.

The significance of industry-specific knowledge for vocational instructors is addressed by Zulkifli (2018), noting the crucial role of instructors in bridging the gap between educational outcomes and workforce requirements. This is further supported by Ally (2019) and Smolyaninova and Bezyzvestnykh (2019), who argue for personalized learning experiences and the integration of digital content, respectively, to enhance the quality of online learning. Duran et al. (2011) discuss the innovative role of TVET instructors in integrating 21st-century skills into the curriculum, showcasing the dynamic nature of vocational education in adapting to technological advancements.

Guthrie (2010) stressed the importance of ongoing professional development for educators to maintain relevance and deliver high-quality instruction, a sentiment echoed by Dumbiri and Nwadiani (2020), who found no significant disparity in competence levels among TVET instructors across different institutions. Hondonga et al. (2021) highlight challenges faced by students in adapting to online learning environments, revealing a gap in accessibility and training for effective e-learning. The need for a

reformed TVET system that aligns with modern 'new economy' skills is discussed by Salleh and Sulaiman (2020), alongside the potential challenges in achieving this alignment.

Pangeni and Karki (2021), Katam and Otieno (2021), and Albrahim (2020) investigated the specifics of e-learning and online teaching competences, emphasizing the necessity for quality and relevance in training programs and the development of diverse competences among educators. König et al. (2020) and Daumiller et al. (2021) explore the adaptation of instructors to online teaching, highlighting the shift towards individualized learning and the positive impact of a learning-oriented approach on instructors' perceptions of online teaching. Nkwanyane et al. (2022) and Ramamuruthy et al. (2021) address the alignment of curricula with industry demands and the need for improved technical communication skills among graduates.

Yamada and Otchia (2021) and Salleh et al. (2021) discussed the perception gaps between instructors and students on employable skills and the impact of technology-enriched instruction on instructors' self-efficacy and intentions. Abd Karim and Mustapha (2022) and Abdullah et al. (2022) highlight the positive perceptions of digital tools, such as mind maps, in enhancing learning and the value of soft skills among TVET trainers. Lastly, Ramaligela (2022) critiques the assessment practices in TVET, pointing out the need for assessments that are valid and reflective of real-life scenarios, thus rounding off a comprehensive overview of the challenges and opportunities in modernizing TVET instruction to meet the demands of the digital era.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter details the philosophical research paradigm, research design, target population, sampling procedure, sample size, data collection instruments, validity, reliability, data analysis, ethical considerations, and a summary.

3.2 Philosophical Research Paradigm

This study aimed to examine the influence of instructor competences on effective online teaching in TVET institutions in Uganda, and it utilized the constructivist paradigm. This paradigm offers a suitable framework for investigating the intricate interplay between instructor competences, perceptions of effectiveness, and the contextual factors that shape these phenomena (Rehman & Alharthi, 2016). The constructivist paradigm, rooted in the principles of social constructivism, posits that reality is not an objective entity but rather a socially constructed concept subject to individual interpretation (Grix, 2018). This paradigm contends that individuals assign meaning to their experiences based on their unique viewpoints and social contexts (Rehman & Alharthi, 2016). Constructivism is both a learning theory and a philosophy of education that emphasizes that individuals actively construct their understanding, utilizing personal experiences and past knowledge, interactions, and reflection to connect new knowledge to existing knowledge. In the case of exploring instructor competences and effective online teaching, this paradigm demonstrates the importance of instructor competences in spearheading a transformation

in TVET online teaching. Contextual factors play a pivotal role in shaping the understanding of effective online teaching within TVET institutions in Uganda. According to Rehman and Alharthi (2016), the constructivist paradigm acknowledges the significance of context in influencing individuals' interpretations and experiences.

Qualitative research methods are inherent to the constructivist paradigm, allowing researchers to explore rich perceptions and experiences of stakeholders. Interviews, as suggested by Peters and Halcomb (2015) facilitate the exploration of how instructors themselves interpret their competences and understand their role in shaping effective online teaching. Additionally, observations can provide insights into the multiplicity of perspectives held by instructors, trainees, and administrators, shedding light on the diverse realities that construct the phenomenon under study. The inductive approach, advocated by Azungah (2018), aligns with the constructivist paradigm's emphasis on allowing themes and patterns to emerge from the data rather than imposing preconceived categories. This approach accommodates the diverse and context-dependent nature of instructor competences and effective online teaching in TVET institutions in Uganda. In conclusion, the constructivist paradigm offers a clear framework for investigating the influence of instructor competences on the effectiveness of online education in Ugandan TVET institutions. As a result, the constructivism philosophy was chosen as the ideal philosophical paradigm to support the investigation.

Quantitative data was also considered using a structured questionnaire uploaded to the Kobo Collect Toolbox platform. Studies suggest that research paradigms and methods should not be strictly bound, allowing flexibility in methodological choices. McChesney and Aldridge (2019) argue that mixed methods studies can be grounded in a single

paradigm, including a constructivist stance, emphasizing integration rather than strict adherence to binary methodological frameworks (McChesney & Aldridge, 2019). Similarly, Shannon-Baker (2016) highlights how constructivist perspectives can be meaningfully applied in mixed methods research (Shannon-Baker, 2016). While the instructors and administrators were key study participants who were mostly interviewed with interview guides, the other participants, such as trainees, were interviewed using a structured questionnaire.

3.3 Research Design

A mixed methods design that combines quantitative and qualitative data collection and analysis methods was utilized. This approach allowed the researcher to explore both the quantitative relationships and the qualitative insights from the instructors, administrators, and trainees on the relationship between instructor competences and online teaching/learning. To that extent, a questionnaire was employed to collect data from instructors and the trainees, while a qualitative tool, interview schedules, were used to collect data from the administrators. This approach aligns with Creswell's (2012) assertion that utilizing both approaches can lead to a deeper comprehension of the study complexities. To have findings from both approaches in a triangulated form, integrating findings from the quantitative with those of the qualitative in a concurrent mixed methods approach.

3.4 Study Area

As seen in Appendix 14, the study was conducted in selected government-aided TVET institutions in Uganda that offer national certificate courses across Uganda to assess the

influence of instructor competences on effective online teaching. To ensure a representative sample, seven government-aided institutions out of the 85 TVET institutions from the four regions in Uganda were included. These comprised Nakawa Vocational Training College, Lugogo Vocational Training Institute, and Ntinda Vocational Training Institute in the Central Region; Iganga Technical Institute in the Eastern Region; Minakulu Technical Institute in the Northern Region; and Nyamitanga Technical Institute in the Western Region. Additionally, Jinja Vocational Training Institute in the Eastern region served as the pilot study site to evaluate the reliability and validity of the study instruments.

Government-aided TVET institutions in Uganda operate under a multi-tiered system, overseen by the Ministry of Education and Sports and managed by the Technical Vocational Education and Training Operations and Management (TVET O&M) department. This system includes vocational training institutions (VTIs), technical colleges, and skills development centers, with a focus on both technical and vocational skills development. Uganda has 142 Technical and Vocational Education and Training (TVET) institutions that receive government assistance. Together with more than 800 privately owned training providers, these institutions are a part of the broader TVET system. Through TVET operation and management (TVET- OM), the Ministry of Education and Sports supervises and directs the activities of these establishments. Government-aided TVET institutions were selected for this study because they typically employ instructors trained under the same curriculum, trained for the same period (1 year), engaged on fixed or permanent contracts, ensuring stability and consistency in instructional delivery. Additionally, these institutions benefit from subsidized and more

reliable digital platforms supported by government initiatives, and they take up the majority of Uganda's student population, making them central to equitable access in vocational education. Furthermore, government-aided TVET institutions were disproportionately affected by the COVID-19 lockdowns due to limited internet infrastructure, highlighting the urgency of examining their digital teaching capacities. The sustained commitment of the institution to digital transformation programs championed by the Ministry of Education and Sports further underscores their relevance to this investigation.

3.5 Study Population

The study population comprised 4,145 trainees, 339 instructors, and 38 administrators (Principals, Deputy principals, Academic Registrar, Dean of students, Procurement officer) drawn from seven government-aided TVET institutions in Uganda that offer certificate courses: Nakawa Vocational Training College, Lugogo Vocational Institute, Iganga Technical Institute, Ntinda Vocational Institute, Minakulu Technical Institute, Nyamitanga Technical Institute, and Jinja Vocational Training Institute.

3.6 Target Population

The targeted population of the study was TVET government-aided institutions that offer certificate courses. These were Nakawa Vocational Training College, Lugogo Vocational Institute, Iganga Technical Institute, Ntinda Vocational Institute, Minakulu Technical Institute, and Nyamitanga Technical Institute in Uganda. Specifically, the trainees, the instructors, and the administrators formed the study population. These institutions have diverse programs/courses undertaken by the trainees, ranging from Automotive

Mechanics, Electrical Installation Systems and Maintenance, Welding and Fabrication, Fashion and Garment Design, Electronics, Building and Construction, Carpentry and Joinery, and Fitting and Machining. The distribution of the trainees, the instructors, and the administrators is as shown in Table 3.1.

Table 3. 1: Target Population

Institutions Under Consideration	Number of Trainees	Number of Instructors	Number of Administrators
Lugogo VTI	544	52	4
Nakawa VTC	800	59	7
Ntinda VTI	464	29	7
Iganga TI	655	40	4
Minakulu TI	216	26	4
Nyamitanga TI	999	86	8
Jinja VTI	467	47	4
Total	**4145**	**339**	**38**

Source: Records Departments of the Institutions under Study, 2024

3.7 Sampling Procedure

The Taro Yamane formula was used to determine the appropriate sample size from the limited population of the identified institutions. To achieve a representative sample, both random and purposive sampling methods were applied. Administrators and instructors were chosen through purposive sampling based on their knowledge and relevance to the research, while a proportional to size technique of stratified sampling was employed to select the number of participants in each stratum. Later, a simple random sampling was used to select participants for the gathered sample.

3.8 Sample Size

This was estimated with the aid of the Taro Yamane formula. This formula was emphasized by Chaokromthong and Sintao (2021); Uakarn, Chaokromthong and Sintao (2021) as a formula with more statistical power than the Krejcie and Morgan. The formula is as follows.

Equation 1: Sample Size Determination (Taro Yamane Formula)

$$n = \frac{N}{1 + N(e)^2} \quad 3.1$$

Where:

1. N is a finite population.
2. e is the margin of error.

Taking a 95% confidence level and a margin of error (e) of 5%. Using this information, the required sample sizes for instructors, students, and administrators were as follows.

3.8.1 Sample Size Calculation for Instructors:

Sample Size (Instructors) = 339 / (1 + 339*(0.036^2) = 184

The study sampled 184 instructors from a total population of 339.

3.8.2 Sample Size Calculation for Trainees:

Sample Size (Trainees) = 4145 / (1 + 4145 * (0.024^2) = 406

The study sampled 406 trainees out of 4145.

3.8.3 Sample Size Calculation for Administrators:

Sample Size (Administrators) = 38 / (1 + 38 (0.058^2) = 36

The study sampled 36 administrators out of 38.

Table 3. 2: Sample size selected from each institution

Institutions Under Consideration	Number of Trainees	Number of Instructors	Number of Administrators
Lugogo VTI	76	36	4
Nakawa VTC	112	41	6
Ntinda VTI	65	20	6
Iganga TI	91	28	4
Minakulu TI	0	21	4
Nyamitanga TI	0	28	8
Jinja VTI	62	10	4
Total	**406**	**184**	**36**

This study considered a non-response rate of 5% given the nature of the institutions to be visited, and based on the desired sample size of 626, which includes instructors, trainees, and administrators. This study estimated a new sample size, accounting for a 5% non-response rate, to mitigate potential data loss. This rate was chosen on the basis of suggestions from Barclay, Todd, Finlay, Grande and Wyatt (2002); Parashos, Morgan and Messer (2005); Smith (1995). The choice of the 5% non-response rate was to account for possible non-response bias typical in the field.

Given that the selected TVET institutions are geographically dispersed across different regions of Uganda, there is a high likelihood of missing responses due to instructors' availability and scheduling constraints. Additionally, incorporating a non-response rate adjustment helps safeguard against the risk of collecting insufficient data from an otherwise resource-intensive field study, ensuring the reliability and completeness of the findings. Therefore, the study computed the new sample size for this category of participants as follows.

Equation 2: Sample Size (Non-response Rate Adjustment)

$$n_o = \frac{n}{1 - NRR}$$

Where n_o is the new sample size, n is the desired sample size, and NRR is the non-response rate (0.05). Substituting these parameters into the above formula yields the following sample size.

$$n_o = \frac{626}{1 - 0.05} = 658$$

Therefore, the new sample size for the instructors and the trainees was 658.

3.9 Study Variables

The outcome variable was effective online teaching in TVET institutions in Uganda. This was measured by aspects such as timeliness of learning, efficiency and effectiveness of learning, the learner-centeredness approach to learning, learner satisfaction, learning outcomes such as scores of performances, the equity/inclusiveness of learning and instructor-learner adaptability to online platforms.

The independent variables in this study were various instructor competences. These were online classroom management competence, pedagogy competence, evaluation and assessment, and digital platforms competence. Under online classroom management competence, the study focused on venue setting, structuring course content, managing time effectively, and utilizing educational gadgets such as projectors, smartphones, and laptops. This aspect also encompassed ensuring proper lighting setups to create a

conducive learning environment, recognizing that the physical and technological settings play a crucial role in facilitating effective learning.

Within the realm of pedagogical competences, this study examined the ability of educators to plan learning programs that accommodate different learning styles, implement various online delivery models effectively, and engage in interactive management of the learning environment. These competences are essential for adapting teaching methods to meet the diverse needs of students and the demands of digital education.

The evaluation and assessment variable investigated the influence of assessment methods and feedback mechanisms, including projects and discussions, on learning outcomes. This component also considered the importance of reflection and ongoing development in teaching practices, highlighting the need for educators to continuously refine their approaches based on feedback and self-assessment.

Lastly, digital platforms proficiency assessed educators' ability to navigate and utilize a range of digital platforms, such as Google Meet, Classrooms, Zoom, Big Blue Button, Moodle, Skype, YouTube, Edmodo, and Canvas LMS. Proficiency in these platforms is vital for effectively delivering content, facilitating student interaction, and conducting assessments in an online or blended learning context.

3.10 Data Collection Instruments

Strictly two data collection instruments were used in this study. The structured questionnaire and the interview schedule were deployed in the English language. The

structured questionnaire was administered to 184 instructors (appendix II) and 406 trainees (appendix III) of the selected TVET institutions. The questionnaire administration lasted for about 40 minutes. The interview guide was utilized to collect data from administrators across all seven TVET institutions. A total of 36 administrators (appendix V) were interviewed across the selected TVET institutions. These included Principals, Deputy Principals, Academic Registrars, Deans of Students, and Procurement Officers. Each interview was expected to last approximately 30 minutes.

Eventually, the qualitative findings complemented the quantitative results through triangulation. The questionnaire consisted of predetermined open- and closed-ended questions designed to assess various instructor competences, including online class management, pedagogical skills, evaluation and assessment competence, and proficiency in using digital platforms. Additionally, an interview guide was used to collect data from administrators, such as principals, deputy principals, academic registrars, and deans of students.

The instructor questionnaire as the main data collection tool included questions relating to the demographic profile of the instructors, their socio-economic factors, and then the 5-point Likert questions covering statements for each of the independent variables, classroom management competence, pedagogical competence, assessment and evaluation competence, and lastly their competence in utilizing online digital platforms. On the other hand, a 5-point Likert scale was designed to ascertain the effectiveness of online teaching. These were the efficiency and effectiveness of online learning, the accuracy of the online modules, the timeliness of online learning, the flexibility and ease of online learning, and the cost-effectiveness factor. These were fundamental in providing their perceptions,

views, and attitudes toward the influence of instructors' various competences on the delivery of online learning in selected TVET institutions in Uganda. This interview schedule was a vital tool in supporting thematic analysis.

3.11 Validity and Reliability of the Instruments

The questionnaire's validity was confirmed through expert review and confirmatory validity, while its reliability was assessed using Cronbach's alpha as follows:

3.11.1 Validity of the instruments

To confirm the accuracy and consistency of the research tools, a pilot study was carried out with a small group that reflected the broader target population. Validity was examined through content and construct validity methods. Content validity was ensured by having experts review the questionnaire and interview guide to confirm they matched the goals of the study. Additionally, the study utilized the built-in "valid scale" function to assess the validity and reliability of a multidimensional scale. This function assessed aspects such as structural, convergent, and divergent validity, as well as reproducibility, internal consistency, known-groups validity, scalability, and sensitivity.

3.11.2 Reliability of the instruments

In this study, the reliability and validity of the instrument were evaluated using Cronbach’s alpha values and measures of convergent and divergent validity. As shown in Table 3.3, the internal consistency of each dimension was high, with Cronbach’s alpha values exceeding the acceptable threshold of 0.70.

Table 3. 3: Reliability and validity of the research instrument

	n	alpha	delta	H	Hj min	
Classroom Management	468	0.89	.	0.45	0.38	
Pedagogical competence	467	0.82	.	0.34	0.28	(item io21)
Assessment and Evaluation	466	0.93	.	0.57	0.47	
Utilization of digital tools	466	0.87	.	0.42	0.27	(item io39)
Effective online teaching	465	0.91	.	0.53	0.48	
Convergent validity: 51/52 items (98.1%) have a correlation coefficient with the score of their own dimension greater than 0.400 Divergent validity: 44/52 items (84.6%) have a correlation coefficient with the score of their own dimension greater than those computed with other scores.						

Source: Author (2024)

Classroom management demonstrated an alpha of 0.89, indicating strong reliability. Pedagogical competence achieved an alpha of 0.82, while assessment and evaluation showed excellent reliability with an alpha of 0.93. The dimensions of the utilization of digital tools and effective online teaching had alphas of 0.87 and 0.91, respectively, further confirming the reliability of these constructs. Convergent validity was established with 98.1% of the items (51 out of 52) showing a correlation coefficient with their respective dimension scores greater than 0.400. This indicates that the items strongly correlate with their intended dimensions. Divergent validity was also satisfactory, with 84.6% of the items (44 out of 52) exhibiting a higher correlation with their dimension scores than with scores of other dimensions. Construct reliability, as a measure, represents the degree to which a set of items consistently measures the same latent construct. The construct reliability values ranged from 0.34 for Pedagogical Competence to 0.57 for Assessment and Evaluation, indicating moderate to strong reliability across the dimensions. Minimal reliability identifies the lowest possible reliability of the scale for any single item within a dimension. For Classroom Management, the minimal reliability

was 0.38, while Assessment and Evaluation and Effective Online Teaching achieved values of 0.47 and 0.48, respectively. Pedagogical competence and utilization of digital tools showed slightly lower but acceptable minimal reliability values of 0.28 and 0.27, suggesting areas for potential refinement. Therefore, a clear observation of the results reveals that productive online discussions are encouraged and managed effectively, and turned out to be among the items that were least reported in the pedagogical competence. Also, digital tools are accessible to all trainees, ensuring inclusivity, which was equally least reported to yield for the utilization of digital tools. As a result, 98.1% of the items (51 out of 52) showed convergent validity by having correlation coefficients with their dimension scores greater than 0.400. This shows that the items correctly measure the constructs they were meant to measure. Divergent validity was also supported, as 84.6% of the items (44 out of 52) exhibited stronger correlations with their dimension scores compared to those with other dimensions.

3.11.2.1 Correlations between items of online teaching and scores

As seen in Figure 3.1, the boxplot visualization shows the correlations between items of online teaching and the scores of various dimensions, such as classroom management, pedagogical competence, assessment and evaluation, utilization of digital tools, and effective online teaching.

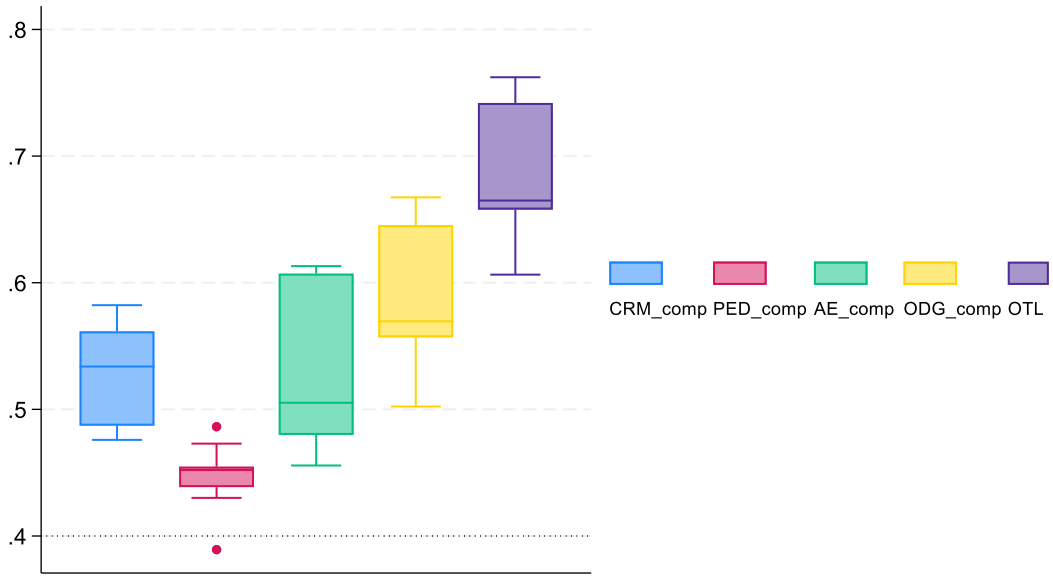


Figure 3. 1: Box plot showing correlations between items of online teaching and scores

Significant variations in strength across dimensions are revealed by the boxplot, which shows the correlations between the items of online teaching and the scores of different dimensions. The utilization of digital tools also exhibited compact and stable correlations, but effective online teaching showed the highest median correlation, indicating a strong and constant alignment with its components. While classroom management and pedagogical competence showed the lowest median correlations, with pedagogical competence also displaying some noticeable outliers, Assessment and evaluation showed moderately high correlations, with a wider variety than other dimensions. There was a strong correlation between online teaching and the use of digital tools, followed by assessment and evaluation, pedagogical competence, and classroom management.

3.11.2.2 Distribution of scores across the dimensions

The histograms below display the distribution of scores across the dimensions of classroom management, pedagogical competence, assessment and evaluation, utilization of digital tools, and online teaching.

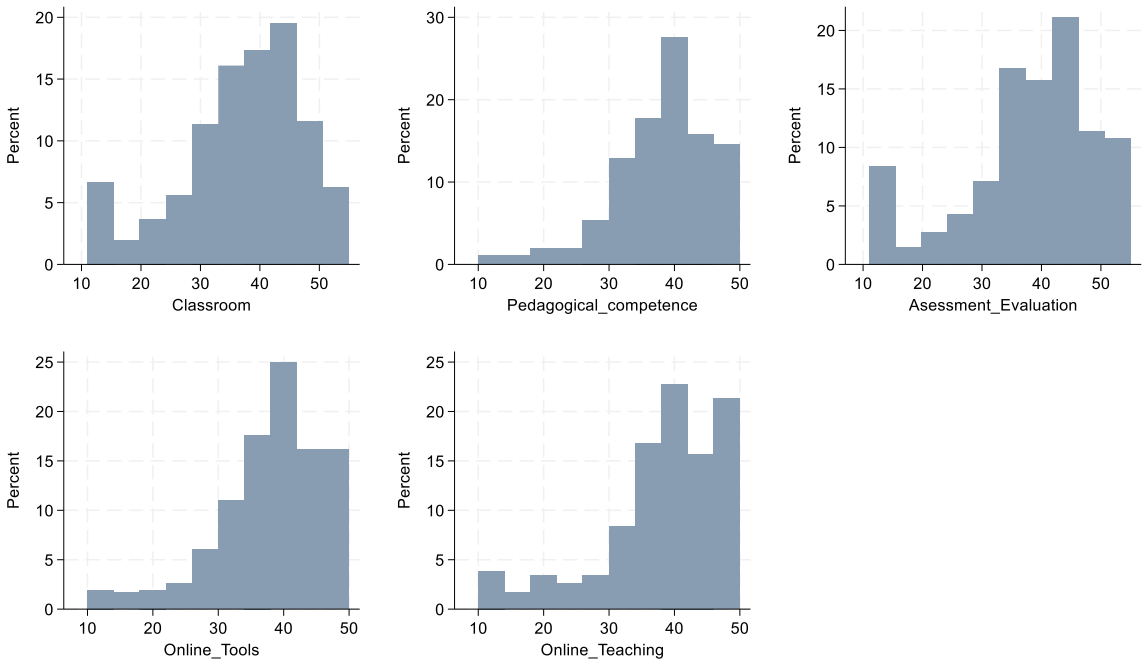


Figure 3. 2: Histogram of scores across the dimensions

Classroom management shows a slightly right-skewed distribution with the majority of scores concentrated between 30 and 50, indicating relatively high proficiency in this area. Pedagogical competence has a broader spread of scores, with a peak of around 40, but also some lower scores, suggesting variability in this dimension. Assessment and evaluation demonstrate a positively skewed distribution, with most scores clustered toward the higher end, reflecting strong performance in this area. The utilization of digital tools is also right-skewed, with a peak around 40, indicating good competence but with

some lower scores present. Finally, online teaching shows a pattern like digital tools, with a strong clustering of higher scores but a noticeable spread across the range, suggesting variability in proficiency.

3.11.2.3 Principal component Biplot and Loading plot for competence dimensions

Figure 4.2 shows relationships between dimension scores (classroom management, pedagogical competence, assessment and evaluation, utilization of digital tools, and online teaching) through a Principal Component Analysis (PCA) biplot on the left and a detailed loading plot on the right.

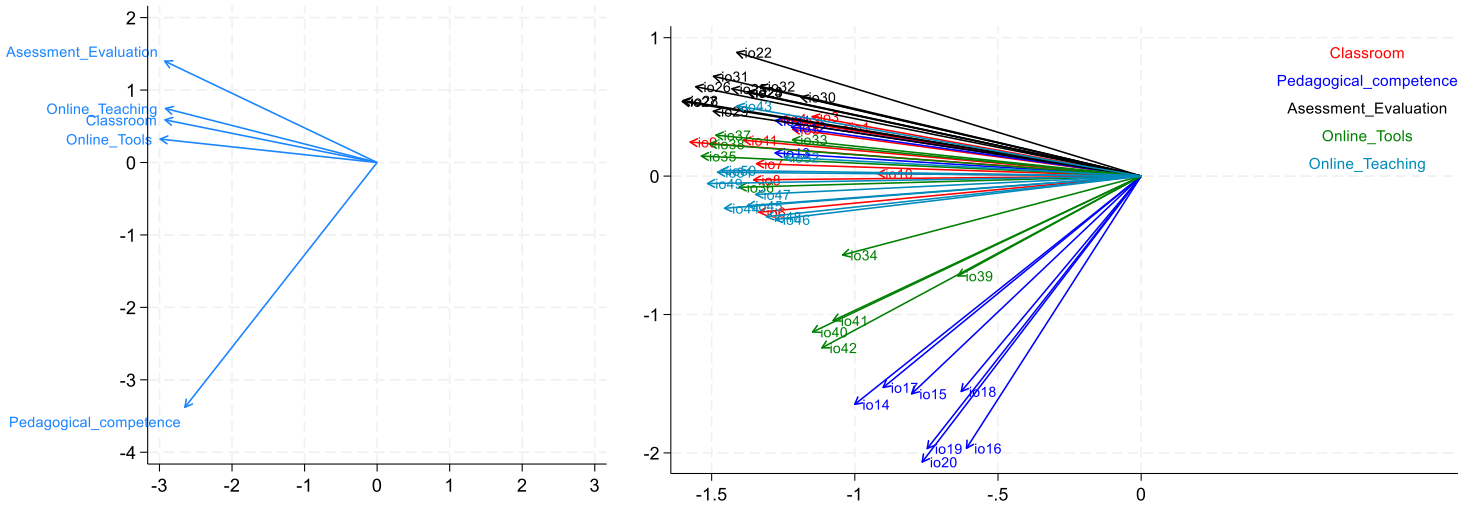


Figure 3. 3: Principal component Biplot and Loading plot

The PCA shows that the dimensions of online teaching, online tools, and assessment and evaluation cluster closely together, indicating strong interrelationships and shared underlying constructs. These dimensions likely reflect overlapping competences in technology-driven and evaluative aspects of teaching. In contrast, pedagogical competence diverges significantly, suggesting that it captures a distinct aspect of teaching skills, separate from those associated with online environments or assessments.

Classroom management shows moderate alignment with other dimensions but remains somewhat independent, likely to reflect its focus on traditional classroom dynamics in the TVET. On the other hand, the loading plot indicates that the items for online tools and online teaching exhibit strong contributions to their dimensions, with long and pronounced vectors indicating their relevance. Pedagogical competence items display weaker associations, particularly items io14 to io20, reinforcing the idea that this dimension is distinct and may require further refinement for stronger cohesion. Meanwhile, assessment, evaluation, and classroom management items cluster tightly, indicating that their items consistently capture the intended constructs.

3.12 Data Collection Procedure

The data collection process involved the utilization of a structured questionnaire and a semi-structured interview schedule. The structured questionnaire was administered to the instructors and the trainees, capturing quantitative data through Likert-scale responses. This questionnaire was integrated into one and uploaded on the Kobo Toolbox for ease of data collection, timely and cheaper means to administer one-to-one, and minimization of non-responses in a bid to reduce bias in the findings. On the other hand, the interview schedule was administered to the administrators to offer insights relating to the influence of instructor competences on effective online teaching among selected TVET institutions. These interviews were manual/paper-based and were audio-recorded to support both content and thematic analysis.

3.13 Data Analysis

The study collected quantitative and qualitative data, which were analyzed differently. Quantitative data was analyzed with the aid of Stata version 18, while qualitative data was analyzed using NVivo version 14. The findings from the qualitative approach were used to nourish the quantitative findings.

3.13.1 Quantitative Data Analysis

The summary of descriptive statistics from the quantitative approach involved means, frequencies, bar charts, pie charts, and percentages. On the other hand, the bivariate analysis level presented tests such as the Pearson Chi-square statistics for assessing the association between categorical/factor variables such as participant, online teaching, age, level of education, religion, region of belonging, and department. The Pearson correlation test examined the correlation between online teaching and the instructors' competences. Also, the Analysis of Variance (ANOVA) tested if the mean online adoption scores were the same across all the factor variables. At the multivariable level, the structural equation model was employed to assess the effect of each of the instructor competences on online teaching in TVET.

The Pearson correlation formula measured the strength and direction of the linear relationship between online teaching and learning with various instructor competences. The functional formula is:

Equation 3: Pearson Correlation Coefficient formula

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 . \sum(Y_i - \bar{Y})^2}}$$

Where:

r = Pearson correlation coefficient

X_i, Y_i observed values for Y and X, where the former is the dependent variable (online learning/teaching) while the latter is the independent variables (classroom management competence, pedagogical competence, assessment and evaluation competence, online digital gadgets competence).

$\bar{X}$, $\bar{Y}$ are the mean values of X and Y

The structural equation model evaluated the effect of the instructors' competences on online learning and teaching in TVET institutions in Uganda. Its functional form is as follows.

Equation 4: Structural Equation Model (SEM)

$$OL = \beta_0 + \beta_1 . CRM + \beta_2 . PED + \beta_3 . AE + \beta_4 . ODG + \varepsilon$$

This study considered scores for online learning and teaching (OL) as the dependent variable, influenced by four key competence constructs, namely, classroom management competence (CRM), pedagogical competence (PED), online assessment and evaluation competence (AE), and the utilization of digital tools and platforms competence (ODG). The intercept term β_0 represented the baseline level of online learning and teaching in the absence of these competences. Regression coefficients β_1-β_4 measure the effect on online

teaching and learning resulting from a unit change in each of the independent variables. The error term, ε represents the unexplained part of the total variation.

3.13.2 Qualitative Data Analysis

Qualitative data from the interview schedules were subjected to thematic analysis to identify recurring patterns, themes, and insights that emerged from participants' narratives using the NVivo software version 14 Enterprise edition. This was done in six distinct steps outlined by Braun and Clarke (2021), which included data familiarization, coding, generating themes, reviewing themes, defining and naming themes, and write-up. Familiarization in this study involved getting to know the data by thoroughly reviewing all the data collected in NVivo. This was followed by coding, where sections of the text data corresponding to code structures were highlighted. Generating themes involved identifying patterns in the data to develop meaningful themes. Reviewing themes ensured that the generated themes were useful and accurately represented the data. The study then defined and named the themes by stating exactly what each theme meant and explaining how it helped in understanding the data. Finally, the write-up involved completing the final analysis and writing about the common trends and patterns identified in the data. This process was conducted after verifying, sorting, and ensuring that all participants were equally represented. It also involved transcribing data from audio to text. Additionally, participants' demographics were coded in a separate Microsoft Excel sheet, which was later imported into NVivo using the file classification sheet. This process facilitated the organization of interviews into the main folder, which included all participants interviewed for the study.

3.14 Ethical Considerations

This study underwent the necessary review by the Research Ethics Committee of Uganda Christian University (UCU-REC). The trainees, the instructors, and the administrators were briefed about the purpose of the study, being informed that it was built and designed purely for academic purposes as outlined in the attached consent sheet. They were further informed that their participation was voluntary and that they had the full right to terminate or withdraw their participation at any time. They were also assured that the information they provided would remain confidential and that their views would be kept private.

3.15 Chapter Summary

This chapter presents the research design and methodology used in the study. It outlined the philosophical research paradigm, research design, study area, target population, sampling procedure, sample size determination, data collection tools and procedures, validity and reliability of the instruments where the study utilized expert reviews and to validate the instruments while pilot survey was conducted to ensure reliability of the instrument with the associated tests such as the Cronbach alpha. Finally, the data analysis methods for both the qualitative and quantitative, and ethical considerations.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This study investigated the influence of instructor competences on effective online teaching among TVET institutions in Uganda. This chapter covered the introduction, the response rate calculation, univariate data analysis involving descriptive analysis of the participants' distributions, bivariate analysis focusing on pairwise correlations, and the multivariable data analysis level for the structural equation model.

4.2 Response Rate Calculation

As shown in Table 4.1, the survey achieved a high response rate of 96%, demonstrating the effectiveness of the follow-up strategy.

Table 4. 1: Response Rate Computation Table

	Number	Percentage
Distributed questionnaires	658	100%
Returned questionnaires	471	72%

Source: Author (2024)

The study attained a response rate of 72%, having distributed 658 questionnaires and obtaining 471 filled questionnaires. This response rate is above 70% and is deemed representative of the study population.

4.3 Background Characteristics of Participants

This study focused on the description of the background characteristics of the participants, such as their positions, religion, age, gender, marital status, education level, field/department/program, their working experiences, and the type of place of residence. Table 4.2 shows both the personal (e.g., region, age, gender, marital status, religion) and professional attributes (e.g., education level, field of specialization, online teaching experience, and teaching/learning experience) of the participants, as seen below.

4.3.1 Region of Belonging

The study participants were asked to indicate their region of belonging before coming to the present institution of learning, the following are the results.

Table 4. 2: Region of belonging of the participants

Region of Belonging	Frequency	Percent (%)
Eastern	252	53.5
Central	88	18.68
Northern	55	11.68
Western	75	15.92
Non-Ugandan	1	0.21
Total	471	100

Source: Author (2024)

According to Table 4.2, about half (54%; n = 252) of the participants came from the Eastern region; 19% (n = 88) were from the Central region, 16% (n = 75) were from the Western region, while 12% (n = 55) were from the Northern region. This revealed that the largest proportion of the TVET institutions visited were from the Eastern region.

4.3.2 Religion of the participants

The study also intended to capture the religion of each of the study participants in a bid to check variations between the study units. The findings on the religion of the participants are seen below.

Table 4. 3: Religion of the participants

Religion of the participants	Frequency	Percent (%)
Born Again Christians	79	16.81
Anglicans/Pentecostals	167	35.53
Catholics	162	34.47
Muslims	44	9.36
Seventh Day Adventist	9	1.91
Other Religions	9	1.91
Total	470	100

Source: Author (2024)

Regarding religion, Table 4.3 shows the majority of participants were Anglicans or Pentecostals (36%; n = 167), followed closely by Catholics (34%; n = 162). Born Again Christians constituted 17% (n = 79), while Muslims accounted for 9% (n = 44), and Seventh Day Adventists and other religious groups each contributed 2% (n = 9).

4.3.3 Nature of Respondent

Given that this study covered two different participants, the instructor and the trainee, it was prudent to identify the category of the respondent in a bid to check differences in responses based on the study objectives. The findings are seen in Table 4.4.

Table 4. 4: Responsibility of Respondent

Category of Respondent	Frequency	Percent (%)
Instructor	195	41.4
Trainee	275	58.39

Other (Principals and Deputy Principals)	1	0.21
Total	471	100

Source: Author (2024)

In terms of respondent category, most participants were trainees (58%; n = 275), followed by instructors (41%; n = 195), with only one participant (0.2%) falling into the other category.

4.3.4 Age of the respondents

Since the study respondents were of a different category, their respective ages differed significantly. The findings in Table 4.5 show the results.

Table 4. 5: Distribution of respondents by age groups

Age group	Frequency	Percent (%)
Under 25	272	57.87
26-35	73	15.53
36-45	68	14.47
46-55	38	8.09
Over 55	19	4.04
Total	470	100

Source: Author (2024)

Age-wise, the majority were under 25 years (58%; *n* = 272), with smaller proportions aged 26-35 (16%; *n* = 73), 36-45 (14%; *n* = 68), 46-55 (8%; *n* = 38), and over 55 (4%; *n* = 19).

4.3.5 Gender of the Respondents

Figure 4.1 shows the gender distribution of the participants who took part in the study.

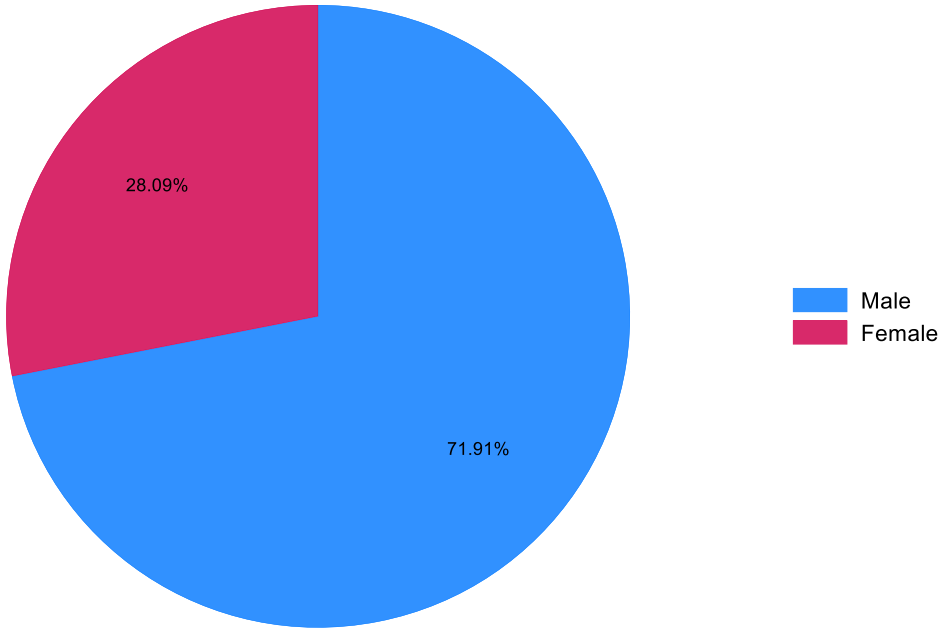


Figure 4. 1: Gender of the Respondents

Gender distribution showed that males dominated the sample (72%; *n* = 338), while females accounted for 28% (*n* = 132). These males worked mostly as instructors and trainees, while the rest were their female counterparts.

4.3.6 Marital status of the respondents

The study was also interested in finding out how many of the participants were married and how many were single to assess the level of responsibility among them, as seen below.

Table 4. 6: Marital status of the respondents

Marital Status	Frequency	Percent (%)
Married	164	34.82
Single	301	63.91
Widowed	4	0.85
Other (PWDs)	2	0.42
Total	471	100

Source: Author (2024)

Most participants were single (64%; n = 301) since most were trainees, with 35% (n = 164) married, mostly the instructors, and only a small number widowed (1%; n = 4) or in other categories (0.4%; n = 2).

4.3.7 Highest Level of Education of Instructors

Since this was an academic-driven study, it was crucial to assess the level of education of the participants. The results are as follows.

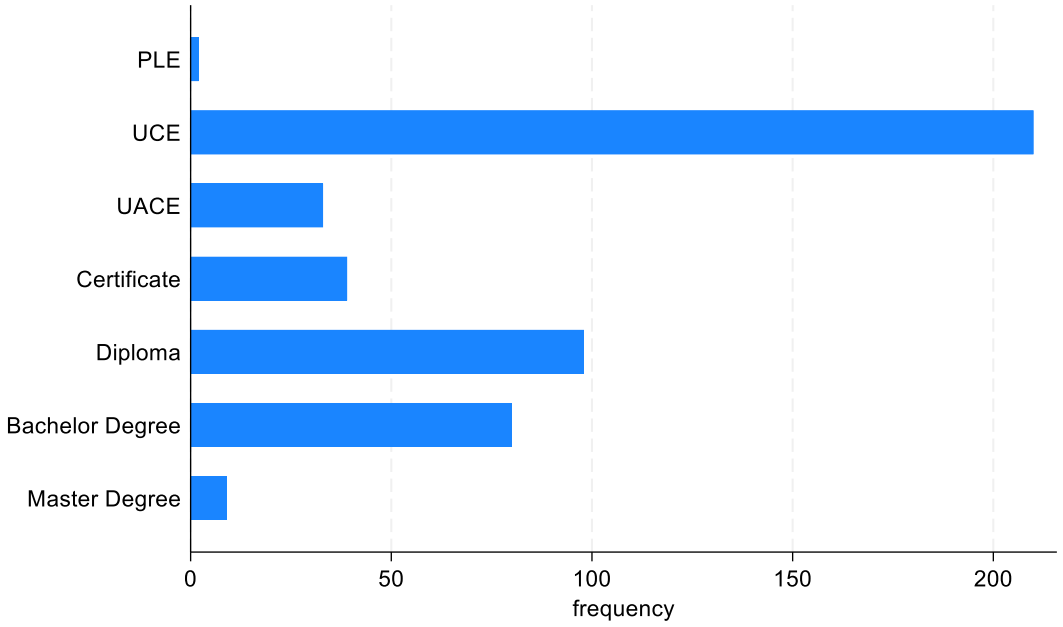


Figure 4. 2: Highest Level of Education of Instructors

Regarding education levels, the majority of the trainees had UCE qualifications (45%; n = 210), followed by instructors with diploma holders (21%; n = 98), certificate holders (8%; n = 39), and those with bachelor's degrees (17%; n = 80). Only a small number had master's degrees (2%; n = 9) or primary-level education (0.4%; n = 2).

4.3.8 Field/Department or the Program of the Instructor/Trainee

The study sought to identify the various fields and programs undertaken by the trainees, including the fields where the instructors belonged, as seen below.

Table 4. 7: Field/Department or the Program of the Instructor/Trainee

Field/Department/Program	Frequency	Percent (%)
Automotive Mechanics	94	19.96
Electrical Installation Systems	73	15.5
Welding and Fabrication	30	6.37
Fashion and Garment Design	58	12.31
Electronics	14	2.97
Building and Construction	63	13.38
Carpentry and Joinery	24	5.1
Fitting and Machining	28	5.94
Other (catering)	87	18.47
Total	471	100

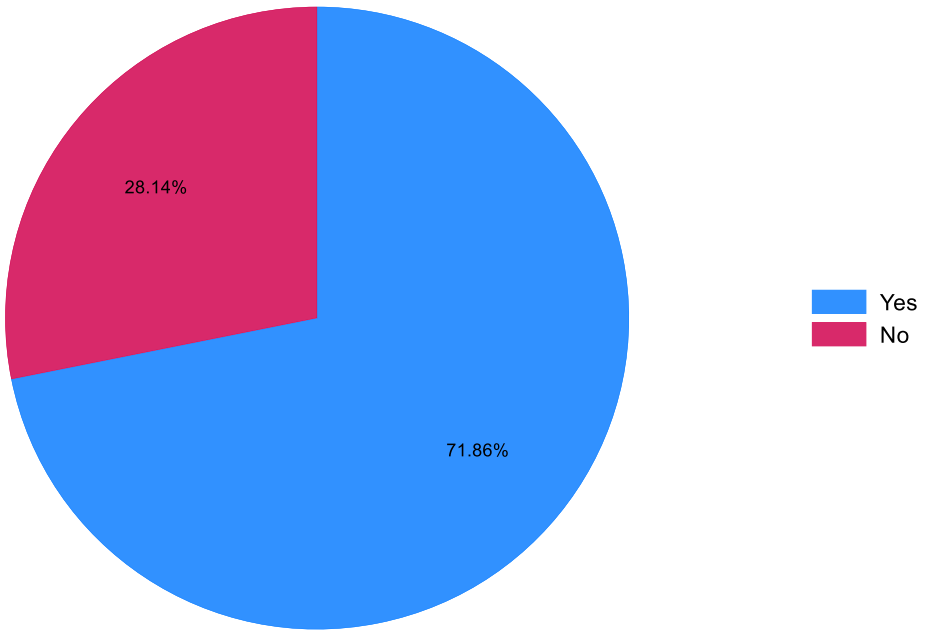
Source: Author (2024)

The participants were distributed across various fields, with the highest representation in Automotive Mechanics (20%; n = 94), followed by Electrical Installation Systems (16%; n = 73) and Building and Construction (13%; n = 63). Other fields included Fashion and Garment Design (12%; n = 58), Welding and Fabrication (6%; n = 30), Carpentry and Joinery (5%; n = 24) and Fitting and Machining (6%; n = 28), with 18% (n = 87) falling into the other category.

4.3.9 Online Teaching Experience

To evaluate the quality of online teaching, the study found it useful to find out the proportion of instructors and trainees that possessed an online teaching and learning experience. The findings are as follows.

Figure 4. 3: Online Teaching Experience



TVET instructor experience with online teaching was reported by 72% (n = 337), while 28% (n = 132) had no such experience. A small proportion of the TVET instructors and trainees had experienced online teaching and learning. Most of those who had experienced it reported having an online interaction individually on platforms such as Zoom for meeting and interaction purposes.

4.3.10 Period of teaching experience

The study also sought to find out the period of teaching experience of the instructors. The study findings are as follows.

Table 4. 8: Period of teaching experience

Teaching/Learning Experience	Frequency	Percent (%)
Less than 1 year	131	38.87
1-5 years	163	48.37
6-10 years	34	10.09
More than 10 years	6	1.78
Total	337	100

Source: Author (2024)

Teaching or learning experience varied, with 49% (n = 163) having 1-5 years of experience, 39% (n = 131) less than one year, and 12% (n = 40) having 6 or more years.

4.3.11 Type of place of residence

The type of place of residence was among the background characteristics that were examined by the study. The findings are as follows.

Table 4. 9: Type of place of residence

Residence Type	Frequency	Percent (%)
Urban	308	65.53
Rural	162	34.47
Total	470	100

Source: Author (2024)

As seen in Table 4.9, the majority lived in urban areas (66%; n = 308), while the rest were from rural areas (34%; n = 162). These findings reflect the diverse background characteristics of the participants with significant variations between the instructors and trainees.

4.3.12 Reasons for the lack of online teaching in TVET institutions

The respondents were asked to ascertain why some of their institutions did not embrace online classes on the TVET. They reported multifaceted challenges preventing the adoption of online teaching in TVET institutions, particularly the need for digital infrastructure and capacity-building initiatives, as in Figure 4.4.

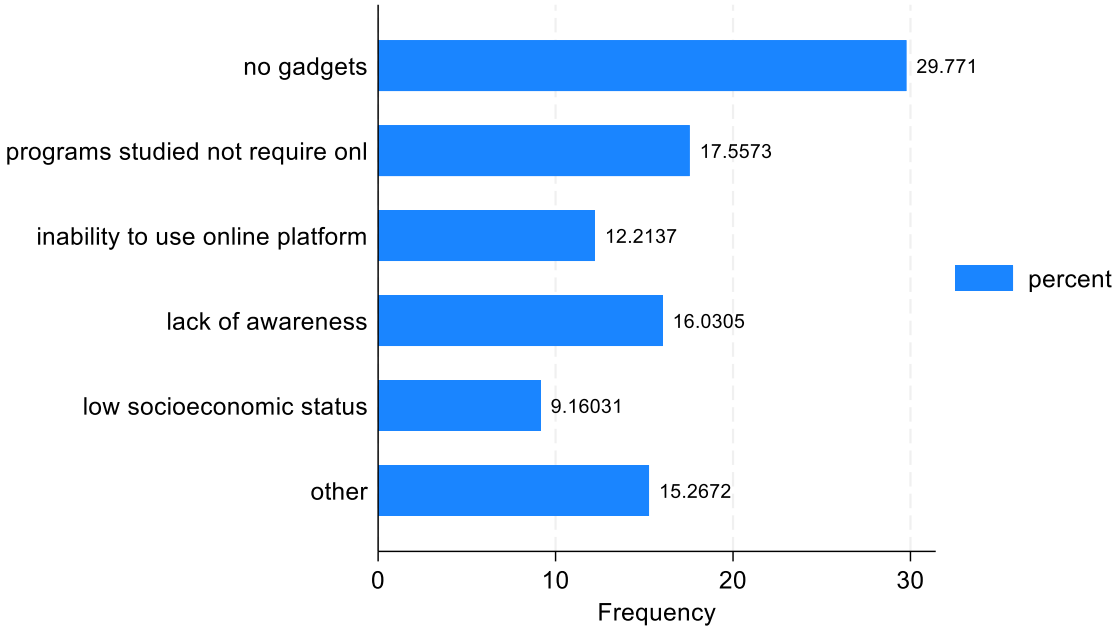


Figure 4. 4: Reasons for the lack of online teaching in TVET institutions

The most cited reason is the lack of access to gadgets (29.7%), reflecting a significant digital divide that hinders online learning. This is followed by the nature of programs studied, with 17.6% indicating that their courses do not require online teaching. Lack of awareness (16.0%) and the inability to use online platforms (12.2%) were also significant barriers, highlighting gaps in digital literacy and preparedness. Low socioeconomic status (9.2%) was identified as another constraint, pointing to financial challenges affecting access to online learning resources.

4.3.13 Distribution of Period of Stay of Instructors in the Institution

To verify the experience the trainees had, they were asked to reveal their periods of stay in their respective TVET institutions. Figure 4.5 suggests that TVET institutions are characterized by a balanced mix of individuals with varying levels of experience but with a concentration of participants in the early to mid-stages of their tenure.

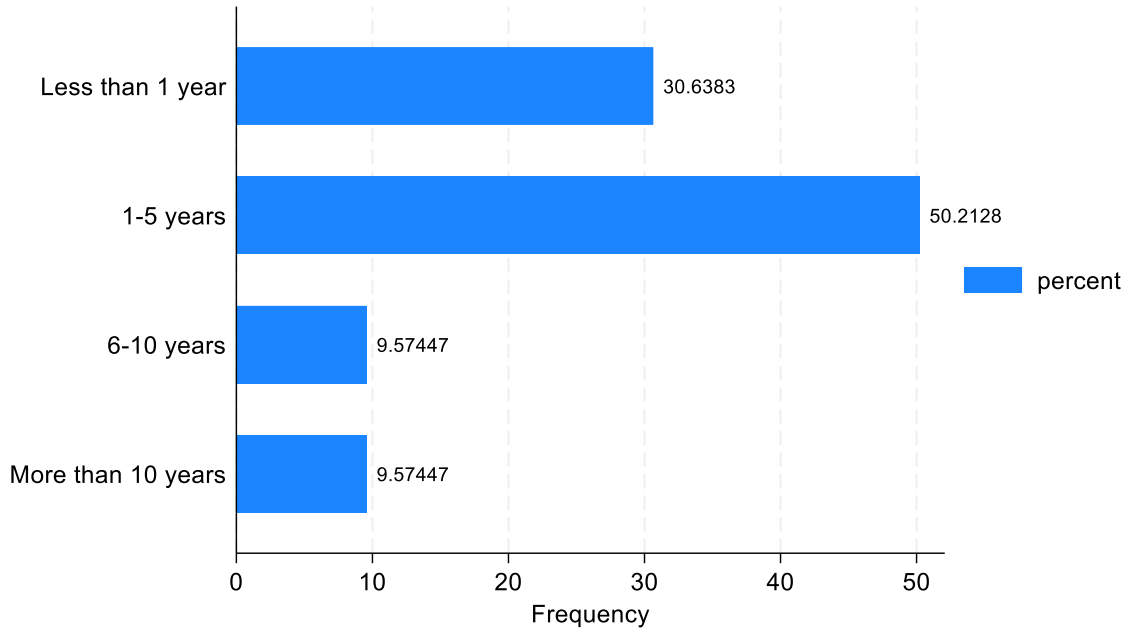


Figure 4. 5: Distribution of Period of Stay of instructors in the Institution

The bar chart indicates that the highest percentage of respondents (50.2%) reported having stayed in the institution for 1-5 years, indicating a significant proportion with moderate experience. This is followed by 30.6% who have been in the institution for less than one year, reflecting a substantial number of newer entrants. In contrast, smaller proportions were observed for those with longer durations, with 9.6% staying for 6-10 years and another 9.6% reporting more than 10 years of stay.

4.3.14 Distribution of the TVET Institutions Surveyed

The pie chart below shows the distribution of participants across various institutions involved in the study. Figure 4.6 below shows a diverse representation of institutions, with a higher concentration of participants from Iganga TI.

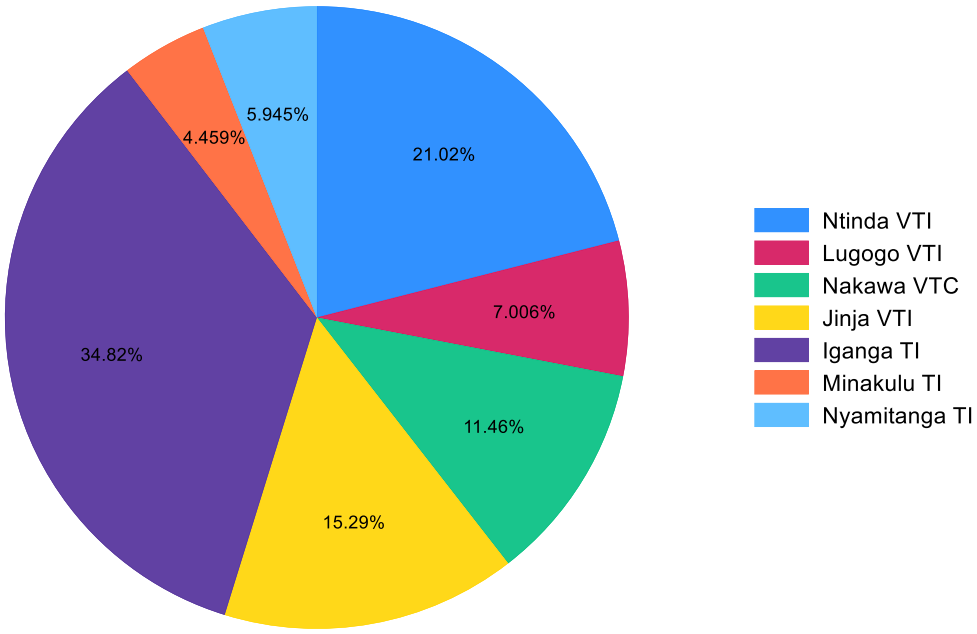


Figure 4. 6: Distribution of the TVET Institutions surveyed

The pie chart in Figure 4.6 shows that Iganga TI accounted for the largest proportion of participants, comprising 34.8% of the total, indicating a significant representation from this institution. Ntinda VTI follows with 21.0%, representing the second-highest share of participants. Other institutions include Jinja VTI with 15.3% and Nakawa VTC with 11.46%, both contributing significant but smaller proportions. Nyamitanga TI and Minakulu TI contributed relatively smaller shares, at 5.9% and 4.5% respectively, while Lugogo VTI recorded the least participation with 7.0%.

4.4 Bivariate Level Data Analysis

The Pearson chi-square test was employed to examine the association between the background features and online teaching and learning.

4.4.1 Association between online teaching and background characteristics

Table 4. 10: Association between online teaching and background characteristics

Variable	Background characteristics	Yes	No	Total	χ^2	*p*
Region	Eastern	165 (65%)	87 (35%)	252		
	Central	68 (79%)	18 (21%)	86		
	Northern	42 (76%)	13 (24%)	55	11.56	0.021
	Western	61 (81%)	14 (19%)	75		
	Non-Ugandan	1 (100%)	0 (0%)	1		
Marital Status	Married	132 (80%)	32 (20%)	164		
	Single	204 (68%)	95 (32%)	299	18.67	0.000
	Widowed	0 (0%)	4 (100%)	4		
	Other	1 (50%)	1 (50%)	2		
Gender	Male	252 (75%)	84 (25%)	336		
	Female	84 (64%)	48 (36%)	132	6.04	0.014
Religion	Born Again Christians	58 (74%)	20 (26%)	78		
	Anglicans/Pentecostal	120 (72%)	47 (28%)	167		
	Catholics	114 (71%)	47 (29%)	161	4.37	0.497
	Muslims	28 (64%)	16 (36%)	44		
	Seventh Day Adventist	8 (89%)	1 (11%)	9		
	Other	8 (89%)	1 (11%)	9		
Participant Type	Instructor	155 (80%)	39 (20%)	194		
	Trainee	181 (66%)	93 (34%)	274	11.15	0.004
	Other	1 (100%)	0 (0%)	1		
Age	Under 25	181 (67%)	90 (33%)	271		
	26-35	57 (79%)	15 (21%)	72		
	36-45	59 (87%)	9 (13%)	68	13.52	0.009
	46-55	27 (71%)	11 (29%)	38		
	Over 55	12 (63%)	7 (37%)	19		
Education Level	PLE	0 (0%)	2 (100%)	2		
	UCE	143 (68%)	66 (32%)	209		
	UACE	19 (58%)	14 (42%)	33	29.11	0.000
	Certificate	21 (54%)	18 (46%)	39		
	Diploma	79 (81%)	19 (19%)	98		
	Bachelor’s degree	69 (87%)	10 (13%)	79		
	Master’s degree	6 (67%)	3 (33%)	9		
Field Program	Automotive Mechanics	76 (82%)	17 (18%)	93		
	Electrical Installation	50 (68%)	23 (32%)	73		
	Welding and Fabrication	27 (90%)	3 (10%)	30	16.74	0.033
	Fashion and Garment Design	34 (59%)	24 (41%)	58		
	Electronics	9 (64%)	5 (36%)	14		
	Building and Construction	41 (65%)	22 (35%)	63		
	Carpentry and Joinery	18 (75%)	6 (25%)	24		
	Fitting and Machining	20 (71%)	8 (29%)	28		
	Other	62 (72%)	24 (28%)	86		
	Total	337	132	469		

Source: Author (2024)

Based on the Pearson Chi-square test, the analysis revealed several statistically significant associations between background characteristics and online teaching in TVET institutions. Regarding the association between the region and online teaching, a Chi-square value of 11.56 with 4 degrees of freedom and a *p*-value of 0.021 indicates that the region of belonging of an instructor is significantly associated with online teaching. Furthermore, the region of belonging also significantly influences online teaching, with 65% of participants from the Eastern region reporting having used and being able to conduct online teaching. Higher proportions were observed in the Western region (81%), Northern region (76%), and Central region (79%), suggesting regional disparities in online teaching practices and infrastructure.

Additionally, marital status demonstrated a significant association ($\chi^2 = 18.67$, $p = 0.000$), with married participants being more likely to engage in online teaching (80%) compared to single participants (68%). Gender also showed a significant relationship ($\chi^2 = 6.04$, $p = 0.014$), with male participants (75%) being more likely to have online teaching experience than female participants (64%).

When examining participant type, instructors were significantly more likely to engage in online teaching (80%) than trainees (66%) ($\chi^2 = 11.15$, $p = 0.004$). Age also played a significant role ($\chi^2 = 13.52$, $p = 0.009$), with higher participation in online teaching among participants aged 36-45 years (87%) compared to those aged under 25 years (67%).

Education level was another significant factor ($\chi^2 = 29.11$, $p = 0.000$), with participants holding bachelor's degrees (87%) or diplomas (81%) reporting the highest levels of online

teaching engagement, while those with lower qualifications, such as UACE (58%) or certificates (54%), demonstrated lower participation rates.

The field of study was also significantly associated with online teaching ($\chi^2 = 16.74$, $p = 0.033$). For example, participants in Welding and Fabrication reported the highest participation (90%), followed by Automotive Mechanics (82%), while Fashion and Garment Design participants showed lower participation (59%).

4.4.2 Pearson Correlation Coefficient showing relationships between variables

The Pearson correlation coefficient was utilized to examine the correlation between online teaching and learning and instructor competence. Table 4.5 examines the strength and direction of the relationship/correlation between the various competences of the instructors and online teaching and learning. Results in Table 4.5 reveal that all the instructor competences investigated have a statistically significant correlation with online teaching.

Table 4. 11: Correlation between online teaching and Instructor competences

	OL	CRM	PED	AE	ODG
OL	1				
CRM	0.6917*	1			
PED	0.6581*	0.6472*	1		
AE	0.7450*	0.7415*	0.6322*	1	
ODG	0.8113*	0.7056*	0.7028*	0.7696*	1

OL = online teaching/learning, CRM = classroom management competences, PED = pedagogical competences, AE = online assessment and evaluation competence, ODG = utilization of online digital gadgets competence

The results indicate that all instructor competences are positively correlated with online teaching.

4.4.2.1 TVET instructor online classroom management competences have no influence on effective online teaching

A correlation coefficient of 0.6917 and its associated *p*-value < 0.05 confirms that the null hypothesis that TVET instructor online classroom management competences have no influence on online teaching effectiveness is rejected in favor of the alternative. The moderate correlation between classroom management competences and online teaching effectiveness suggests that the more competent an instructor is in managing an online class, the higher the effectiveness in online teaching.

4.4.2.2 TVET instructor pedagogical competences have no influence on effective online teaching

Similarly, a coefficient of 0.6581 with its associated *p*-value of less than 5% suggests that the null hypothesis, that, instructor pedagogical competence have no influence on online teaching effectiveness is rejected in favor of the alternative hypothesis. This suggests that pedagogical competences have a moderate positive relationship with online teaching effectiveness.

4.4.2.3 TVET instructor evaluation and assessment competences do not influence effective online teaching

Interestingly, a correlation of 0.7450 against its *p*-value < 0.05 shows that there is a highly significant positive correlation between evaluation/assessment competence and effective online teaching. This suggests that the null hypothesis that assessment/evaluation competences do not influence effective online teaching is rejected in favor of the alternative. Therefore, instructor assessment competence strongly influences online teaching effectiveness among TVET institutions in Uganda.

4.4.2.4 TVET instructor competences in utilizing digital teaching platforms are independently related to effective online teaching

Furthermore, there is a very strong positive correlation between digital utilization competence and effective online teaching (ODG, $r = 0.811$). This implies that the null hypothesis that instructor digital competence is independently related to online teaching effectiveness is resoundingly rejected in favor of the alternative. Therefore, as digital

utilization competences of an instructor increase, online teaching effectiveness shoots up, revealing the critical role of digital tools in facilitating online instruction.

4.4.3 Correlation Matrix

Figure 4.7 represents the pairwise correlation coefficients between variables (including classroom management (CRM), pedagogical competence (PED), online assessment and evaluation (AE), and utilization of online digital gadgets (ODG)). Each value indicates the strength and direction of the linear relationship between the corresponding variables. The diagonal values are typically 1 (perfect correlation with itself), while off-diagonal values show how strongly the variables are correlated.

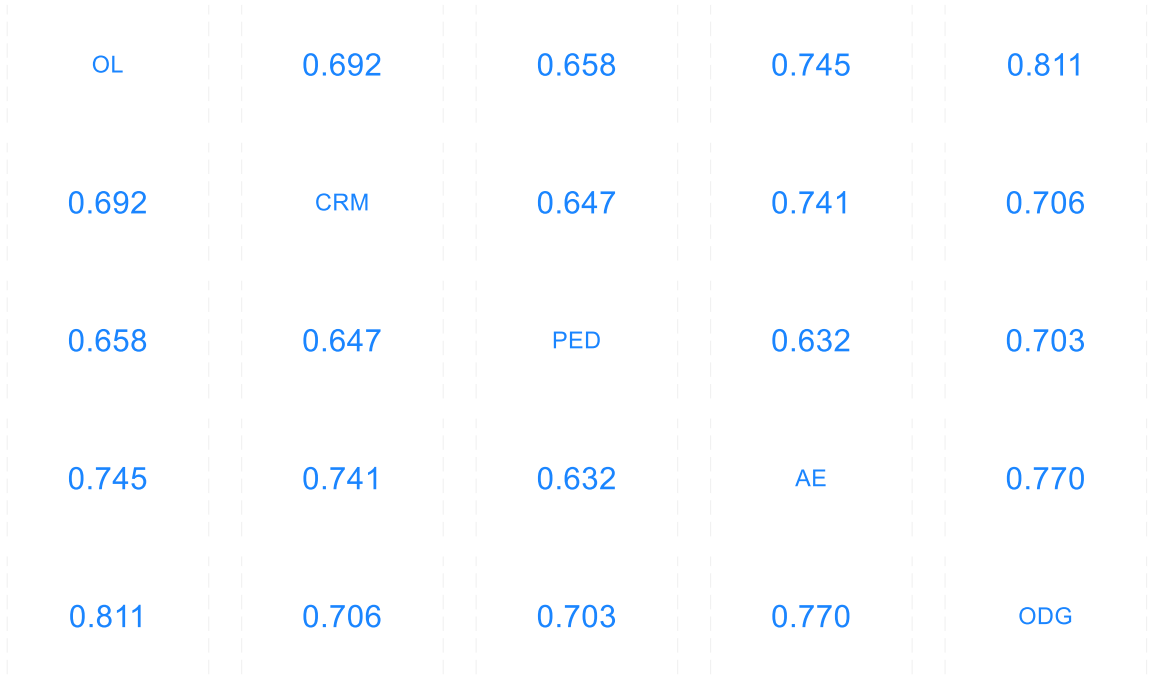


Figure 4. 7: Correlation matrix

The results indicate that all instructor competences have a significant and positive correlation with online teaching. Among the competences, the strongest correlation is observed between online teaching and the utilization of online digital gadgets (ODG, r = 0.811), highlighting the critical role of digital tools in facilitating online instruction. This is followed by online assessment and evaluation competence (AE, r = 0.745), emphasizing the importance of effective evaluation practices in online environments. Classroom management (CRM, r = 0.692) and pedagogical competence (PED, r = 0.658) also show significant but slightly weaker correlations with online teaching, suggesting that while essential, these competences may play a more supportive role in online teaching.

4.4.4 ANOVA table for comparing means across factor variables

The ANOVA analysis was conducted to examine whether there were statistically significant differences in the likelihood scores for adopting online learning and teaching across various factors such as region, religion, institution, age, gender, marital status, education level, field/department, teaching experience, and place of residence.

Table 4. 12: ANOVA table for comparing means across significant factors

Variable	Group	M	SD	n	F-ratio	*p*-value
Region	Eastern	35.62	11.24	252		
	Central	38.14	10.04	88		
	Northern	37.18	8.23	55	2.55	0.039
	Western	39.41	9.31	75		
	Non-Ugandan	28	0	1		
	Total	36.86	10.49	471		
Institution	Ntinda VTI	40.55	7.5	99		
	Lugogo VTI	37.85	10.54	33		
	Nakawa VTC	39.15	6.81	54	7.97	0.000
	Jinja VTI	31.06	11.22	72		

Variable	Group	M	SD	n	F-ratio	*p*-value
	Iganga TI	35.46	11.71	164		
	Minakulu TI	37.81	8.14	21		
	Nyamitanga VTI	40.64	10.03	28		
	Total	36.86	10.49	471		
Region of Institution	Eastern	34.51	11.47	230		
	Central	39.64	8.15	185	8.63	0.000
	Northern	37.81	8.14	21		
	Western	36.85	12.59	34		
	Total	36.84	10.49	470		
Age	Under 25	35.5	10.93	272		
	26-35	38.75	8.12	73		
	36-45	40.74	8.58	68	4.49	0.001
	46-55	37.47	10.29	38		
	Over 55	34.32	14.35	19		
	Total	36.88	10.49	470		
Marital Status	Married	39.1	9.45	164		
	Single	35.72	10.8	301	4.9	0.002
	Widowed	28	13.37	4		
	Other	42	5.66	2		
	Total	36.86	10.49	471		
Field Dept. Program	Automotive	38.45	9.29	94		
	Electrical	32.88	12.86	73		
	Welding	41.33	7.39	30	2.9	0.004
	Fashion	37.26	10.88	58		
	Electronic	36.86	6.96	14		
	Building	37.24	9.89	63		
	Carpentry	39.54	8.94	24		
	Fitting	33.68	12.42	28		
	Other	36.68	9.78	87		
	Total	36.86	10.49	471		
Online Teaching Experience	Yes	38.85	8.52	337		
	No	31.61	12.97	132	50	0.000
	Total	36.81	10.48	469		
Reasons for Not Teaching	No Gadget	32	12.07	39		
	Programs	32.22	11.05	23		
	Inability	30.38	12.62	16	3.94	0.002
	Lack of Aid	38.33	12.47	21		
	Low Socio	35.5	6.19	12		

Variable	Group	M	SD	n	F-ratio	*p*-value
	Other	22.05	15.99	20		
	Total	31.66	13.01	131		
Place of Residence	Urban	37.56	9.64	308		
	Rural	35.56	11.86	162	3.88	0.049
	Total	36.87	10.49	470		

Source: Author (2024)

Regional differences emerged as a key determinant, with the Western and Central regions showing the highest mean likelihood scores (M = 39.41 and M = 38.14, respectively) compared to the Eastern region, which had the lowest score (M = 35.62; F = 2.55, p = 0.039). This suggests that institutions in the Western and Central regions have better access to the resources, infrastructure, and training necessary for successful online learning and teaching.

Significant differences were found between institutions (F = 7.97, p = 0.000), with Nyamitanga VTI (M = 40.64) and Ntinda VTI (M = 40.55) demonstrating the highest mean likelihood scores, while Jinja VTI recorded the lowest score (M = 31.06). Nyamitanga VTI, despite its distance from Kampala, exhibits a strong commitment to adopting online teaching as a means to extend its educational services to learners in remote areas. Similarly, Ntinda Vocational Institute shows a proactive approach to leveraging online learning, aiming to expand its offerings to include fields and programs that are not currently functional at the institute, thereby increasing accessibility and accommodating a broader range of learners.

Age differences were statistically significant (F = 4.49, p = 0.001). Participants aged 36-45 had the highest likelihood score (M = 40.74), while those over 55 had the lowest (M = 34.32). Younger participants were predominantly trainees, while adult participants,

especially those in the 36-45 age group, were mainly instructors who highlighted the urgent need for online teaching to meet the demands of modern education. This suggests that instructors in their mid-career are likely more motivated and equipped to adopt online teaching due to their dual exposure to traditional teaching methods and modern technological tools. Conversely, participants over 55 may face challenges such as limited technological proficiency or resistance to change, contributing to their lower likelihood scores.

Differences across fields or departments were statistically significant ($F = 2.9$, $p = 0.004$), with participants from the welding department reporting the highest likelihood of adopting online teaching ($M = 41.33$), while those in electrical scored the lowest ($M = 32.88$). This indicates that fields such as welding, which may have embraced technology for practical training and demonstration, are better positioned to integrate online teaching methods. On the other hand, fields like electrical may face barriers such as the perceived difficulty of translating hands-on training into a virtual format.

Online teaching experience had a highly significant impact on the likelihood of adopting online teaching ($F = 50$, $p = 0.000$). Participants with prior experience in online teaching reported a much higher mean likelihood score ($M = 38.85$) compared to those without any experience ($M = 31.61$). This suggests that familiarity with online platforms and digital teaching tools greatly enhances confidence and willingness to adopt online teaching.

The place of residence showed a significant effect on the likelihood of adopting online teaching ($F = 3.88$, $p = 0.049$). Participants residing in urban areas had a higher mean

likelihood score (M = 37.56) compared to those in rural areas (M = 35.56). This suggests that urban residents may have better access to the infrastructure, internet connectivity, and resources necessary for online teaching. Rural participants, by contrast, may face systemic challenges such as limited access to reliable technology and lower digital literacy levels.

The reasons for not adopting online teaching showed statistically significant differences (F = 3.94, p = 0.002). Participants citing "lack of aid" as a reason reported the highest mean likelihood score (M = 38.33), suggesting that external support, such as funding and access to technology, could significantly enhance their ability to adopt online teaching. Conversely, participants citing "other reasons" had the lowest score (M = 22.05), which may indicate deeper, less quantifiable barriers such as lack of interest or institutional discouragement.

Table 4. 13: ANOVA table for comparing means across insignificant factors

Teaching Experience Years	< 1 year	37.71	9.56	131		
	1-5 years	39.15	8.14	163	1.63	0.165
	6-10 years	41.44	5.2	34		
	> 10 years	41.67	7.45	6		
	5+ years	37	8.54	3		
	Total	38.85	8.52	337		
Religion	Born Again	36.58	9.97	79		
	Anglicans	37.22	10.31	167		
	Catholics	36.25	11.42	162	0.46	0.808
	Muslims	38.16	8.48	44		
	Seventh D	39.67	12.6	9		
	Other	35.33	8.53	9		
	Total	36.88	10.49	470		
Education Level	PLE	36	11.31	2		
	UCE	35.85	11.22	210		
	UACE	36.03	10.05	33	1.75	0.108
	Certificate	34.9	11.58	39		

	Diploma	38.78	9.7	98		
	Bachelor	38.83	8.6	80		
	Master	33.78	9.99	9		
	Total	36.86	10.49	471		
Gender	Male	36.68	10.66	338		
	Female	37.22	10.02	132	0.25	0.615
	Total	36.83	10.48	470		

Source: Author (2024)

The ANOVA results in Table 4.16 indicate that teaching experience, religion, education level, and gender are insignificant determinants in comparing mean likelihood scores across the groups. This is due to the *p*-values for all factors exceeding the standard significance threshold of 0.05.

4.5 Multivariable Level Data Analysis

4.5.1 Structural Equation Model Diagram

The Structural Equation Model (SEM) graph presents the relationship between Online Teaching/Learning (OL) as the outcome variable and four key predictors: Classroom Management Competences (CRM), Pedagogical Competences (PED), Online Assessment and Evaluation Competences (AE), and Utilization of Online Digital Gadgets Competences (ODG). The model graph highlights the direct influences, covariances among predictors, and the explained variance in online teaching and learning.

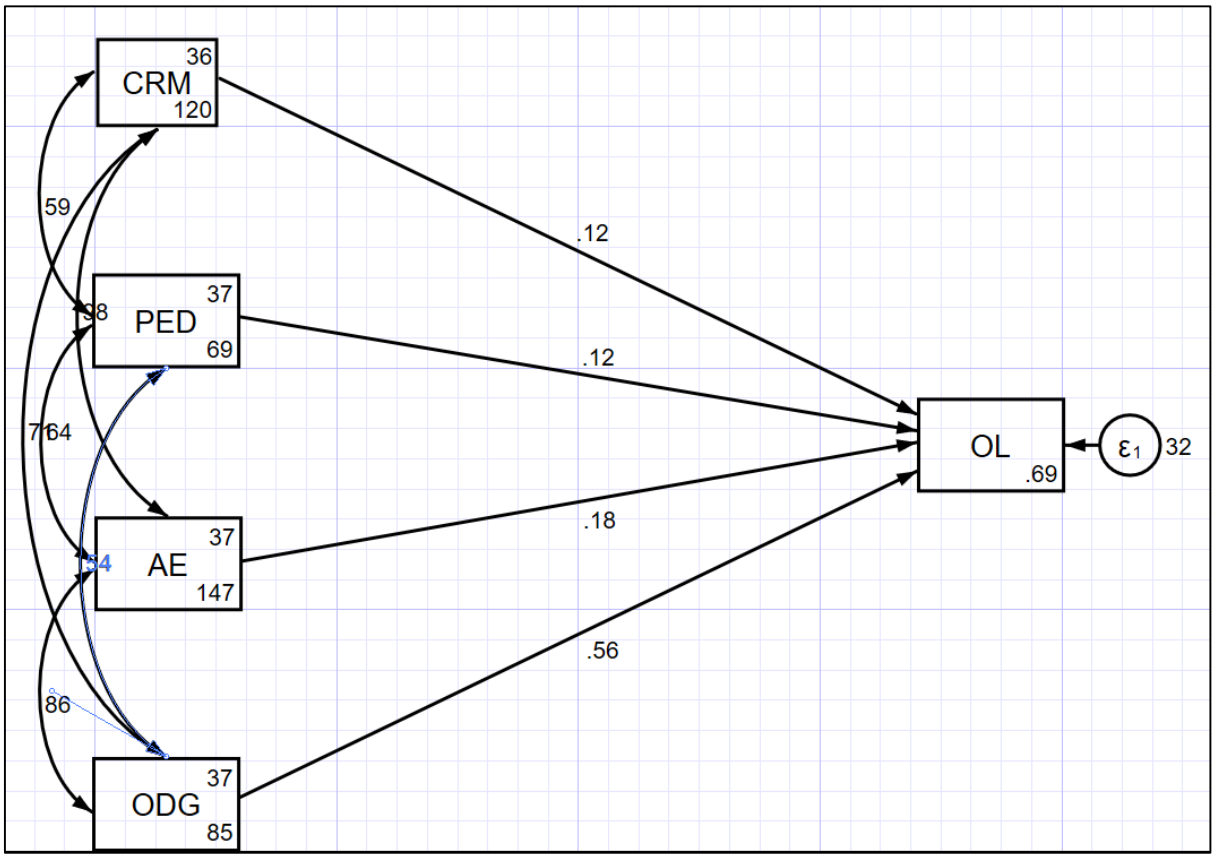


Figure 4. 8: Structural Equation Model Diagram (SEM)

According to figure 4.8, utilization of online digital gadgets competences (ODG) has the strongest positive effect on online learning, with a path coefficient of 0.56, emphasizing the critical role of digital tool usage in fostering successful online learning environments. Online assessment and evaluation competencies (AE) follow, with a moderate effect of 0.18, highlighting the importance of implementing effective assessment methods to sustain online learning. Classroom Management Competences (CRM) and Pedagogical Competences (PED) contribute equally, each with smaller but positive path coefficients of 0.12, indicating that these foundational skills, while essential, play a supportive role compared to ODG and AE in directly influencing the success of online teaching and learning.

Furthermore, the model reveals significant interrelationships among the four predictors, reflected in their covariances. The strongest covariance is observed between CRM and ODG (0.86), suggesting a high degree of interconnectedness between classroom management skills and the effective utilization of digital tools in online contexts. A substantial covariance is also found between PED and AE (0.64), indicating that robust pedagogical strategies are closely tied to the ability to assess and evaluate learners effectively in an online environment. Additionally, CRM and PED exhibit a strong covariance (0.59), underlining the interplay between teaching strategies and the ability to manage classroom dynamics, even in virtual settings.

4.5.2 Structural Equation Model Output

The Structural Equation Model output in Table 4.7 provides results from the contributions of various competences to the success of Online Teaching/Learning (OL).

Table 4. 14: Structural Equation Model Output

Structural Equation	OIM					
Online Learning	Coefficient	std. err.	z	P>|z|	[95% conf.	interval]
CRM	0.118248	0.038635	3.06	0.0020	0.042525	0.193971
PED	0.123505	0.046374	2.66	0.0080	0.032615	0.214396
AE	0.184814	0.037679	4.91	0.0000	0.110965	0.258663
ODG	0.556663	0.050205	11.09	0.0000	0.458263	0.655063
_cons	0.691214	1.243326	0.56	0.5780	-1.74566	3.128088
mean(CRM)	36.40127	0.503794	72.25	0.0000	35.41386	37.38869
mean(PED)	37.20382	0.383581	96.99	0.0000	36.45202	37.95563
mean(AE)	36.91932	0.558265	66.13	0.0000	35.82514	38.0135
mean(ODG)	36.72611	0.425475	86.32	0.0000	35.8922	37.56003
var(e.OL)	32.10716	2.092215			28.25755	36.4812
var(CRM)	119.5439	7.789899			105.2107	135.8296
var(PED)	69.30028	4.51585			60.99128	78.74125
var(AE)	146.7918	9.56547			129.1917	166.7896
var(ODG)	85.26469	5.556147			75.04157	96.88053
cov(CRM,PED)	58.91184	4.995758	11.79	0.0000	49.12034	68.70335
cov(CRM,AE)	98.22133	7.598677	12.93	0.0000	83.3282	113.1145
cov(CRM,ODG)	71.23517	5.69339	12.51	0.0000	60.07633	82.39401
cov(PED,AE)	63.76167	5.498169	11.6	0.0000	52.98545	74.53788
cov(PED,ODG)	54.0261	4.329253	12.48	0.0000	45.54092	62.51128
cov(AE,ODG)	86.10317	6.504924	13.24	0.0000	73.35375	98.85259

OL = online teaching/learning, CRM = classroom management competences, PED = pedagogical competences, AE = online assessment and evaluation competence, ODG = utilization of online digital gadgets competence

4.6 Interpretation of findings

4.6.1 Effect of Classroom Management Competence on Online Teaching

The coefficient for Classroom Management Competences (CRM) is 0.118, which means that a one-unit rise in CRM leads to about an 11.8% increase in online teaching and learning. This indicates that better classroom management competences are associated

with improved and effective online teaching/learning. Effective classroom management ensures a structured, organized, and productive virtual learning environment, which is essential for achieving teaching goals in online settings.

Effective management of online classrooms is critical for ensuring successful online teaching, particularly in technical and vocational education and training (TVET) institutions. Respondents consistently highlighted the need for instructor competence, technological infrastructure, and strategic planning to overcome challenges associated with online instruction. While some institutions made strides during the COVID-19 pandemic to integrate online platforms such as Zoom and EDMODO, others faced limitations in resources, instructor readiness, and student engagement. Below is a detailed analysis of respondents' insights:

An administrator at Nakawa VTC emphasized the importance of technical support in managing online classrooms. The institution relied on an ICT expert to handle technical aspects such as creating links and enrolling participants, allowing instructors to focus on scheduling and delivering lectures. This structured approach facilitated continuity in learning during the pandemic. In his words:

> *We started conducting online training during the COVID-19 pandemic using platforms like EDMODO and Zoom. Zoom turned out to be the best mode, managed by our ICT expert who creates links and enrolls participants. Our role involves scheduling lectures daily and coordinating submissions for the training schedule.*

The senior administrator at Nakawa VTC discussed the benefits of blending online learning with face-to-face instruction. He noted that theoretical lessons could be conducted online, thereby saving time and enabling higher enrolment, while practical training was reserved for physical workshops. She observed,

> *Switching to online blended with face-to-face teaching was necessitated by the pandemic. Online engagement saves time and supports higher enrolment despite limited campus infrastructure. Theoretical lessons are conducted online, reserving physical sessions for practical training.*

Another correspondent at the same TVET institute highlighted the challenges of managing online engagement, such as varying student backgrounds, limited access to laptops, and over-reliance on smartphones with limited capacity. He also called for government intervention to provide the necessary equipment for students and improve online learning systems. As he noted,

> *Online teaching faced challenges, including diverse student backgrounds, limited access to laptops, and over-reliance on smartphones. Some students did not take it seriously. Rwanda provides a better model with laptops for every student, indicating the need for similar government support in Uganda.*

A senior instructor who played a pioneering role in online instruction during COVID-19 reported the use of multiple platforms like Zoom, EDMODO, and WhatsApp to facilitate theoretical and practical lessons. While students and even parents engaged actively, persistent challenges included data limitations and instructor readiness. He remarked,

> *We initiated online teaching during the pandemic, combining Zoom and Edmodo for interactive theoretical lessons. Social platforms like WhatsApp helped with communication. However, challenges like data limitations and device access persisted, and instructor readiness remained a concern, reducing online activities after physical classes resumed.*

At Ntinda VTI, a notable administrator stated that online teaching was rare and largely dependent on individual instructors, with occasional ICT department-led sessions using platforms such as Zoom and Google Classroom. Assessments were often used to measure student engagement. He explained,

> *Online teaching here is rare and mostly dependent on individual instructors. Occasionally, the ICT department conducts online teaching, but it is not a common practice. They use various platforms such as Zoom and Google Classroom.*

In the same institute, another administrator acknowledged that the institution does not currently offer online classes due to limited internet access outside the ICT lab. He stated,

> *We don't have online classes at the moment. Yes, we have internet access, but it is only available in the ICT lab. Instructors and trainees do not have access to it from their departments.*

Furthermore, another administrator pointed to the lack of instructor training as a barrier to implementing online teaching. She suggested ICT training, orientation, and sensitization to improve understanding of online teaching systems. She noted,

> *There is no online teaching because instructors need ICT training. Orientation and sensitization about online teaching would help instructors understand the required systems and equipment.*

At Lugogo VTI, a significant administrator reported no institutional-level online teaching but mentioned personal efforts to conduct classes using Zoom. However, he stated that by leveraging PowerPoint presentations and encouraging students to share devices, he ensured participation despite resource constraints. He commented,

> *As an institution, we don't have online teaching. I have conducted private classes using Zoom. Students shared devices where needed, and I used PowerPoint for presentations, encouraging active participation.*

In Nyamitanga TI, one administrator asserted that online engagement was limited to meetings with stakeholders, with no structured online teaching in place. He stated,

> *We don't have online teaching. No, apart from online meetings with stakeholders like those facilitated by the World Bank or Rick.*

Another administrator noted efforts to explore online learning through stakeholder engagement. While schools had been closed entirely during COVID-19, some steps were taken to provide Wi-Fi and share materials through WhatsApp groups. He remarked,

> *Online learning has not started officially. During COVID-19, the complete shutdown of schools impacted performance and morale. We have provided Wi-Fi for research and assignments, but a comprehensive online learning strategy is yet to be adopted.*

4.6.2 Effect of pedagogical competence on online teaching

For pedagogical competence (PED), the coefficient is 0.124, which means that a one-unit rise in PED results in about a 12.4% increase in online teaching and learning. This suggests that strong and adaptable teaching strategies significantly contribute to improved and effective online education. Pedagogical competences provide the foundation for designing and delivering engaging and impactful learning experiences in virtual environments. Therefore, developing pedagogical competences for online instruction is crucial for enhancing the effectiveness of digital learning environments, particularly in technical and vocational education and training (TVET). Findings revealed that enhancing pedagogical competence by one unit would lead to a 12.4% increase in online teaching and learning. This was supported by various administrators in verbatim as follows:

Regarding pedagogy, an administrator at Nakawa VTC emphasized the importance of interactive teaching methods as a core pedagogical approach. While the institution lacks a dedicated studio, instructors utilize tools such as YouTube videos and PowerPoint presentations to illustrate concepts. He noted the importance of catering to individual differences, stating,

> *The core online teaching pedagogies, I think, are more interactive. Although we do not have a studio now, instructors utilize YouTube videos for illustration purposes and PowerPoint presentations. Each instructor plans their presentation depending on the content to ensure everyone is catered for.*

The second administrator at Nakawa VTC stressed the necessity of retraining instructors through continuous professional development. She highlighted the importance of adapting to evolving technologies and conducting periodic evaluations to ensure instructors meet performance objectives. She remarked,

> *Retraining is essential. Continuous professional development should be mandatory as technologies evolve rapidly. Programs must be set, followed up by training managers, and periodically appraised to ensure objectives are met.*

The third administrator emphasized the need for ICT compliance among instructors and training focused on curriculum interpretation, lesson planning, and preparing teaching materials. He also advocated for integrating continuous assessment and standardized test items to effectively evaluate student performance. He explained,

> *Instructors must first become ICT compliant. Training should focus on interpreting curricula, creating lesson plans, and preparing teaching materials, such as information sheets and worksheets.*

The last administrator at Nakawa VTC shared his experience in utilizing a combination of platforms like Zoom and Edmodo for theoretical lessons and WhatsApp for communication. Videos were segmented to improve accessibility, which enhanced student engagement and even drew parental interest. He observed,

> *We held interactive Zoom sessions for theoretical lessons and used WhatsApp for communication. Videos were segmented to make them more accessible. Students engaged well, and even some parents became interested in the process.*

One of the administrators at Ntinda VTI emphasized institutional efforts to support instructors by providing Wi-Fi access, organizing training seminars, and supplying lesson materials such as compact discs and pre-recorded lectures. She noted,

> *We provide Wi-Fi access, organize seminars for system training, and supply compact discs and videos of lessons. Some departments, like Automotive, have TVs where instructors play pre-recorded lectures.*

Another administrator at Ntinda VTI emphasized the importance of both training instructors and securing government support to provide necessary infrastructure and equipment. He stated,

> *Through training and providing the necessary resources. We also need government support to provide the infrastructure and equipment required for online teaching.*

Another administrator at Ntinda VTI stressed the role of capacity building in equipping instructors with ICT skills. She remarked,

> *Through capacity building and training in ICT skills. This will equip them with the ability to use technology effectively in their teaching.*

The first administrator at Ntinda VTI emphasized the need for retooling instructors in ICT, particularly those who began teaching before the digital era. He also called for both institutional and personal investments in tools like laptops. He commented,

> *Instructors should be retooled in ICT. Many of us started teaching before the digital era, so a shift from traditional chalk-and-board methods to ICT is needed.*

The second administrator at Nakawa VTC suggested training instructors to use simulations and digital tools effectively, especially for technical subjects. He noted that such initiatives would require substantial investment. He explained,

> *Instructors should receive training on using simulations and other digital tools. For example, if teaching motor vehicle mechanics, trainees could work with physical tools while instructors demonstrate remotely.*

Th**e** third administrator at Nyamitanga TI advocated for utilizing local materials for practical demonstrations, creating detailed lesson plans, and conducting intellectual meetings to share innovative strategies. He observed,

> *Utilize local materials for practical demonstrations, emphasize lesson preparation with schemes of work and lesson plans, conduct regular staff presentations, and blend video training with live demonstrations.*

4.6.3 Effect of Online Assessment and evaluation Competences on online teaching

The coefficient for Online Assessment and Evaluation competences (AE) is 0.185, meaning a one-unit increase in AE leads to an 18.5% increase in online teaching and learning. This highlights the critical role of competences in assessing and evaluating learners in online settings. This suggests that evaluation and assessment competences are essential for maintaining the integrity and effectiveness of online instruction. Respondents identified various tools and methods that have been or could be employed

to conduct fair and accurate assessments, while also highlighting the challenges faced in evaluating both theoretical and practical skills. A combination of digital platforms, innovative strategies, and infrastructural investment was recommended to enhance assessment capabilities.

The first administrator at Nakawa VTC described using platforms like Zoom and email for administering assignments, citing simplicity as a priority. While EDMODO was identified as a useful tool for structured assignments, it required significant training. He explained,

> *We use mainly Zoom and also emails because EDMODO was a bit hectic. For these other assignments, we can give through WhatsApp or email. They do the assignments and send back the work.*

The second administrator at Nakawa VTC emphasized the potential of simulators and platforms like Moodle for automating assessments. She noted that such tools provide fairness through randomization and automated feedback, reducing opportunities for academic dishonesty. She observed,

> *Simulators can automate assessments, ensuring fairness and accuracy. Moodle, for instance, provides random questions, making it difficult for students to cheat. Assignments can be submitted online, marked, and feedback provided automatically.*

The third administrator at Nakawa VTC highlighted that while online assessments are suitable for theoretical knowledge, practical skills require physical interaction. Simulators

could bridge this gap, but their cost and infrastructure requirements pose significant barriers. He noted,

> *Online assessments can work well for theoretical knowledge using tools like Moodle. However, practical skills, such as making a door or assembling a motor vehicle, require physical interaction. Simulators could bridge this gap, but they are costly and require substantial infrastructure investments.*

The fourth administrator at Nakawa VTC discussed the use of randomized questions and timed submissions to ensure fairness. Platforms like Rubistar and EDMODO were used to prevent collusion by providing unique questions for each student. He explained,

> *By using randomized questions and timed submissions, platforms like Rubistar and EDMODO ensured that each student had unique questions and limited opportunities for collusion. Once assessments were submitted, they could not be revisited, maintaining fairness.*

The first administrator at Ntinda VTI noted that the institution does not currently have advanced assessment systems due to the cost of ICT infrastructure. She suggested that adopting platforms like Moodle and MUELE, as used in Makerere University, would be beneficial but require substantial investment. She stated,

> *Currently, we do not have such systems in place due to the high cost of developing ICT infrastructure. A system like Moodle or MUELE as used in Makerere University would require significant investment in software development and student awareness.*

The second administrator at Ntinda VTI recommended using learning management systems with built-in modules for assignments and assessments. Tools like Zoom and simulations could also complement these systems for evaluations. He remarked,

> *Using learning management systems with modules for assignments and assessments could help. Additionally, tools like Zoom and simulations would be effective for evaluations.*

The third administrator at Ntinda VTI proposed developing apps for assignments and evaluations, allowing students to complete tasks and receive automated feedback, thereby streamlining the assessment process. She noted,

> *They could develop apps for setting and evaluating assignments where students can answer questions and receive automated feedback. This would streamline the assessment process.*

The first administrator at Lugogo VTI emphasized the importance of platforms like MUELE and suggested the use of open-book assessments and tools to detect academic dishonesty. Both summative and formative assessments could be adapted for online platforms. He explained,

> *Using tools like the MUELE platform at Makerere University could help. Open-book assessments and systems that detect academic dishonesty are vital. Summative and formative assessments can also be adapted for online platforms.*

The first administrator at Nyamitanga TI echoed the benefits of platforms like MUELE but highlighted challenges such as limited access to devices and the internet. He noted,

> *Platforms like Makerere University's MUELE could be adapted for TVET. Assignments could be uploaded, completed within a stipulated time, and submitted online. However, this requires reliable access to devices and the internet, which is currently a challenge.*

The second administrator at Nyamitanga TI stressed the importance of fostering originality in student work and suggested the use of assessment forms and strategic grouping of students. He also advocated for disciplinary action to address plagiarism. He explained,

> *Promote a culture of originality and authenticity in student work. Use assessment forms and group students strategically. Proofread reports and call out plagiarism for disciplinary action.*

4.6.4 Effect of the utilization of digital gadgets competence on online teaching

Utilization of online digital gadgets competences (ODG) has the highest coefficient at 0.557, indicating that a one-unit rise in ODG leads to a 55.7% increase in online teaching and learning. This reflects the central role of technological proficiency in enabling effective online education. Mastery of digital tools and platforms is vital for seamless delivery, engagement, and interaction in virtual classrooms, making ODG the most influential factor in the model.

The utilization of online teaching platforms plays a pivotal role in facilitating effective online instruction, particularly in technical and vocational education and training (TVET). Respondents highlighted a variety of platforms, each with distinct advantages and

challenges, underscoring the need for capacity building, infrastructure development, and strategic support to maximize their potential.

The first administrator at Nakawa VTC noted that platforms like Zoom and EDMODO were utilized during the COVID-19 pandemic, with Zoom becoming the preferred option due to its simplicity and ease of use. He stated,

> *We utilized Zoom and other new platforms such as EDMODO during the COVID-19 pandemic. However, the EDMODO platform needed specialized training, and we abandoned it for Zoom.*

The second administrator at Nakawa VTC identified platforms such as EDMODO and Moodle as effective tools but pointed out challenges related to infrastructure, connectivity, and limited instructor skills. She explained,

> *Platforms like EDMODO and Moodle have been used successfully in this institution, especially during the pandemic. However, challenges include lack of infrastructure, internet connectivity issues, and limited skills among instructors to run online classes effectively.*

The third administrator at Nakawa VTC emphasized the use of Moodle, TEELS (Teacher Education e-Learning System), and Padlet, while highlighting issues of affordability, access, and limited adoption of advanced multimedia tools common in international settings. He noted,

> *Platforms like Moodle, TEELS, and Padlet are used. However, affordability and access are challenges. There is also limited use of advanced multimedia tools, which are common in international settings.*

The fourth administrator at Nakawa VTC discussed using platforms such as Zoom, WhatsApp, Google Classroom, and EDMODO. He stressed the need for capacity building to enhance instructor proficiency in technology use and content creation. He observed,

> *Common platforms include Zoom, WhatsApp, Google Classroom, and EDMODO. Capacity building and continuous training are necessary for instructors to transition from basic technology literacy to advanced content creation.*

The first administrator at Ntinda VTI pointed out that zoom and Google Classroom are the most commonly used platforms but emphasized the lack of infrastructure as a major limitation. She suggested adopting systems like Moodle and MUELE, as seen in Makerere University, though this would require significant investment. She stated, "

> *Zoom and Google Classroom are the most commonly used platforms. Systems like Moodle and MUELE used in Makerere University would require significant investment in software development and student awareness.*

The second administrator at Ntinda VTI revealed the importance of training instructors to equip them with the necessary skills for using online teaching platforms effectively. He remarked,

> *Currently, they do not have the capacity. Training is essential to equip them with the necessary skills.*

The third administrator at Ntinda VTI identified Zoom and Google Meet as the most commonly used platforms, with WhatsApp serving as an informal communication tool. She noted,

> *I think Zoom and Google Meet are commonly used platforms. WhatsApp can also be used for communication, but it is more informal.*

The first administrator at Lugogo VTI added Glen to the list of platforms, along with Zoom and Google Meet, as commonly used tools for online instruction. He explained,

> *Zoom, Google Meet, and Glen are some platforms I am familiar with. These are commonly used for online instruction.*

The first administrator at Nyamitanga TI highlighted the adaptability of platforms like WhatsApp for online teaching, especially given its increasingly interactive features. He noted,

> *Platforms like Zoom, Google Meet, and WhatsApp are commonly known and can be used effectively. WhatsApp, in particular, has become more interactive with features similar to Zoom.*

The second administrator at Nyamitanga TI reiterated the use of Google Meet, Zoom, and WhatsApp for sharing information and conducting online classes. He observed,

> *Google Meet, Zoom, and shared information platforms like WhatsApp.*

4.7 Addressing Technical Issues Hindering Online Teaching in TVET

The covariances among the competences reveal strong interdependencies, emphasizing their integrated nature. For instance, the covariance between CRM and PED is 58.91, reflecting the complementary relationship between classroom management and teaching strategies in supporting online education. Similarly, CRM and AE exhibit a strong covariance of 98.22, suggesting that effective classroom management is closely tied to

robust evaluation practices. Additionally, ODG and AE show a high covariance of 86.10, indicating that proficiency with digital tools enhances the implementation of effective assessment strategies. This suggests that managing technical challenges is crucial for ensuring the effectiveness of online classes. Respondents acknowledged a range of issues, from connectivity problems and limited access to resources to the need for capacity building among instructors and students. Institutions have adopted diverse strategies to mitigate these challenges, though systemic barriers, such as poor infrastructure and resource constraints, persist.

The first administrator at Nakawa VTC pointed out that some technical issues, such as poor network connectivity, are beyond their control, while others, like students' inability to afford internet bundles, stem from resource constraints at an individual level. He explained,

> *There are technical issues, some that can be within us and others that are beyond us. Technical issues have to do with poor network; we cannot manage to overcome those technical issues. Then, other technical issues deal with maybe students lacking resources to buy bundles. Because this one is on an individual basis, you facilitate your own learning. So even if you don't have the facilities, you may not be able to also manage that.*

The second administrator at Nakawa VTC highlighted infrastructure and resource challenges, including unstable electricity and expensive internet requiring high bandwidth. She also emphasized the need for instructor training to effectively use online tools and simulators for teaching and assessment. In her words,

> *Challenges include unstable electricity, expensive internet requiring high bandwidth, and costly server hosting. On the learners' side, access to devices and internet is a barrier. Instructors also need training to effectively use multimedia tools, online resources, and simulators for both teaching and assessment.*

The first administrator at Nakawa VTC focused on mindset change among instructors, stressing the need for proper selection criteria emphasizing practical skills over academic qualifications. He noted,

> *The primary challenge is attitude and mindset change among instructors. There is a need for proper selection criteria for TVET trainers, emphasizing skills over academic qualifications. Practical assessments should be included during recruitment to ensure trainers are capable of handling technical tasks.*

The second administrator at Ntinda VTI reported that the institution provides Wi-Fi in the ICT lab to support instructors and trainees. However, many instructors prefer physical classes due to students' lack of data for online sessions. If online engagement fails, instructors often revisit the material in physical classes. She stated,

> *Most instructors prefer physical classes because of challenges such as students lacking data to attend online classes. The institute provides Wi-Fi in the ICT lab, which instructors and trainees can use. If online engagement fails, instructors recap lectures physically.*

The first administrator at Nyamitanga TI emphasized that technical skills in TVET require face-to-face demonstrations, which cannot be effectively replaced by online teaching. He

pointed out systemic challenges, such as unreliable connectivity, lack of gadgets, and unmotivated instructors. He noted the importance of sensitizing and building the capacity of trainers and trainees to understand the benefits of online teaching. He explained,

> *For TVET, online teaching would be more theoretical. Technical skills require physical demonstrations for instructors to identify weaknesses and impart competencies effectively. Our students come from rural backgrounds and need face-to-face training to understand concepts clearly. Instructors are often unmotivated without supervision, network connectivity is unreliable, and many lack the required gadgets. Even students might not have access to devices or the internet. Sensitization and capacity building are needed for both trainers and trainees to understand the benefits of online teaching.*

The transition to online instruction has yielded notable successes and presented key challenges in technical and vocational education and training (TVET). Respondents highlighted improvements in ICT skills, enhanced knowledge sharing, and successful training programs as significant achievements while emphasizing the need for infrastructure, policy development, and capacity building to address ongoing challenges

4.8 Discussion of Findings

Instructor competence in utilizing digital technologies is strongly correlated with effective online learning outcomes. Specifically, the ability to effectively operate online platforms and digital devices, including establishing and maintaining internet connectivity (e.g., configuring internet access and connecting to fiber optic networks), was identified as a primary factor contributing to successful online TVET instruction.

Furthermore, competence in online assessment and evaluation constituted a significant secondary factor. This encompasses the instructors' capacity to leverage online platforms for conducting assessments and evaluating student performance. Finally, classroom management and pedagogical competence demonstrated comparable levels of influence on the effectiveness of online TVET delivery.

4.8.1 Influence of TVET Instructors' online classroom management on online teaching in TVET institutions in Uganda.

The hypothesis that online classroom management competence does not influence online teaching and learning was rejected by this study. Findings from the pairwise correlation revealed that the correlation between online learning (OL) and classroom management competences (CRM) is high. This demonstrated that TVET instructors who demonstrated stronger classroom management competences were more likely to manage online teaching environments effectively. Classroom management in online settings requires skills like engaging students, organizing resources, and addressing disruptions, which are integral to successful online instruction. In addition, the SEM model showed that a unit rise in classroom management competence (CRM) is linked to an 11.8% increase in online teaching and learning. This finding agrees and disagrees with a plethora of other previous studies. To begin with, Mesuwini (2024) found that poor classroom management competence was related to a significant number of failures in the TVET. He advised that addressing the challenges and acquiring a data-free learning management system could enhance online teaching and learning. This study result was also supported by Mesuwini and Mokoena (2024), who pointed out that lecturers face challenges in online teaching and learning, including technical difficulties, limited interaction, and access issues. This

was augmented by Tshewang, Sarki and Wangmo (2023), who pointed to the technical handling and management of the equipment required and necessary for online learning as the single number one limitation to Sustainable Development Goal 4 of inclusive, equitable education and lifelong learning. In Malaysia, Saud, Noor, Kamin, Hamid and Hisham (2022) reported that the management of an interactive learning environment and learning syllabus were key catalysts for effective online learning in TVET. Conversely, Srivishagan, Madhusankha, Munasinghe, Danthanarayana and Samarasinghe (2022) asserted that despite the substantial role of the management of online teaching, the TVET sector requires physical presence for practical lessons. This was also quoted verbatim by various respondents in the qualitative research. For instance, the Principal of Nyamitanga Technical Institute revealed that online learning would reduce the TVET learning concept to the theoretical model, yet technical skills require physical demonstrations for instructors to identify weaknesses and impart competencies effectively.

4.8.2 Influence of TVET instructors' pedagogical competences on online teaching in TVET institutions in Uganda.

The hypothesis that instructor pedagogical competence does not influence online teaching was rejected in favor of the alternative, suggesting that the instructor’s pedagogical competence played a key role in shaping online teaching in TVET. Results from the pairwise correlation indicated that there was a moderately strong correlation between the pedagogical competence of the instructors and online teaching. Besides, the structural equation model showed that a one-unit rise in pedagogical competence resulted in a 12.4% increase in online teaching and learning in TVET. This finding received significant support from previous empirical works. With anywhere access, online pedagogy is more

successful than in-person pedagogy in providing TVET practical skills training (Mutebi, Wanjala Kerre, & Mubichakani, 2023). Through instructional strategies including inquiry, problem-based learning, active learning, viewing students as knowers, and demonstration, TVET instructors in Nigeria can enhance their application of guiding pedagogical concepts (Okolie, Ogwu, Osuji, Ogba, Igwe, & Obih, 2021). Online teaching and learning present lecturers with several hurdles, such as limited contact, access problems, and technical pedagogical difficulties, especially in the interaction and demonstration of real-life phenomena (Mesuwini & Mokoena, 2024; Ronald Mutebi, Bonaventure W Kerre, & Joseph Mubichakani, 2023). Particularly, the lack of ICT equipment, poor internet connectivity, lack of feedback and real-time interaction, poor course/training design, and electricity outages are the top challenges of online pedagogy for TVET practical skills training delivery and assessment. In addition, Museene (2018) noted that despite the importance of training in enhancing pedagogical knowledge, understaffing and a large influx of learners negatively affect knowledge transmission (Museene, 2018).

4.8.3 Influence of Instructors' Evaluation and Assessment Competences on Online Teaching in TVET Institutions in Uganda.

Similarly, the hypothesis that assessment and evaluation competence does not influence online teaching in TVET was void. Results from both pairwise correlation and the regression model showed that this competence is very necessary as it allows the instructors to examine their learners in a more flexible environment. Particularly, the pairwise correlation showed that there was a strongly positive correlation between assessment and evaluation and online teaching in TVET. Research has consistently

emphasized the importance of assessment competences for successful online teaching. For instance, Tang et al. (2022) demonstrated that instructors' digital competences, including evaluation and assessment skills, are critical for navigating online teaching effectively. Their study validated a framework for measuring instructors' abilities in creating adaptable assessments, thereby supporting a positive relationship between evaluation competences and effective online instruction (Tang, Gu, & Xu, 2022). Similarly, Zenouzagh (2019) explored the role of formative and summative online assessments in improving teaching competences. The findings indicated that structured feedback mechanisms through assessment tools significantly enhanced teacher preparedness and online teaching quality, suggesting a strong link between assessment skills and instructional success (Mohamadi Zenouzagh, 2018). Despite the predominant support for the positive role of assessment competences, some studies have presented challenges associated with implementing online assessments effectively. Handayani, Ramadhan, Maharani, Cakrawati and Mukhidin (2023) noted that while instructors understand the theoretical importance of evaluation in online learning, practical limitations such as technological barriers, lack of parental support, and limited access to devices hinder the effective application of these competences (Handayani, Ramadhan, Maharani, Cakrawati, & Mukhidin, 2023). Moreover, Orleans (2010) argued that fully online teacher training programs, while beneficial for improving assessment knowledge, often fail to address the skill-based components of evaluation, such as designing practical assessments. This limitation suggests that without additional interventions, the positive influence of assessment competences on online teaching may not be fully realized (Orleans, 2010).

4.8.4 Influence of instructors' capacity to utilize digital teaching platforms on online teaching in TVET institutions in Uganda.

Finally, the hypothesis that instructors' competence in handling and utilizing digital teaching tools and platforms was resoundingly rejected in this study. Matter of fact, results revealed that this competence was the single most significant factor of online teaching in TVET. This indicated that proficiency in using digital tools such as learning management systems, video conferencing software, and multimedia resources is critical for effective online teaching. Mastery of these tools enables instructors to create engaging and efficient online learning environments. The results from the SEM regression output revealed that a one-unit rise in online digital competence leads to a 55.7% increase in online teaching and learning. The study by Songkram, Chootongchai, Thanapornsangsuth, Osuwan, Piromsopa, Chuppunnarat and Songkram (2023) highlights that success in promoting digital learning platforms depends on factors like education policy, online classroom management, and training methods. Their findings align with the results of this study by emphasizing the critical role of instructors' proficiency in digital tools for enhancing online learning outcomes. The study proposed structured training and institutional support as essential elements for improving the utilization of digital platforms (Songkram, Chootongchai, Thanapornsangsuth, Osuwan, Piromsopa, Chuppunnarat, & Songkram, 2023).

Similarly, Sehar and Alwi (2023) identified a strong correlation between instructors' digital competence and their ability to manage online classrooms effectively. The study concluded that high levels of digital literacy empower instructors to create engaging learning environments, thereby improving teaching outcomes. This reinforces the

argument that digital competence is a critical determinant of success in online teaching (Sehar & Alwi, 2023). Another study by Mousa, Mohd Zaid, Abuhassna and Mohammed (2024) identifies the transformative role of digital platforms in enhancing instructor performance. It highlights the importance of designing tools that align with instructors' needs and emphasizes ongoing development to sustain the integration of digital teaching technologies (Mousa, Mohd Zaid, Abuhassna, & Mohammed, 2024). On the contrary, a study by Labuguen and Cabrillas (2023) found that while instructors may exhibit high confidence in using digital tools, gaps in advanced digital literacy can limit their ability to leverage the full potential of these platforms. The study highlighted the need for targeted professional development programs to address these deficiencies (Labuguen & Cabrillas, 2023).

Additionally, Yu et al. (2024) noted that instructors' perspectives on digital teaching vary significantly based on experience and academic background. While many instructors recognize the benefits of digital platforms, challenges such as resistance to change and limited access to resources persist, impacting the effectiveness of these tools in online teaching (Yu et al., 2024).

4.9 Chapter Summary

This chapter provided the results and interpretation of findings starting with the response rate calculation, univariate analysis focusing on the distributions of participants characteristics, bivariate analysis focusing on possible associations, mean differences, and correlation matrices. In addition, the chapter covered multivariable analysis level focusing on the models for predicting the influence of various competences on effective online teaching.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter concludes the study. It entails a summary of findings, the conclusions, recommendations, and suggestions for future research.

5.2 Summary of Findings

Classroom management, pedagogical competence, assessment and evaluation, digital tool utilization, and effective online teaching all showed strong reliability, with alphas of 0.89, 0.82, 0.93, and 0.87, respectively.

Convergent validity was confirmed with 98.1% of items (51 out of 52) showing a correlation coefficient greater than 0.400, indicating a strong correlation with intended dimensions.

The study demonstrated satisfactory diversity validity, with 84.6% of items (44 out of 52) showing a higher correlation with their dimension scores than with other dimensions.

Classroom Management aligned moderately with other dimensions, likely reflecting TVET's focus on traditional classroom dynamics. Online tools and teaching items contribute strongly, while pedagogical competence items show weaker associations. Assessment/evaluation and classroom management items cluster tightly, consistently capturing intended constructs.

Table 4.3 shows that 54% of participants were from the Eastern region, with the largest proportion of TVET institutions visiting being from this region. Many participants were Anglicans or Pentecostals (36%), followed by Catholics (34%). Born Again Christians constituted 17%.

Most participants were trainees (58%), followed by instructors (41%). The majority were under 25, with smaller proportions aged 26-35, 36-45, 46-55, and over 55. Males dominated the sample (72%), with females accounting for 28%.

Many participants were single (64%), mostly trainees, with 35% married. Most had UCE qualifications (45%), followed by diploma holders (21%), certificate holders (8%), and bachelor's degrees (17%). Only a small number had master's degrees or primary-level education.

The study found that 72% of TVET instructors had experience with online teaching, with varying levels of experience. Most had 1-5 years of experience, with the majority living in urban areas, while the rest were rural.

The digital divide, lack of access to gadgets, and low socioeconomic status are major barriers to online learning, with 29.77% citing gadgets, 17.56% stating non-online courses, 16.03% lacking awareness, and 12.21% unable to use online platforms.

The bar chart shows that 50.21% of respondents have stayed in an institution for 1-5 years, with 30.64% being newer entrants. Longer durations were more common, with 9.57% staying for 6-10 years and 9.57% for more than 10 years.

The pie chart shows Iganga TI has the largest participation, accounting for 34.82% of the total, followed by Ntinda VTI at 21.02%. Other institutions include Jinja VTI, Nakawa VTC, Nyamitanga TI, and Minakulu TI.

The study found significant associations between background characteristics and online teaching in TVET institutions, with religion significantly influencing it. The region of belonging also influenced online teaching, with Eastern regions having 65% of participants, while Western, Northern, and Central regions had higher proportions.

Marital status and gender significantly influenced online teaching engagement, with married participants more likely to engage (80%) and male participants more likely to have online teaching experience (75%).

Instructors were more likely to engage in online teaching (80%) than trainees (66%), and age also played a significant role, with 87% of participants aged 36-45 years.

Education level significantly influenced online teaching engagement, with those with bachelor's degrees or diplomas reporting higher engagement rates, while those with lower qualifications showed lower participation rates.

The study found a significant association between online teaching and participation in various fields, with welding and fabrication having the highest participation rates.

The study found a significant positive correlation between instructor competences and online teaching, with the strongest correlation being the use of digital gadgets. Effective evaluation practices, classroom management, and pedagogical competence also play a

crucial role in online learning. Therefore, the use of digital tools and familiarity with online teaching platforms are essential for effective online teaching.

Online Digital Gadgets Competences (ODG) significantly impact online learning, with a path coefficient of 0.56. Online Assessment Competences (AE) are moderately influential, while Classroom Management (CRM) and Pedagogical Competences (PED) had an equal contribution to the success of online teaching.

5.3 Conclusion of Study Findings

The pairwise correlation indicated a significant positive connection ($r = 0.6917$) between classroom management competence (CRM) and online teaching, demonstrating that the ability to manage classrooms effectively plays a pivotal role in ensuring successful online instruction. This highlights the importance of skills such as maintaining order, engaging students, and fostering interaction in virtual learning environments. The regression results further validated this relationship, as classroom management competence exhibited a positive and statistically significant coefficient ($\beta = 0.118$, $p = 0.002$). This finding implies that a one-unit increase in classroom management competence resulted in an 11.8% improvement in the quality of online teaching. The relatively moderate magnitude of the coefficient suggests that while classroom management contributes to online teaching, its impact may be secondary to other competences.

The importance of technical support and structured scheduling was emphasized as essential for effective online teaching, with an ICT expert managing platforms and proper scheduling, ensuring organization. A blended learning model, combining online theoretical sessions with in-person practical activities, was proposed to optimize

resources and increase enrollment. To address accessibility issues, government intervention was called for, particularly in providing laptops for students, following Rwanda's model. Additionally, improved instructor readiness and technological literacy were identified as key, with calls for training in tools like Zoom and Edmodo and segmenting videos for better accessibility. However, infrastructure limitations and insufficient training were noted as barriers to online teaching, with increased investment in both areas recommended. ICT illiteracy among instructors was also highlighted as a significant challenge, suggesting mandatory training programs. Private initiatives, such as conducting online classes through Zoom and encouraging resource sharing, were proposed to address device shortages. Lastly, collaboration with stakeholders was recommended to explore online learning systems, with suggestions for government-provided Wi-Fi, cheaper data bundles, and blended learning models to enhance access and flexibility.

5.3.2 Effect of pedagogical competence on online teaching

The correlation analysis revealed a strong positive link ($r = 0.6581$) between pedagogical competence (PED) and online teaching, highlighting the critical role of instructional design and teaching strategies in enhancing student engagement and learning in virtual settings.

The regression output confirmed the importance of pedagogical competence, as evidenced by a significant coefficient ($\beta = 0.123$, $p = 0.008$). This indicates that a one-unit increase in pedagogical competence was associated with a 12.3% enhancement in online teaching effectiveness. The findings emphasize the necessity of equipping

instructors with the pedagogical skills required to create interactive and adaptable online learning experiences. Based on the qualitative findings, the importance of pedagogical competences in effective online instruction was emphasized by multiple respondents, focusing on interactive teaching methods, continuous professional development, and the integration of digital tools to enhance learning experiences.

Interactive teaching methods were emphasized as a core pedagogical approach, with instructors using tools like YouTube videos and PowerPoint presentations to illustrate concepts, despite limited access to advanced studios. It was stressed that lesson planning should cater to individual differences to address students' varying capabilities. Mandatory retraining and continuous professional development programs for instructors were recommended to adapt to technological advancements, with programs monitored and linked to performance evaluations. ICT compliance among instructors was also highlighted, with a focus on training for curriculum interpretation, lesson planning, and preparing teaching materials, as well as integrating continuous assessment and standardized tests to evaluate student performance.

The use of platforms like Zoom and EDMODO for theoretical lessons and WhatsApp for communication was shared as a successful approach to foster engagement, with segmented videos improving accessibility. At Ntinda VTI, efforts were made to support instructors by providing Wi-Fi, system training seminars, and compact discs with pre-recorded lessons. The need for further instructor training and government support for infrastructure was emphasized. Capacity building in ICT skills was identified as crucial for effective technology integration into teaching. The shift from traditional to ICT-based

teaching methods was also noted, with a call for institutional support and personal investment in digital tools like laptops.

5.3.3 Effect of Online Assessment and evaluation Competences on online teaching

The pairwise correlation showed a strong positive association ($r = 0.7450$) between online assessment and evaluation competences (AE) and online teaching. This result highlights the essential role of assessment and evaluation in providing structured feedback, measuring learning outcomes, and maintaining academic integrity in online environments. The regression results affirmed this influence, with assessment and evaluation competences yielding a significant and impactful coefficient ($\beta = 0.185$, $p < 0.001$), indicating that a one-unit improvement in these competences led to an 18.5% enhancement in the effectiveness of online teaching. Among the competences analyzed, AE was one of the strongest impacts, highlighting its critical role in shaping successful online instruction. In this regard, the ability to evaluate and assess students effectively in online environments is critical for maintaining academic integrity, providing timely feedback, and ensuring learning outcomes are achieved. Respondents highlighted various tools, strategies, and challenges in implementing evaluation and assessment competences in online teaching.

Platforms like Zoom, emails, and WhatsApp were noted for their simplicity in distributing and collecting assignments, while EDMODO, though effective, required more training and was considered complex. Simulators and platforms like Moodle were highlighted for their potential to automate assessments, ensuring fairness and accuracy, with Moodle's ability to randomize questions reducing cheating. While online assessments were suitable

for theoretical knowledge, practical skills, such as motor vehicle assembly, still required physical interaction, though simulators could help bridge this gap with significant infrastructure investment.

Platforms like Rubistar and EDMODO, with randomized questions and timed submissions, were used to minimize collusion, ensuring fairness. However, high ICT infrastructure costs hindered the adoption of advanced assessment systems. Moodle and MUELE were suggested as effective platforms, but would require substantial investment and awareness-building by the Ministry of Education and Sports. Custom applications to streamline assessments and provide automated feedback were proposed as a solution. There was support for adapting both summative and formative assessments to online platforms, with open-book assessments and tools for detecting academic dishonesty being recommended.

Challenges such as unreliable internet and limited access to devices were acknowledged, particularly in using platforms like MUELE for assignment submissions. Promoting originality in student work through strategic groupings, using assessment forms, and proofreading reports to detect plagiarism was emphasized, with disciplinary actions suggested for violations.

5.3.4 Effect of the utilization of digital gadgets' competence on online teaching

The pairwise correlation revealed the strongest relationship (r = 0.8113) between the utilization of digital gadgets competence (ODG) and online teaching. This finding underscores the foundational role of digital tools in enabling effective online instruction by facilitating multimedia delivery, interaction, and content management. The regression

results further highlighted the critical importance of this competence, with digital gadget utilization competence yielding the highest coefficient among all competences ($\beta = 0.557$, $p < 0.001$). This implies that a one-unit increase in competence in utilizing digital tools resulted in a remarkable 55.7% improvement in online teaching effectiveness. These results indicated that mastery of digital tools is the most influential factor in ensuring success in online teaching. This can be evidenced by suggestions offered by key informants from the qualitative interviews as follows.

The findings showed that platforms such as Zoom, WhatsApp, Google Classroom, and Google Meet were commonly used for online teaching, particularly during the COVID-19 pandemic. These platforms were favoured for their user-friendliness and accessibility, with Zoom standing out as the most popular due to its ease of use. Despite their popularity, challenges such as insufficient infrastructure, poor connectivity, and a lack of instructor proficiency limited their full potential. Advanced platforms like EDMODO and Moodle were seen as useful, but their implementation faced hurdles due to the need for specialized training and technical expertise, which were not always readily available.

In terms of teaching tools, platforms like Moodle, TEALS, and Padlet were recognized for their value in online instruction, though their affordability and accessibility remained significant barriers, particularly in institutions with limited resources. The integration of advanced multimedia tools, commonly used in international settings, was difficult to achieve due to these constraints.

There was a strong emphasis on the need for continuous capacity building and training for instructors. Effective online teaching requires instructors to go beyond basic

technology literacy and move towards creating more interactive and engaging content. This training should focus on leveraging the interactive features of these platforms to enhance the learning experience.

The lack of advanced assessment systems in many institutions was another key issue, particularly due to the high cost of ICT infrastructure. While platforms like Moodle and MUELE were identified as potential solutions, their adoption would require significant investment in software development and awareness-building among instructors and students.

Furthermore, it was noted that while online assessments work well for theoretical knowledge, practical skills, such as those required in technical subjects, still necessitate physical interaction. Simulators were suggested as a potential solution, but they would require substantial investment in infrastructure.

Despite the challenges, platforms like WhatsApp were seen as a valuable supplement to formal teaching tools, enabling effective communication and engagement. The use of informal tools like WhatsApp also highlighted the importance of adaptability in the face of technological limitations.

5.4 Recommendations

5.4.1 Effect of Classroom Management Competence on Online Teaching

1. To improve classroom management competence in online teaching, TVET institutions should invest in structured training programs that focus on virtual

classroom management techniques, such as maintaining student engagement and fostering participation in digital environments.

2. TVET institutions should invest heavily in equipping their instructors and sending them for workshops for professional research and development on managing online virtual programs.
3. The government of Uganda should provide funding and support for developing guidelines and frameworks to help instructors adapt their classroom management strategies to online settings.
4. TVET institutions should adapt monitoring and evaluation strategies for the implementation of online teaching policies across TVET institutions
5. TVET institutions should ensure inclusive access to online learning resources for all instructors and learners.

5.4.2 Effect of Pedagogical Competence on Online Teaching

1. To address the impact of pedagogical competence, TVET institutions should prioritize continuous professional development programs tailored to online teaching.
2. These programs should include training on curriculum adaptation, lesson planning, and the use of interactive teaching methods suitable for virtual platforms.
3. The government of Uganda should support these efforts by establishing national standards for online pedagogy and providing incentives for instructors to participate in training.

4. Institutions should also encourage peer learning and the sharing of innovative teaching strategies to strengthen pedagogical skills.
5. The ministry of education and sports should develop an ICT in Education Policy with a focus on integrating digital technologies into teaching, learning, and institutional administration which will enhance the integration of digital instructional methods and tools into TVET curricula.
6. Ministry of Education and Sports should develop national standards for instructor digital competences in TVET.
7. The government should provide more funding for continuous instructor training in digital pedagogy.

5.4.3 Effect of Online Assessment and Evaluation Competences on Online Teaching

1. To enhance evaluation and assessment competences, TVET institutions should integrate learning management systems like Moodle or MUELE, which facilitate automated and randomized assessments to ensure fairness and academic integrity.
2. The government should allocate resources for developing ICT infrastructure and subsidize the acquisition of assessment tools.
3. Training workshops on designing and implementing online assessments should be mandatory for instructors, emphasizing both theoretical and practical evaluation methods.
4. Institutions should also establish policies to promote originality and combat academic dishonesty in online assessments.

5. The government should invest in institutional digital infrastructure and learning management systems to support for online teaching and institutional capacity building.
6. TVET institutions should implement performance evaluations and feedback mechanisms to monitor and enhance instructors' classroom management skills in online teaching.

5.4.4 Effect of Utilization of Digital Gadgets Competence on Online Teaching

1. To strengthen the use of digital gadgets in online teaching, TVET institutions should collaborate with the private sector and donors (PPP) to equip instructors with essential digital tools such as laptops and multimedia equipment.
2. The government of Uganda should invest in improving internet connectivity nationwide and subsidizing the cost of digital devices to make them accessible to instructors and students.
3. Capacity-building initiatives, including hands-on training in the use of digital gadgets and software, should be implemented to ensure instructors can fully leverage available tools for effective online teaching.
4. The ministry of education and sports should develop an ICT in Education Policy with a focus on integrating digital technologies into teaching, learning, and institutional administration which will enhance the integration of digital instructional methods and tools into TVET curricula

5.5 Suggestions for Further Research

Assess the suitability and effectiveness of various digital platforms, simulation tools, and interactive techniques used in delivering skills-based content in TVET institutions with emphasis on practices that replicate hands-on training in virtual settings.

Studies should also examine the role of advanced technologies, such as artificial intelligence, augmented reality and virtual reality, in enhancing pedagogical, assessment, and classroom management competences.

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APPENDICES

Appendix I: Informed Consent

Dear respondents,

Did you know that technical and vocational education and training (TVET) institutions play a crucial role in equipping individuals with practical skills and knowledge for the job market? And that over the years, advancements in technology have brought about transformative changes in education, including the emergence of online learning. The journey of TVET institutions from traditional classroom-based instruction to the integration of digital tools provides insights into the changing dynamics of technical and vocational education. The researcher is a student at the University of Eldoret pursuing a course leading to an award of a degree of Doctor of Philosophy in the Department of Technology Education and is carrying out a study entitled ‘‘Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda’’ as part of the academic requirement.

The research and data thereof shall be used for academic purposes only. The identity of respondent shall remain anonymous. Please, spare a little time to answer the questionnaire. In case you need further information, do not hastate to contact me on telephone at +256779558170 / +256 701382738 and email aatam64@yahoo.com

Respondent: ……. Signature: …… Date: ……

Researcher: ……. Signature: …… Date: ……

Appendix II: Questionnaire for the Instructors

Title: Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda.

Introduction

Hello, I am Kisu Mohammed Aata, a Postgraduate student pursuing a **Doctor of Philosophy (PhD) in Technology Education (TVET option)** at the University of Eldoret. As part of the partial requirements for my graduation, I am conducting a study on the influence of instructor competences on effective online teaching in TVET institutions in Uganda. I want to invite you to participate in this study by answering some questions about your perception of your competences and how they influence effective online teaching and learning in TVET institutions. This questionnaire will take about 15 minutes to complete. Your participation is voluntary and confidential. You can skip any question you do not want to answer or stop the questionnaire at any time. Thank you for your cooperation.

Background Information

Date: ……. Region …… District …….

Name of Institute: …….

Participant category: **Instructors from selected TVET institutions**

Section A: Demographic Characteristics

What is your:

1. Age:
    1) Below 25 [ ]

2) 26-35 [ ]
3) 36-45 [ ]
4) 46-55 [ ]
5) Above 55 [ ]

2. Gender:
    1) Male
    2) Female
3. Highest Level of Education
    1) Diploma
    2) Bachelor's Degree
    3) Master's Degree
    4) Doctorate
    5) Others…please specify
4. Field of Instruction:
    1) Engineering and Technology
    2) Health Sciences
    3) Business and Management
    4) Information Technology
    5) Education
    6) Other. Kindly specify……
5. Have you been teaching online?
    1) Yes
    2) No
6. If yes, how many years of experience do you have in online teaching?
    1) Less than 1 year
    2) 1-3 years
    3) 4-6 years
    4) 7-10 years
    5) More than 10 years

Section B: Socio-Economic Background

8. What is your Monthly Income:

    1) Below UGX 500,000

    2) UGX 500,001-1,000,000

    3) UGX 1,000,001-2,500,000

    4) 2500,001- 5,000,000

    5) 5,000,0001and more

9. What is your Location Type:

1) Urban
2) Rural

10. What is your highest education level?

1) Certificate
2) Diploma
3) Bachelor's degree
4) Master's degree or higher

11. How long have you been teaching in this TVET institution?

1) Less than 1 year
2) 1-5 years
3) 6-10 years
4) More than 10 years

12. What type of employment do you have?

1) Permanent full-time
2) Permanent part-time
3) Contractual
4) Freelance

13. Do you have any secondary sources of income?

1) Yes
2) No
3) If yes, please specify: _____

14. How many dependents do you have?

1) None
2) 1-2
3) 3-4
4) 5 or more

15. What are your primary areas of financial expenditure? (Select all that apply)

1) Housing
2) Education
3) Healthcare
4) Transportation
5) Leisure activities
6) Savings/investments
7) Other: _____

Section C: Online Teaching

16. Do you have access to internet?

1) Yes
2) No

17. If yes, how often do use the internet in a day?

1) 1 hour
2) 2 hours
3) 3 hours
4) 4 hours
5) 5+ hours

18. If no, what do you think are the reasons why your institution has no access to internet? (Multiple Responses)

1) There is no ICT infrastructure in place
2) The administration only recognizes physical interaction (Lack of admin support)
3) Lack of specialized training with online
4) There are no programs suited for online teaching

5) The cost of ICT and online learning is high and problematic
6) The integration of online with practical here is a complex idea
7) Most of us are not competitive enough to handle online teaching
8) Lack of digital tools such as smartphones, laptops, tablets, and projectors

19. What major activities do you use this internet for?

1) Strictly for online teaching
2) For searching for new information
3) For assessment and evaluation
4) For interaction with the learners
5) For personal development and online teaching
6) For administrative tasks related to my role
7) For personal use (e.g., social media, entertainment, etc)
8) Other (Please specify) ……

20. Where do most of your online teaching activities take place?

1) At work (Institution)
2) At home
3) Any other (Specify) …….

21. Who provides this internet connectivity to you?

1) The institution
2) My personal investment
3) Government
4) Funders as donations and grants
5) Through Public-private partnership
6) Other (Please specify) …….

22. Which of the following digital devices provides internet during your online teaching?

1) Smartphone Mobile Hotspots
2) Wireless Routers

3) Tablets with Cellular Data
4) Modems/Mifi/ Routers
5) Network Switches
6) Access Points
7) Fiber Optic Connections

23. What is your main/primary device for online teaching:

1) Desktop Computer
2) Laptop
3) Tablet
4) Smartphone

Instructions: Before you begin, please read each statement carefully and indicate your level of agreement based on your experiences. Use the following scale for your response:

Expectation: Reflect on your experiences with how you manage online classes, handle technical issues, and foster a positive online learning environment.

Section C: Instructor Management Competence for Online Classes

- SD (Strongly Disagree) - You completely disagree with the statement.
- D (Disagree) - You disagree with the statement.
- N (Neutral) - You neither agree nor disagree with the statement.
- A (Agree) - You agree with the statement.
- SA (Strongly Agree) - You completely agree with the statement.

	Statements	**SD**	**D**	**N**	**A**	**SA**
1.	I effectively manage and organize online class activities.					
2.	I utilize online classroom management tools effectively.					
3.	I ensure that online classes start and end as scheduled.					
4.	I facilitate an inclusive online learning environment that respects diversity.					
5.	I monitor student participation and engagement in online classes.					
6.	I address technical issues promptly to minimize disruptions.					
7.	I promote a sense of community among online learners.					
8.	I set clear expectations for online behavior and netiquette.					
9.	I use feedback from students to improve online class management.					

Expectation: Consider how you use different teaching methods to meet students' needs and enhance the online learning experience.

Section D: Instructor's Pedagogical Competence

	Statements	SD	D	N	A	SA
1.	I apply diverse pedagogical strategies suitable for online environments.					
2.	I engage students in active learning through collaborative activities.					
3.	I provide timely and constructive feedback to students.					
4.	I adapt teaching methods to meet diverse learning needs.					
5.	I incorporate critical thinking and problem-solving activities in my lessons.					
6.	I use technology to enhance pedagogical effectiveness.					
7.	I facilitate student reflection on their learning process.					
8.	I ensure that learning objectives are clear and achievable.					
9.	I integrate real-world examples to enhance relevance.					
10	I encourage and manage productive online discussions.					

Expectation: Think about the assessment strategies you use, the feedback you provide, and how assessments contribute to the learning process.

Section E: Instructor's Evaluation and Assessment Competence

	Statements	SD	D	N	A	SA
1.	I am proficient in designing online assessments and evaluations that accurately measure student understanding.					
2.	I effectively utilize a variety of digital assessment and evaluation tools and strategies that are appropriate for online learning environments.					
3.	I maintain the integrity and fairness of online assessments and evaluation, ensuring that they are secure and unbiased.					
4.	I provide diverse options for students to demonstrate their learning online, accommodating different learning styles and needs.					
5.	I use the results of online assessments and evaluations to inform and adapt my future teaching strategies.					
6.	I provide timely and constructive feedback on online assessments and evaluations to enhance student learning.					
7.	I ensure that all online assessments and evaluations are directly aligned with the learning objectives of the course.					
8.	I actively involve students in the online assessment process, including self-assessments and evaluations.					
9.	I ensure that all students have equal access to online assessments and evaluations, regardless of their technical resources or personal circumstances.					
10	I regularly review and update my online assessment and evaluation practices to reflect technological advancements and pedagogical best practices.					

11	I have reliable access to the necessary technology and infrastructure required to administer and monitor online assessments and evaluations.					

Expectation: Reflect on how you use digital tools to create engaging and interactive online learning environments.

Section F: Instructor's Capacity to Utilize Online Digital Tools

	Statements	**SD**	**D**	**N**	**A**	**SA**
1.	I am proficient in using digital tools for online teaching.					
2.	I integrate multimedia resources to enhance the learning experience.					
3.	I continuously update my knowledge in using new online teaching technologies.					
4.	I use online tools to foster interactive and engaging learning environments.					
5.	I am comfortable troubleshooting basic technical issues for myself and students.					
6.	I explore and adopt new technologies that can improve online teaching.					
7.	I ensure digital tools are accessible to all students.					
8.	I use technology to provide personalized learning experiences.					
9.	I effectively manage digital resources for easy access and use.					
10.	I encourage students to use digital tools for learning and collaboration.					

Expectation: Evaluate your online learning experiences across these dimensions, considering aspects like the scheduling of classes, the relevance and organization of course materials, the support provided to students, and the value of the online course.

Section G: Effective Online Learning (Dependent Variable)

	Statements	**SD**	**D**	**N**	**A**	**SA**
1.	Online classes are conducted on time.					
2.	The content delivered online is accurate and well-organized.					
3.	Online learning is efficient, and effective, and enhances understanding.					
4.	The approach to online learning is student-centered.					
5.	Online learning platforms used are flexible and easy to navigate.					
6.	I ensure that online courses are inclusive and cater for diverse learning needs.					
7.	I regularly seek feedback from students to improve the effectiveness of online learning.					

8.	I measure the success of online learning through students' achievements and feedback.					
9.	Online learning resources are regularly updated to stay relevant and effective.					
10.	I facilitate and support students' ability to work independently through online resources.					

Adoption Likelihood of Online Learning Versus Traditional Classrooms

On a scale of 1 to 10, with 1 being the least likely and 10 being the most likely, how likely are you to adopt online learning as your primary mode of instruction in the future, compared to traditional physical classrooms?

_____

Preference Scale for Online Versus Physical Classroom Delivery

On a scale of 1 to 10, with 1 indicating a strong preference for physical classroom teaching and 10 indicating a strong preference for online teaching, where do you currently place your preference for delivering your courses?"

_____

Thank you for your insightful responses!!

Appendix III: Questionnaire for Trainees

Dear respondent, I am **Kisu Mohammed Aata**, conducting a study on "Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda'' leading to the award of a DEGREE OF DOCTOR OF PHILOSOPHY (PhD) IN TECHNOLOGY EDUCATION (TVET OPTION) at University of Eldoret, Kenya. With honor, I would like to inform you that you have been purposively and randomly selected to provide relevant information on the above topic of study. This study is purely for academic purposes, and the information discussed will be treated with utmost confidentiality.

The purpose of this study is to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.

This questionnaire tool is purely anonymous; you do not need to indicate your name anywhere. My humble request is that you provide information at will without pressure, and you are free to withdraw it.

Section A: Demographic and Background Information

1. Gender:

1) Male
2) Female

2. Age: _____

3. Program of Study: (Check all that apply)

1) Automotive Mechanics
2) Electrical Installation
3) Plumbing
4) Welding and Fabrication
5) Fashion and Garment Design

4. Residence Status:

1) Urban

2) Rural

5. Religion:

1) Catholic
2) Anglican
3) Muslim
4) SDA (Seventh-day Adventist)
5) Other (Please Specify): _____

6. District of Origin: _____

7. Previous Qualification:

1) Primary Education
2) Secondary Education
3) Vocational Training
4) Other (Please Specify): _____

8. Are you pursuing a:

1) National Certificate
2) Competency Based Certificate

For each section of the questionnaire that relates to the study objectives, I'll design 5-point Likert scale statements (where 1 = Strongly Disagree, 5 = Strongly Agree) to better assess instructors' management of online classrooms, their pedagogical competences, evaluation and assessment competences, and their capacity in utilizing online teaching platforms for effective instruction in TVET institutions in Uganda.

Section B: Instructors' Management of Online Classrooms

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

1.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
2.	The online classroom environment is effectively managed by the instructors.					
3.	Instructors ensure equitable access to ICT infrastructure for all students.					
4.	The use of ICT infrastructure significantly enhances the effectiveness of instruction in TVET institutions.					
5.	Instructors demonstrate proficient use of digital tools and technology in teaching.					
6.	Effective communication is maintained between instructors and students in the online classroom.					

Section C: Instructor Pedagogical Competences

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

1.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
2.	Instructors effectively manage online classrooms.					
3.	Instructors provide clear guidelines for online learning.					
4.	Instructors address technical issues promptly.					
5.	Online courses have organized and accessible learning materials.					
6.	Instructors use engaging teaching methods online.					
7.	Instructors address individual student needs online.					

Section D: Instructors' Evaluation and Assessment Competences

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

1.	Statements	SD	D	N	A	SA
2.	Instructors provide timely and constructive feedback on assessments and exams.					
3.	The evaluation methods used by instructors accurately reflect students' understanding and mastery of the subject matter.					
4.	Instructors effectively use digital tools for conducting assessments and exams.					
5.	The assessment strategies used by instructors encourage critical thinking and problem-solving skills.					
6.	Feedback from instructors on assessments is clear, helpful, and enhances learning outcomes.					

Section E: Instructors' Capacity in Utilization of Online Teaching Platforms

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

1.	Statements	SD	D	N	A	SA
2.	Instructors are well-trained in utilizing online teaching platforms for instruction.					
3.	Instructors effectively integrate digital resources and materials into their teaching.					
4.	Online teaching platforms used by instructors are accessible and user-friendly for students.					
5.	Instructors employ interactive teaching strategies that effectively engage students in the online environment.					
6.	Instructors are adaptive and continually seek to improve their use of online teaching platforms to enhance instruction effectiveness.					

Adoption Likelihood of Online Learning Versus Traditional Classrooms

On a scale from 1 to 10, where 1 represents the least likelihood and 10 the highest likelihood, how likely are you to prefer online learning as your main method of study in the future, in contrast to traditional in-person classrooms?

_____

Preference Scale for Online Versus Physical Classroom Delivery

On a scale from 1 to 10, with 1 showing a strong preference for learning in physical classrooms and 10 showing a strong preference for online learning, where do you currently rank your preference for receiving your education?

_____

Thank you for your insightful responses!

Appendix IV: Combined Questionnaire

Questionnaire for the Instructors

Title: Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda.

Introduction

Hello, I am Kisu Mohammed Aata, a Postgraduate student pursuing a **Doctor of Philosophy (PhD) in Technology Education (TVET option)** at the University of Eldoret. As part of the partial requirements for my graduation, I am conducting a study on the influence of instructor competences on effective online teaching in TVET institutions in Uganda. I want to invite you to participate in this study by answering some questions about your perception of your competences and how effective online teaching and learning are in TVET institutions. This questionnaire will take about 15 minutes to complete. Your participation is voluntary and confidential. You can skip any question you do not want to answer or stop the questionnaire at any time. Thank you for your cooperation.

Background Information

Date: ……. Region …… District …….

Name of Institute: …….

Participant category: **Instructors from selected TVET institutions**

Section A: Demographic Characteristics

What is your:

7. Age:
    6) Below 25 [ ]
    7) 26-35 [ ]
    8) 36-45 [ ]
    9) 46-55 [ ]
    10) Above 55 [ ]
8. Gender:
    3) Male
    4) Female
9. Highest Level of Education
    6) Diploma
    7) Bachelor's Degree
    8) Master's Degree

9) Doctorate
10) Others…please specify

10. Field of Instruction:
    7) Engineering and Technology
    8) Health Sciences
    9) Business and Management
    10) Information Technology
    11) Education
    12) Other. Kindly specify……
11. Have you been teaching online?
    3) Yes
    4) No
12. If yes, how many years of experience do you have in online teaching?
    6) Less than 1 year
    7) 1-3 years
    8) 4-6 years
    9) 7-10 years
    10) More than 10 years

Section B: Socio-Economic Background

8. What is your Monthly Income:
    6) Below UGX 500,000
    7) UGX 500,001-1,000,000
    8) UGX 1,000,001-2,500,000
    9) 2500,001- 5,000,000
    10) 5,000,0001and more
9. What is your Location Type:
    3) Urban
    4) Rural
10. What is your highest education level?
    5) Certificate
    6) Diploma
    7) Bachelor's degree
    8) Master's degree or higher
11. How long have you been teaching in this TVET institution?
    5) Less than 1 year
    6) 1-5 years
    7) 6-10 years
    8) More than 10 years
12. What type of employment do you have?
    5) Permanent full-time
    6) Permanent part-time
    7) Contractual
    8) Freelance
13. Do you have any secondary sources of income?

4) Yes
5) No
6) If yes, please specify: _____

14. How many dependents do you have?
5) None
6) 1-2
7) 3-4
8) 5 or more

15. What are your primary areas of financial expenditure? (Select all that apply)
8) Housing
9) Education
10) Healthcare
11) Transportation
12) Leisure activities
13) Savings/investments
14) Other: _____

Section C: Online Teaching

16. Do you have access to internet?
3) Yes
4) No

17. If yes, how often do use the internet in a day?
6) 1 hour
7) 2 hours
8) 3 hours
9) 4 hours
10) 5+ hours

18. If no, what do you think are the reasons why your institution have no access to internet? (Multiple Responses)
9) There is no ICT infrastructure in place
10) The administration only recognizes physical interaction (Lack of admin support)
11) Lack of specialized training with online
12) There are no programs suited for online teaching
13) The cost of ICT and online learning is high and problematic
14) The integration of online with practicals here is a complex idea
15) Most of us are not competitive enough to handle online teaching
16) Lack of digital tools such as smartphones, laptops, tablets, and projectors

19. What major activities do you use this internet for?
9) Strictly for online teaching
10) For searching for new information
11) For assessment and evaluation
12) For interaction with the learners
13) For personal development and online teaching
14) For administrative tasks related to my role
15) For personal use (e.g., social media, entertainment, etc)
16) Other (Please specify) ……

20. Where do most of your online teaching activities take place?
    4) At work (Institution)
    5) At home
    6) Any other (Specify) …….
21. Who provides this internet connectivity to you?
    7) The institution
    8) My personal investment
    9) Government
    10) Funders as donations and grants
    11) Through Public-private partnership
    12) Other (Please specify) …….
22. Which of the following digital devices provides internet during your online teaching?
    8) Smartphone Mobile Hotspots
    9) Wireless Routers
    10) Tablets with Cellular Data
    11) Modems/Mifi/ Routers
    12) Network Switches
    13) Access Points
    14) Fiber Optic Connections
23. What is your main/primary device for online teaching:
    5) Desktop Computer
    6) Laptop
    7) Tablet
    8) Smartphone

Instructions: Before you begin, please read each statement carefully and indicate your level of agreement based on your experiences. Use the following scale for your response:
Expectation: Reflect on your experiences with how you manage online classes, handle technical issues, and foster a positive online learning environment.

Section C: Instructor Management Competence for Online Classes

- SD (Strongly Disagree) - You completely disagree with the statement.
- D (Disagree) - You disagree with the statement.
- N (Neutral) - You neither agree nor disagree with the statement.
- A (Agree) - You agree with the statement.
- SA (Strongly Agree) - You completely agree with the statement.

	Statements	**SD**	**D**	**N**	**A**	**SA**
1.	I effectively manage and organize online class activities.					
2.	I utilize online classroom management tools effectively.					
3.	I ensure that online classes start and end as scheduled.					
4.	I facilitate an inclusive online learning environment that respects diversity.					
5.	I monitor student participation and engagement in online classes.					
6.	I address technical issues promptly to minimize disruptions.					
7.	I promote a sense of community among online learners.					
8.	I set clear expectations for online behavior and netiquette.					
9.	I use feedback from students to improve online class management.					

Expectation: Consider how you use different teaching methods to meet students' needs and enhance the online learning experience.

Section D: Instructor's Pedagogical Competence

	Statements	SD	D	N	A	SA
11	I apply diverse pedagogical strategies suitable for online environments.					
12	I engage students in active learning through collaborative activities.					
13	I provide timely and constructive feedback to students.					
14	I adapt teaching methods to meet diverse learning needs.					
15	I incorporate critical thinking and problem-solving activities in my lessons.					
16	I use technology to enhance pedagogical effectiveness.					
17	I facilitate student reflection on their learning process.					
18	I ensure that learning objectives are clear and achievable.					
19	I integrate real-world examples to enhance relevance.					
20	I encourage and manage productive online discussions.					

Expectation: Think about the assessment strategies you use, the feedback you provide, and how assessments contribute to the learning process.

Section E: Instructor's Evaluation and Assessment Competence

	Statements	SD	D	N	A	SA
12.	I am proficient in designing online assessments and evaluations that accurately measure student understanding.					
13.	I effectively utilize a variety of digital assessment and evaluation tools and strategies that are appropriate for online learning environments.					
14.	I maintain the integrity and fairness of online assessments and evaluation, ensuring that they are secure and unbiased.					
15.	I provide diverse options for students to demonstrate their learning online, accommodating different learning styles and needs.					
16.	I use the results of online assessments and evaluations to inform and adapt my future teaching strategies.					
17.	I provide timely and constructive feedback on online assessments and evaluations to enhance student learning.					
18.	I ensure that all online assessments and evaluations are directly aligned with the learning objectives of the course.					
19.	I actively involve students in the online assessment process, including self-assessments and evaluations.					
20.	I ensure that all students have equal access to online assessments and evaluations, regardless of their technical resources or personal circumstances.					
21.	I regularly review and update my online assessment and evaluation practices to reflect technological advancements and pedagogical best practices.					
22.	I have reliable access to the necessary technology and infrastructure required to administer and monitor online assessments and evaluations.					

Expectation: Reflect on how you use digital tools to create engaging and interactive online learning environments.

Section F: Instructor's Capacity to Utilize Online Digital Tools

	Statements	SD	D	N	A	SA
11.	I am proficient in using digital tools for online teaching.					
12.	I integrate multimedia resources to enhance the learning experience.					
13.	I continuously update my knowledge in using new online teaching technologies.					
14.	I use online tools to foster interactive and engaging learning environments.					
15.	I am comfortable troubleshooting basic technical issues for myself and students.					
16.	I explore and adopt new technologies that can improve online teaching.					
17.	I ensure digital tools are accessible to all students.					
18.	I use technology to provide personalized learning experiences.					
19.	I effectively manage digital resources for easy access and use.					
20.	I encourage students to use digital tools for learning and collaboration.					

Expectation: Evaluate your online learning experiences across these dimensions, considering aspects like the scheduling of classes, the relevance and organization of course materials, the support provided to students, and the value of the online course.

Section G: Effective Online Learning (Dependent Variable)

	Statements	SD	D	N	A	SA
11.	Online classes are conducted on time.					
12.	The content delivered online is accurate and well-organized.					
13.	Online learning is efficient, and effective, and enhances understanding.					
14.	The approach to online learning is student-centered.					
15.	Online learning platforms used are flexible and easy to navigate.					
16.	I ensure that online courses are inclusive and cater for diverse learning needs.					
17.	I regularly seek feedback from students to improve the effectiveness of online learning.					
18.	I measure the success of online learning through students' achievements and feedback.					
19.	Online learning resources are regularly updated to stay relevant and effective.					
20.	I facilitate and support students' ability to work independently through online resources.					

Adoption Likelihood of Online Learning Versus Traditional Classrooms

On a scale of 1 to 10, with 1 being the least likely and 10 being the most likely, how likely are you to adopt online learning as your primary mode of instruction in the future, compared to traditional physical classrooms?

_____

Preference Scale for Online Versus Physical Classroom Delivery

On a scale of 1 to 10, with 1 indicating a strong preference for physical classroom teaching and 10 indicating a strong preference for online teaching, where do you currently place your preference for delivering your courses?"

Thank you for your insightful responses!!

Questionnaire for Trainees

Dear respondent, I am **Kisu Mohammed Aata**, conducting a study on "Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda'' leading to the award of a DEGREE OF DOCTOR OF PHILOSOPHY (PhD) IN TECHNOLOGY EDUCATION (TVET OPTION) at the University of Eldoret, Kenya. With honor, I would like to inform you that you have been purposefully and randomly selected to provide relevant information on the above topic of study. This study is purely for academic purposes, and the information discussed will be treated with utmost confidentiality.

The purpose of this study is to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.

This questionnaire tool is purely anonymous; you do not need to indicate your name anywhere. My humble request is that you provide information at will without pressure, and you are free to withdraw it.

Section A: Demographic and Background Information

1. Gender:
    3) Male
    4) Female
2. Age: _____
3. Program of Study: (Check all that apply)
    6) Automotive Mechanics
    7) Electrical Installation
    8) Plumbing
    9) Welding and Fabrication
    10) Fashion and Garment Design
4. Residence Status:
    3) Urban
    4) Rural
5. Religion:
    6) Catholic
    7) Anglican
    8) Muslim
    9) SDA (Seventh-day Adventist)
    10) Other (Please Specify): _____
6. District of Origin: _____
7. Previous Qualification:
    5) Primary Education

6) Secondary Education
7) Vocational Training
8) Other (Please Specify): _____

8. Are you pursuing a:
3) National Certificate
4) Competency-Based Certificate

For each section of the questionnaire that relates to the study objectives, I'll design 5-point Likert scale statements (where 1 = Strongly Disagree, 5 = Strongly Agree) to better assess instructors' management of online classrooms, their pedagogical competences, evaluation and assessment competences, and their capacity in utilizing online teaching platforms for effective instruction in TVET institutions in Uganda.

Section B: Instructors' Management of Online Classrooms

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Statements	**SD**	**D**	**N**	**A**	**SA**
The online classroom environment is effectively managed by the instructors.					
Instructors ensure equitable access to ICT infrastructure for all students.					
The use of ICT infrastructure significantly enhances the effectiveness of instruction in TVET institutions.					
Instructors demonstrate proficient use of digital tools and technology in teaching.					
Effective communication is maintained between instructors and students in the online classroom.					

Section C: Instructor Pedagogical Competences

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Statements	**SD**	**D**	**N**	**A**	**SA**
Instructors effectively manage online classrooms.					
Instructors provide clear guidelines for online learning.					
Instructors address technical issues promptly.					
Online courses have organized and accessible learning materials.					
Instructors use engaging teaching methods online.					
Instructors address individual student needs online.					

Section D: Instructors' Evaluation and Assessment Competences

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Statements	**SD**	**D**	**N**	**A**	**SA**
Instructors provide timely and constructive feedback on assessments and exams.					
The evaluation methods used by instructors accurately reflect students' understanding and mastery of the subject matter.					
Instructors effectively use digital tools for conducting assessments and exams.					
The assessment strategies used by instructors encourage critical thinking and problem-solving skills.					
Feedback from instructors on assessments is clear, helpful, and enhances learning outcomes.					

Section E: Instructors' Capacity in Utilization of Online Teaching Platforms

Rate on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree).

Statements	**SD**	**D**	**N**	**A**	**SA**

Instructors are well-trained in utilizing online teaching platforms for instruction.					
Instructors effectively integrate digital resources and materials into their teaching.					
Online teaching platforms used by instructors are accessible and user-friendly for students.					
Instructors employ interactive teaching strategies that effectively engage students in the online environment.					
Instructors are adaptive and continually seek to improve their use of online teaching platforms to enhance instruction effectiveness.					

Adoption Likelihood of Online Learning Versus Traditional Classrooms

On a scale from 1 to 10, where 1 represents the least likelihood and 10 the highest likelihood, how likely are you to prefer online learning as your main method of study in the future, in contrast to traditional in-person classrooms?

_____

Preference Scale for Online Versus Physical Classroom Delivery

On a scale from 1 to 10, with 1 showing a strong preference for learning in physical classrooms and 10 showing a strong preference for online learning, where do you currently rank your preference for receiving your education?

_____

Thank you for your honest and insightful responses!

Appendix V: Interview Schedule for the Administrators (Principals, Deputy Principals, Academic Registrars, Deans of Students)

Title: ‘‘Influence of Instructor Competences on effective online teaching in TVET institutions in Uganda’’

Introduction: The researcher, **Kisu Mohammed Aata**, is a student at the University of Eldoret pursuing a course leading to an award of a DEGREE OF DOCTOR OF PHILOSOPHY (PhD) IN TECHNOLOGY EDUCATION (TVET OPTION**)** at the University of Eldoret, Kenya. With honour, I would like to inform you that you have been purposively and randomly selected to provide relevant information on the above topic of study. This study is only for academic purpose and the information discussed will be treated with utmost confidentiality.

The purpose of this study is to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda. By examining the competences required for effective online teaching, this study seeks to provide insights that can guide the professional development of instructors and enhance the overall effectiveness of online education in the Ugandan TVET context.

This interview guide tool is purely anonymous; you do not need to indicate your name anywhere. My humble request is that you provide information at will without pressure, and you are free to withdraw it.

Demographic Information

1. Please state your name (optional) and your position within the TVET institution.

2. How many years have you been working in TVET administration?

3. Can you describe the size and scope of the TVET institution you are a part of, such as the number of instructors and students, and the range of programs offered?

Objective I: Management of Online Classrooms for Effective Online Instruction

4. How do instructors in your institution manage student engagement and participation in online classrooms to ensure effective instruction?

5. In what ways do TVET instructors address technical challenges that both they and students face in online classrooms?

Objective II: Pedagogical Competences for Effective Online Instruction

6. How do you support TVET instructors to develop their pedagogical skills for online teaching?

7. How do TVET instructors adapt their teaching strategies to cater for diverse learning needs in the online environment?

Objective III: Evaluation and Assessment Competences for Effective Online Instruction

8. What methods do TVET instructors use to evaluate and assess student performance in online courses?

9. How do instructors ensure the integrity and fairness of assessments conducted online?

Objective IV: Utilization of Online Teaching Platforms for Effective Online Instruction

10. What online teaching platforms are most commonly used by TVET instructors in your institution, and why?

11. How do TVET instructors enhance their technical skills to effectively utilize these online teaching platforms for effective online teaching instruction?

Closing Question

12. Is there any additional information you would like to share about the challenges or successes in implementing online learning within your TVET institution?

Appendix VI: Research Work Plan

The study was envisaged to take Thirty-six months (Years I, II and III).

ACTIVITIES	Year One		Year Two		Year Three	
	Sep - Dec 2022	Jan – April 2023	Aug - Dec 2023	Jan - April 2024	Aug - Dec 2024	Jan–Nov 2025
Concept Note and Research proposal submission and University approval						
Research Proposal submission, Presentations to the department and School of education						
Data collection, cleaning, transformation, reduction and analysis						
Thesis Report writing, draft's submission and Defense						
Thesis Defense and graduation						

Appendix VII: Research Budget

Exchange rate: 1Ksh = 32.3 Ugx

ITEM	**Quantity**	**Unit cost (Kshs)**	**Uganda Shillings.**	**Kenya shillings**
Stationery/Report writing and other learning materials	6 semesters		1,744,200	**54,000**
University fees	6 Semesters		19,509,200	**604,000**
PhD Guidance	1		969,000	**30,000**
Graduation fees and Alumni membership	1		193,800	**6,000**
Certificate storage fees	1		32,300	**1,000**
Transport from Kampala to Malaba border (return journey)	6 semesters	1,238	40,000	**178,272**
Transport from Malaba to and from Eldoret Town	TBD	500	2,325,600	**72,000**
Transport from Eldoret Town to Eldoret Main Campus	Four times per semester	100	775,200	**24, 000**
Accommodation in Eldoret Town			5,232,600	**162,000**
Subsistence at Eldoret Town			5,232,600	**162,000**
Data and Internet			1,080,000	**33,436**
Research		625,000	20,000,000	**625,000**
Supervisors' Facilitation While in Uganda?	Hotel costs and inland transport per supervisor (once a year, for two years)	6,192	2,000,000	**12,384**
Totals			**59,136,500/= ugx**	**1,830,852/= kes**

Appendix VIII: Nakawa Vocational Training College

The field staff team being introduced to Nakawa VTC administrators just before main data collection.

Appendix IX: Ntinda Vocational Training Institute

Upon arrival at the premises of Ntinda Vocational Training Institute for data collection

Appendix X: Jinja Vocational Training Institute

Data collection field team after a successful field at Jinja VTI

Appendix XI: Iganga Technical Institute

The field staff team posing for a group photo with the Principal of Iganga TI, and the principal researcher

Appendix XII: Lugogo Vocational Training Institute

Research team with Lugogo VTI administrators

The field staff team had a brief with the Lugogo administrators just before the data collection

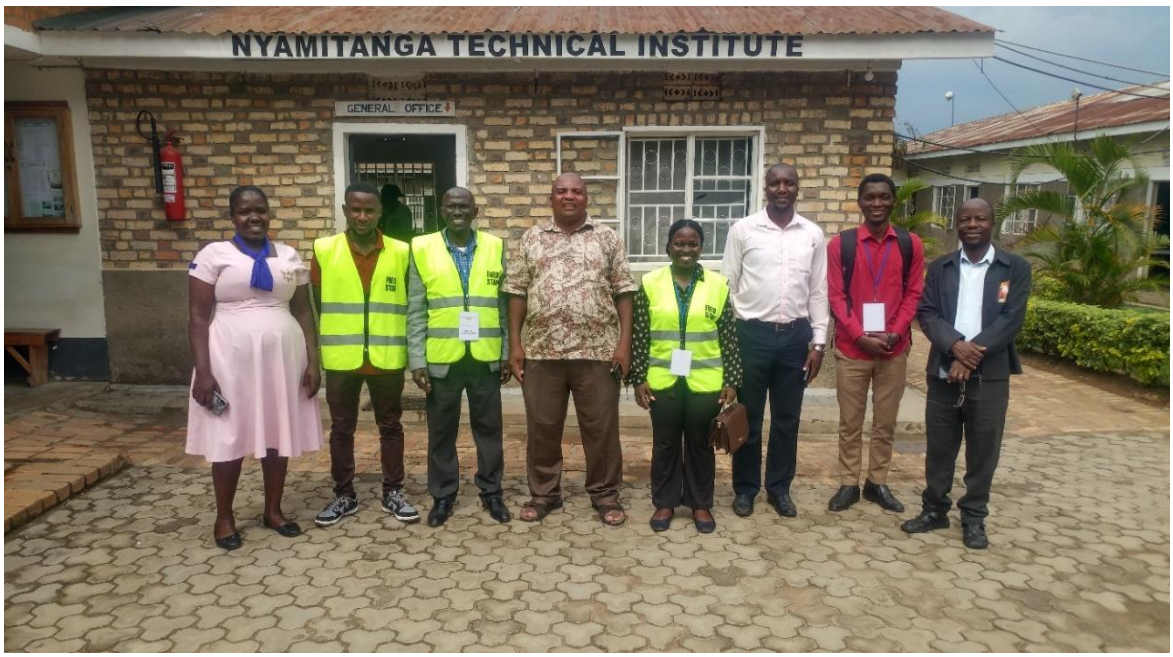
Appendix XIII: Minakulu Technical Institute

Field staff team posing for a photo with the principal at Minakulu TI in Gulu

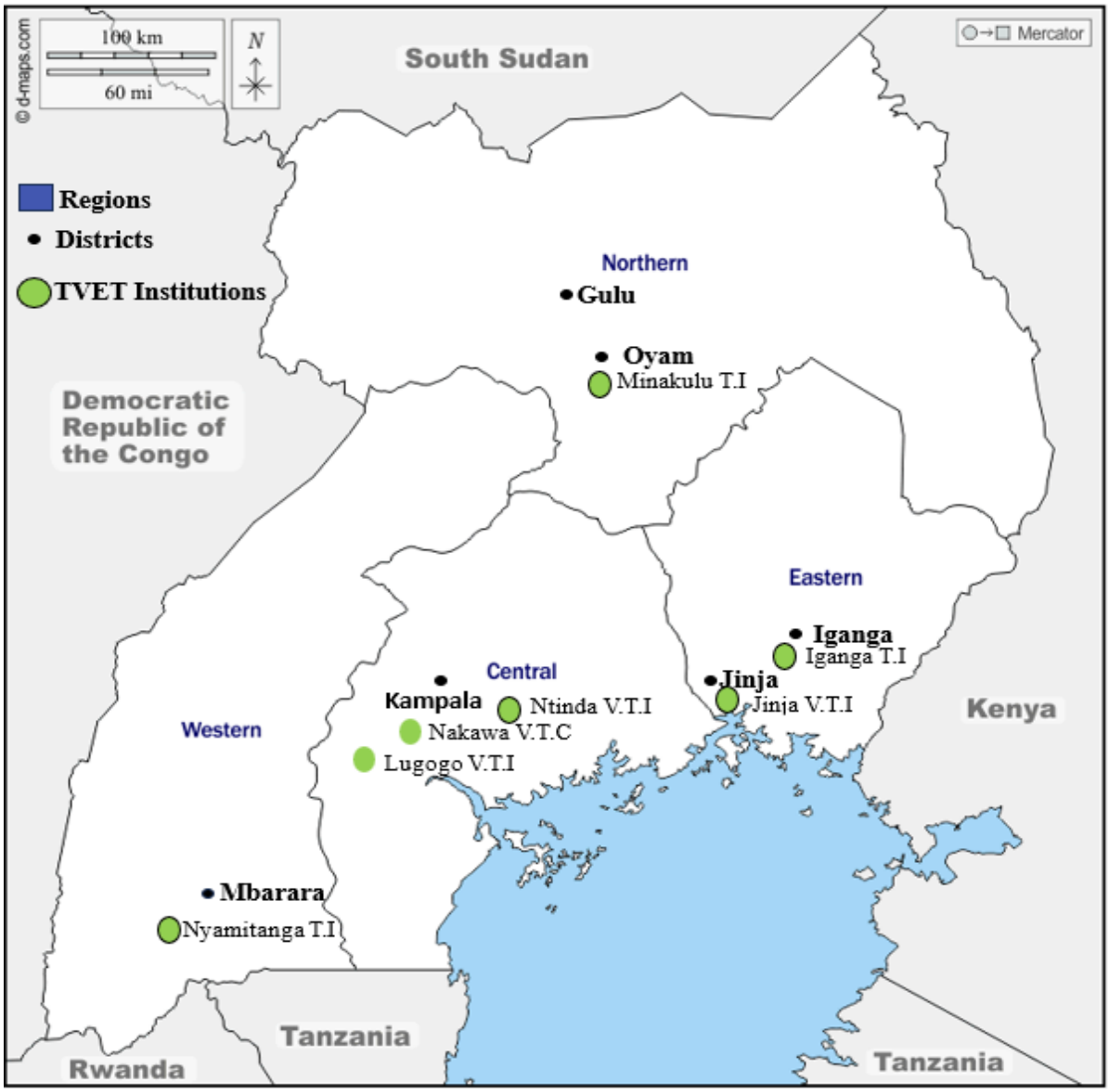
Field staff interviewing an instructor

Appendix XIV: Signpost of Nyamitanga Technical Institute

A principal investigator with the research team and Nyamitanga TI administrators



Appendix XV: Map showing the study locations



Appendix XVI: Research Permit (UoE)

University of Eldoret
flame of knowledge and innovation

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

School of Education
Department of Technology Education

Our Ref: UOE/B/TED/PGR/065 **DATE: 3rd June, 2024**

The Director of Research and Ethics Committee,
Uganda Christian University,
P. O BOX 4,
MUKONO, UGANDA.

Dear Sir/Madam,

SUBJECT: RESEARCH PERMIT FOR KISU MOHAMMED AATA - SEDU/TED/P/004/22

This is to confirm that the above named student has done course work of his Doctor of Philosophy in Technology Education: Technical and Vocational Education and Training Option.

He is currently preparing for his field research work on the thesis entitled: ***"Influence of Instructor Competences on Effective Online Teaching in TVET Institutions in Uganda. "***

He successfully presented his proposal on **22nd March, 2024** and has been approved by the university.

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

Yours faithfully,

HEAD DEPARTMENT OF TECHNOLOGY EDUCATION UNIVERSITY OF ELDORET P.O. BOX 1125-30100, ELDORET

UGANDA CHRISTIAN UNIVERSITY APPROVED UNTIL 09 JUL 2025 RESEARCH ETHICS COMMITTEE

DR. ISAAC NANGENDO
HOD, TECHNOLOGY EDUCATION

Appendix XVII: REC Approval (UCU)

UGANDA CHRISTIAN UNIVERSITY

A Centre of Excellence in the Heart of Africa

09/07/2024

To: Mohammed Kisu

University of Eldoret
+256779558170

Type: Initial Review

Re: UCUREC-2024-904: INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA

I am pleased to inform you that the Uganda Christian University REC, through expedited review held on **04/07/2024** approved the above referenced study.
Approval of the research is for the period of **09/07/2024** to **09/07/2025.**

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

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the REC for re-review and approval **prior** to the activation of the changes.
3. Reports of unanticipated problems involving risks to participants or any new information which could change the risk benefit: ratio must be submitted to the REC.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by participants and/or witnesses should be retained on file. The REC may conduct audits of all study records, and consent documentation may be part of such audits.
5. Continuing review application must be submitted to the REC **eight weeks** prior to the expiration date of **09/07/2025** in order to continue the study beyond the approved period. Failure to submit a continuing review application in a timely fashion may result in suspension or termination of the study.
6. The REC application number assigned to the research should be cited in any correspondence with the REC of record.
7. You are required to register the research protocol with the Uganda National Council for Science and Technology (UNCST) for final clearance to undertake the study in Uganda.

The following is the list of all documents approved in this application by Uganda Christian University REC:

No.	Document Title	Language	Version Number	Version Date
1	COVID-19 & EBOLA risk management plan for the study	English	1	2024-06-12
2	Community Engagement plan if applicable to your study	English	1	2024-06-12
3	Informed consent form for the recruitment of research participants	English	1	2024-06-12
4	Data collection tools	English	1	2024-06-12
5	Data collection tools	English	1	2024-06-12
6	Data collection tools	English	1	2024-06-12
7	Protocol	English	1	2024-06-10

Yours Sincerely

Prof. Peter Waiswa
For: Uganda Christian University REC

Appendix XVIII: UNCST Research Approval

Uganda National Council for Science and Technology

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

Our Ref: SIR370ES **13 September 2024**

Mohammed Kisu
UGANDA CHRISTIAN UNIVERSITY
Mukono

Re: Research Approval: **INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA. Research Number UCUREC-2024-904**

I am pleased to inform you that on **13/09/2024**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **13/09/2024** to **13/09/2027**.

Your research registration number with the UNCST is **SIR370ES**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project. As the Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. Keeping all co-investigators informed of the status of the research.
2. Submitting all changes, amendments, and addenda to the research protocol or the consent form (where applicable) to the designated Research Ethics Committee (REC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local REC for review with copies to the National Drug Authority and a notification to the UNCST.
4. Unanticipated problems involving risks to research participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST notification after review by the REC.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. An annual progress report and approval letter of continuation from the REC must be submitted electronically to UNCST. Failure to do so may result in termination of the research project.

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

No.	Document Title	Language	Version Number	Version Date
	Project Proposal	English	1	
1	Approval Letter	English		
2	Administrative Clearance	English		

Yours sincerely,

Hellen Opolot
For: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Appendix XIX: Consent Letter for Data Collection (Ntinda VTI)

The Principal Ntinda Vocational Training Institute

Martyrs Way, Ntinda

P.O BOX 29898

Kampala.

Dear Principal,

SUBJECT: REQUEST FOR ACADEMIC RESEARCH DATA (SEPT – NOV. 2024)

I hope this letter finds you well.

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute, currently, pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret. My Research Thesis is "**Influence of Instructor competences on effective online teaching in TVET Institutions in Uganda''**

The Purpose of the study is **to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.**

The Study area includes; Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute and Iganga Technical Institute. Reference letter from PS/MoES, no. **ADM203/235/01**

The study population are: National Certificate Trainees, Instructors and Administrators

Objectives of the Research

- To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda
- To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda
- To assess the influence of Instructors' evaluation and assessment competences on effective online teaching in TVE institutions in Uganda
- To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda

The data collected from or given by your institutions will be treated with utmost confidentiality and will only be used for academic purpose to enable the researcher conduct this study effectively and successfully.

Yours faithfully,

Kisu Mohammed Aata
PhD Student
University of Eldoret, Kenya
kisuaata@uoeld.ac.ke / aatam64@yahoo.com
+256779558170/701382738

Appendix XX: Consent Letter for Data Collection (Nakawa VTC)

The Principal Nakawa Vocational Training College

Nakawa

Kampala.

Dear Principal,

SUBJECT: REQUEST FOR ACADEMIC RESEARCH DATA (SEPT – NOV. 2024)

I hope this letter finds you well.

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute, currently, pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret. My Research Thesis is "**Influence of Instructor competences on effective online teaching in TVET Institutions in Uganda**"

The Purpose of the study is **to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.**

The Study area includes; Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute and Iganga Technical Institute. Reference letter from PS/MoES, no. **ADM203/235/01**

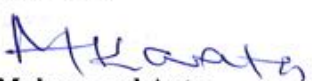
The study population are: National Certificate Trainees, Instructors and Administrators

Objectives of the Research

- To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda
- To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda
- To assess the influence of Instructors' evaluation and assessment competences on effective online teaching in TVE institutions in Uganda
- To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda

The data collected from or given by your institutions will be treated with utmost confidentiality and will only be used for academic purpose to enable the researcher conduct this study effectively and successfully.

Yours faithfully,



Kisu Mohammed Aata
PhD Student
University of Eldoret, Kenya
kisuaata@uoeld.ac.ke / aatam64@yahoo.com
+256779558170/701382738

Appendix 20: Consent Letter for Data Collection (Lugogo VTI)

16th September 2024

The Principal Lugogo Vocational Training Institute,

Kampala.

Dear Principal,

SUBJECT: REQUEST FOR ACADEMIC RESEARCH DATA (SEPT – NOV. 2024)

I hope this letter finds you well.

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute, currently, pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret. My Research Thesis is "**Influence of Instructor competences on effective online teaching in TVET Institutions in Uganda''**

The Purpose of the study is **to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.**

The Study area includes; Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute and Iganga Technical Institute. Reference letter from PS/MoES, no. **ADM203/235/01**

The study population are: National Certificate Trainees, Instructors and Administrators

Objectives of the Research

- To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda
- To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda
- To assess the influence of Instructors' evaluation and assessment competences on effective online teaching in TVE institutions in Uganda
- To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda

The data collected from or given by your institutions will be treated with utmost confidentiality and will only be used for academic purpose to enable the researcher conduct this study effectively and successfully.
Yours faithfully,

Kisu Mohammed Aata
PhD Student
University of Eldoret, Kenya
kisuaata@uoeld.ac.ke / aatam64@yahoo.com
+256779558170/701382738

Appendix XXI: Consent for Data Collection (Jinja VTI)

30th September 2024

The Principal Jinja Vocational Training Institute

Jinja

Dear Principal,

SUBJECT: REQUEST TO PRETEST MY RESEARCH INSTRUMENTS FOR PhD STUDY (2nd and 3rd October 2024)

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute, currently, pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret. My Research Thesis is "**Influence of Instructor competences on effective online teaching in TVET Institutions in Uganda**"

The Purpose of the study is **to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.**

The Study area includes; Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute and Iganga Technical Institute. Reference approval letter from PS/MoES, no. **ADM203/235/01** is attached.

The study population are: **National Certificate Trainees, Instructors and Administrators**

Objectives of the Research

- To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda
- To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda
- To assess the influence of Instructors' evaluation and assessment competences on effective online teaching in TVE institutions in Uganda
- To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda

The purpose of this letter is to request for permission to allow me and my data collectors to interact with randomly selected Trainees, Instructors and Administrators. The team will comprise of **12** people.

The data collected from or given by your institutions will be treated with utmost confidentiality and will only be used for academic purpose to enable the researcher conduct this study effectively and successfully.
Yours faithfully,

Kisu Mohammed Aata
PhD Student
University of Eldoret, Kenya
kisuaata@uoeld.ac.ke / aatam64@yahoo.com
+256779558170/701382738

Appendix XXII: Consent for Data Collection (Iganga TI)

16th September 2024

Iganga Technical Institute
Religio Triumphum Societatis
10 SEP 2024
P.O.BOX 130. IGANGA
DEPUTY PRINCIPAL

The Principal Iganga Technical Institute

Iganga.

Dear Principal,

SUBJECT: REQUEST FOR ACADEMIC RESEARCH DATA (SEPT – NOV. 2024)

I hope this letter finds you well.

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute, currently, pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret. My Research Thesis is "**Influence of Instructor competences on effective online teaching in TVET Institutions in Uganda''**

The Purpose of the study is **to evaluate the influence of instructor competences on effective online teaching in TVET institutions in Uganda.**

The Study area includes; Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute and Iganga Technical Institute. Reference letter from PS/ MoES, no. **ADM203/235/01**

The study population are: National Certificate Trainees, Instructors and Administrators

Objectives of the Research

- To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda
- To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda
- To assess the influence of Instructors' evaluation and assessment competences on effective online teaching in TVE institutions in Uganda
- To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda

The data collected from or given by your institutions will be treated with utmost confidentiality and will only be used for academic purpose to enable the researcher conduct this study effectively and successfully.

Yours faithfully,

Kisu Mohammed Aata
PhD Student
University of Eldoret, Kenya
kisuaata@uoeld.ac.ke / aatam64@yahoo.com
+256779558170/701382738

Appendix XXIII: Consent for Data Collection (Nyamitanga TI)

Received by
PRINCIPAL
Nyamitanga Technical Institute
16 OCT 2024
P.O. BOX 27, Mbarara

PRINCIPAL
NTINDA VOCATIONAL TRAINING INSTI
(NTVTI)
16 OCT 2024
PLOT 3,9,11-17,23-27 MARTYR
P.O.BOX 29898, KAMPALA UG
TEL: +256-774-9596
Email: ntindavti@gmail

14th October 2024

The Principal Nyamitanga Technical Institute

Thru: Principal Ntinda VTI

Dear Principal,

Re: **REQUEST FOR PERMISSION TO CONDUCT AN ACADEMIC FIELD RESEARCH NYAMITANGA TECHNICAL INSTITUTE**

Study Title: **"Influence of Instructor Competences on Effective Online Teaching in TVET Institutions in Uganda"**

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute. Currently, I am pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret, Kenya. My original study area/location comprised of: Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute , Iganga Technical Institute with Jinja Vocational Training Institute as a pilot survey (pretest) site . To achieve a representative study area, I have included **Nyamitanga** (Western) and **Minakulu** (Northern)Technical Institutes in order to reflect the characteristics and context of the broader population being studied (diversity). This will not only increase validity and reliability of findings, but also enhance generalizability and reduce bias and sampling errors. Instructors and Administrators will form the study population.

Objectives of the Research

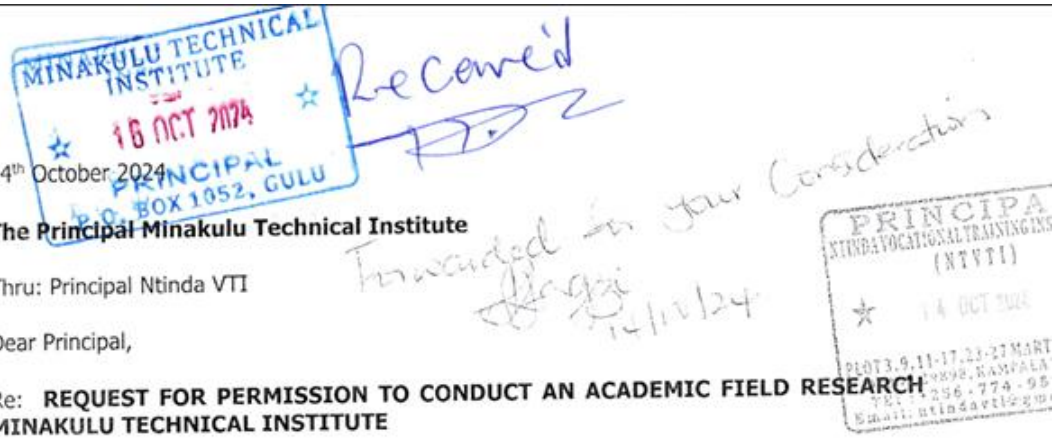
i). To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda.
ii). To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda.
iii). To assess the influence of instructors' evaluation and assessment competences on effective online teaching in TVET institutions in Uganda.
iv). To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda.

Methodology: The research will employ both qualitative and quantitative methods. Data will be collected using online questionnaire on Kobo tool box and ODK platform administered to the instructors and interviews with audio - recording for administrators from the TVET institutions in Uganda. The researcher will adhere to all ethical guidelines, ensuring confidentiality and voluntary participation. The sschedule for data collection is on Wednesday 16th 2024.

The purpose of this letter is to request for permission and support to engage and interact with your staff in this data collection process.

Yours sincerely,
14/10/24
Kisu Mohammed Aata
Deputy Principal Ntinda VTI +256779558170
PhD Student - University of Eldoret (UOE)

Appendix XXIV: Consent for Data Collection (Minakulu TI)



14th October 2024

The Principal Minakulu Technical Institute

Thru: Principal Ntinda VTI

Dear Principal,

Re: **REQUEST FOR PERMISSION TO CONDUCT AN ACADEMIC FIELD RESEARCH MINAKULU TECHNICAL INSTITUTE**

Study Title: **"Influence of Instructor Competences on Effective Online Teaching in TVET Institutions in Uganda"**

I am Kisu Mohammed Aata, the Deputy Principal Ntinda Vocational Training Institute. Currently, I am pursuing a Degree of Doctor of Philosophy (PhD) in Technology Education (TVET Option) at the University of Eldoret, Kenya. My original study area/location comprised of: Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training Institute, Iganga Technical Institute with Jinja Vocational Training Institute as a pilot survey (pretest) site. To achieve a representative study area, I have included **Nyamitanga** (Western) and **Minakulu** (Northern)Technical Institutes in order to reflect the characteristics and context of the broader population being studied (diversity). This will not only increase validity and reliability of findings, but also enhance generalizability and reduce bias and sampling errors. Instructors and Administrators will form the study population.

Objectives of the Research

i). To determine the influence of TVET instructors' online classroom management on effective online teaching in TVET institutions in Uganda.
ii). To establish the influence of TVET instructors' pedagogical competences on effective online teaching in TVET institutions in Uganda.
iii). To assess the influence of instructors' evaluation and assessment competences on effective online teaching in TVET institutions in Uganda.
iv). To analyze the influence of instructors' capacity to utilize digital teaching platforms on effective online teaching in TVET institutions in Uganda.

Methodology: The research will employ both qualitative and quantitative methods. Data will be collected using online questionnaire on Kobo tool box and ODK platform administered to the instructors and interviews with audio - recording for administrators from the TVET institutions in Uganda. The researcher will adhere to all ethical guidelines, ensuring confidentiality and voluntary participation. The sschedule for data collection is on Wednesday 16th 2024.

The purpose of this letter is to request for permission and support to engage and interact with your staff in this data collection process.

Yours sincerely,
Aata - 14/10/24
Kisu Mohammed Aata
Deputy Principal Ntinda VTI +256779558170
PhD Student - University of Eldoret (UOE)

Appendix XXV: Permission to Conduct Research Letter (MoES)

Ministry of Education and Sports,
P.O.Box 7063 Kampala, Uganda
Embassy House Plot 9/11,
King George VI Way

The Republic of Uganda
Ministry of Education and Sports

0417 893 600 (General)
0417 893 602 (Permanent Secreta
Email: permasec@education.go.ug
www.education.go.ug

In any correspondence on
this subject please quote No. **ADM203/235/01**

22nd August 2024

Kisu Mohammed Aata,

PhD Student,

University of Eldoret, Kenya.

PERMISSION TO CONDUCT RESEARCH.

Reference is made to your letter dated 29th July 2024 requesting the Ministry of Education and Sports for Permission to conduct research on the Thesis "***Influence of Instructor Competences on Effective Online Teaching in TVET Institutions in Uganda***"

The Ministry of Education and Sports is pleased to support your research endeveaurs and confident that your work will contribute significantly to the development of Uganda's Education sector.

The purpose of this letter, therefore, is to grant you permission to conduct your research at **Nakawa Vocational Training College, Lugogo Vocational Training Institute, Ntinda Vocational Training and Iganga Technical institute.**

By copy of this letter, you are informed accordingly and advised to forward a copy of the final **Thesis** to the Ministry of Education and Sports, Department of Education Policy and Research (EPAR). For further clarification, contact; **Assistant Commissioner Research and Innovation, 0772440090, arwebanda@yahoo.co.uk.**

Brighton Barugahare

For: PERMANENT SECRETARY

UGANDA CHRISTIAN UNIVERSITY
APPROVED
09 JUL 2025
RESEARCH ETHICS COMMITTEE

Appendix XXVI: Community Engagement Plan

Community Engagement Plan.

Research study entitled; **INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA**

Principal Investigator (PI): Kisu Mohammed Aata

Co-Investigators/Academic Supervisor: Wadada Robert, Meja Gift and Nalwoga Sandra Noeline

Goal and objectives

The goal of this plan is to give appropriate guidance to the researcher on how best he can involve research participants and the general Uganda Christian University fraternity. I aim at ensuring that this research represents well what is on ground, that participants will not be imposed on ideas, concepts and information that does not belong to them as I embark on the phenomenological study of teacher perceptions of the integration of values into teaching and learning.

Community Consultation

The university management were involved in the initial stages of this study and they gave permission to go on with the study. The administrative authorities and teaching community will be engaged more at the commencement of field work.

Sensitization and Education

The researcher and his team will sensitize participants before they are recruited or engaged in any activities. This includes a broad-brush of the study, the aims, approaches, and potential benefits, and most importantly the ethical and informed consenting processes.

Capacity strengthening

The study envisages a stronger community informed and committed to value driven teaching practices and possibly positive perceptions from all involved. It is our desire therefore to see that individual in the community and collectively are aware of what it takes to have a well positive perceptions and integration of values into teaching and learning.

Community participation and involvement

Uganda Christian University is well known for being value driven and having an active teaching and learning department. This section will be beneficial in participation but also in the continuity of values-oriented teaching and learning practices.

Community empowerment

If the community is informed or reminded, it becomes more efficient when it is vigilant, it practices, teaches the values it envisions itself and reduces any inappropriate practices. This is what we intend to achieve as researchers, we shall ensure that participants are protected from any

harm during the process of data collection and the University, but also in turn, they also carry-on value-oriented practices in teaching with deliberateness.

Research evaluation

After the study, participants will be asked to give their opinions on what they suggest can be done better what could not have gone well, what they would like to see their university, but also a report of outcomes shared so that areas for improvement or self-evaluation can be identified.

Ethical approval

This research is to be reviewed and approved by the Uganda Christian University Research ethics Committee (UCU-REC) which is overseen by the Uganda National council for Science and Technology (UNCST), if there are any ethical concerns, please contact UCU-REC Chairperson, Prof. Peter Waiswa, 0772405357, pwaiswa@ucu.ac.ug, or UCU-REC Manager, Mr. Osborn Ahimbisibwe, 0775737627, oahimbisibwe@ucu.ac.ug

Appendix XXVII: Similarity Score Report

DrillBit

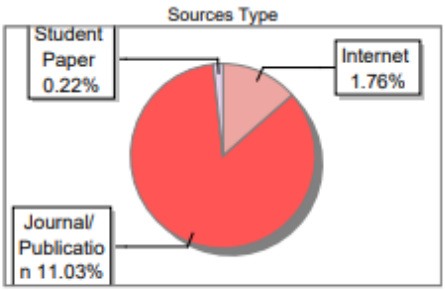
The Report is Generated by DrillBit Plagiarism Detection Software

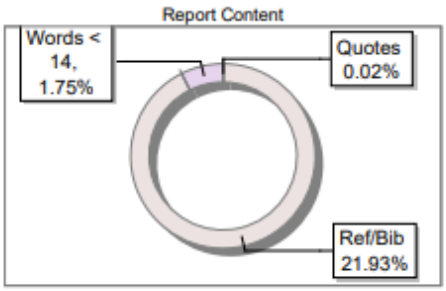
Submission Information

Author Name	Kisu Mohammed Aata SEDU/TED/P/004/22
Title	INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA
Paper/Submission ID	4631460
Submitted by	similarity@uoeld.ac.ke
Submission Date	2025-11-06 08:50:57
Total Pages, Total Words	233, 45540
Document type	Dissertation

Result Information

Similarity **13 %**





Exclude Information

Quotes	Not Excluded
References/Bibliography	Not Excluded
Source: Excluded < 14 Words	Not Excluded
Excluded Source	**0 %**
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

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University of Eldoret

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Certificate of Plagiarism Check for Thesis

Author Name	Kisu Mohammed Aata SEDU/TED/P/004/22
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Name of Guide	Type here...
Department	Type here...
Acceptable Maximum Limit	Type here.
Submitted By	similarity@uoeld.ac.ke
Paper Title	INFLUENCE OF INSTRUCTOR COMPETENCES ON EFFECTIVE ONLINE TEACHING IN TVET INSTITUTIONS IN UGANDA
Similarity	13%
Paper ID	4631460
Total Pages	233
Submission Date	2025-11-06 08:50:57

Signature of Student

Signature of Guide

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UNIVERSITY OF ELDORET

BOARD OF POSTGRADUATE STUDENTS

CERTIFICATE OF THESIS CORRECTIONS

I/We the University Supervisors/Examiner(s) of Kisu Mohammed Aata, SEDU/TED/P/004/22, hereby certify that the corrections recommended by the Thesis Board of Examiners concerning the Thesis entitled: **"Influence of Instructor Competences on effective Online teaching in TVET Institutions in Uganda"** at the Oral Examination of 21st October 2025 have been carried out to our satisfaction.

Student

Kisu Mohammed Aata MKaata. 31st October 2025

Examiner

Name: ..... Signature..... Date.....

Supervisor(s)

Name: Dr. Hoseah Kiplagat Signature..... Date.....01.11.2025

Name: Dr. Jafred Muyaka.....Signature . Date 1st November 2025

Chairperson of Thesis Board of examiners

Name : Dr. Hoseah Kiplagat Signature..... Date 01.11.2025

DEAN OF EDUCATION SCHOOL UNIVERSITY OF ELDORET

The supervisors to certify that the corrections that were recommended by the Thesis Examination Board have been carried out and fill his/her form.

The examiner will fill this part only if it was recommended by the supervisors of this thesis after corrections.