EFFICACY OF REMOTE LEARNING IN TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS IN BUNGOMA COUNTY, KENYA

BY

MUIRURI PETER MOSE

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DECLARATION

Declaration by the Student

This is my original work and has not been presented in any other university for examination. No part of this thesis may be reproduced without my knowledge and that of the University of Eldoret.

Muiruri Peter Mose

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SEDU/TED/M/008/20   **DATE**

Declaration by the Supervisors

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

_____   _____

Dr. Hoseah Kiplagat   **Date**
Department of Technology Education
University of Eldoret, Kenya

_____   _____

Dr. Philemon Kibiwott   **Date**
Department of mathematics & computer science
University of Eldoret, Kenya

DEDICATION

This work is dedicated to my parents Mr. and Mrs. Muiruri, Brother Njuguna, Sisters Wambui, Eunice, Peris and friends who have been a constant source of inspiration and support. You have inspired and disciplined me to tackle this task with great enthusiasm and determination.

ABSTRACT

TVET programmes typically involve a combination of classroom and workplace-based training. The hallmark of TVET, its focus on practical skills and work readiness, makes remote learning particularly challenging. Remote learning approaches are a weak substitute for practical exercises when they require the use of equipment or materials not usually found inside home setting. Most providers are unable to deliver or assess practical skills training remotely. This research aimed to assess the efficacy of remote learning in Technical and Vocational Education and Training (TVET) institutions in Bungoma County, Kenya. The specific objectives of the study were; to determine trainers' competence towards remote learning, to determine trainees' competence towards remote learning, to assess trainers' attitude towards remote learning, to assess trainees' attitude towards remote learning and to identify the remote learning tools used in technical training in TVET institutions in Bungoma County, Kenya. Mixed methods were adopted in this study by use of descriptive survey design. To test the validity of the instruments used in the study, the instruments were availed to a panel of University of Eldoret research experts together with the supervisors to review the instruments. To determine the reliability of the instrument, trainee questionnaire was piloted at Ol'lessos Technical Training Institute. Qualitative data from interview schedule was transcribed, thematically classified, and arranged before they were reported in narrations and quotations. The study found that only 33.4% (n=79) of the trainers' found it easy to train learners remotely while 83% (n=195) agreed that teaching theory courses online was easy. The study established that despite many trainers finding it easy to teach theory remotely, there was negative attitude among the majority of trainers on training practicals remotely. The study recommended that TVET institutions should blend remote learning with physical sessions to allow practical training to take place. Institutions should look for ways to mitigate challenges associated with remote learning.

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LIST OF ACRONYMS

CATs	Continuous Assessment Tests
ICT	Information and Communications Technology
ICTs	Information and Communications Technologies
KNBS	Kenya National Bureau of Statistics
NACOSTI	National Commission for Science, Technology and Innovation
PDF	Portable Document Format
TVET	Technical and Vocational Education and Training
TV	Television
TVC	Technical and Vocational College
SPSS	Statistical Package for Social Sciences
UoE	University of Eldoret

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CHAPTER ONE

INTRODUCTION

1.1   Introduction

This chapter focuses on the history of remote learning and how their use has grown in the past. The problem statement, the purpose of the study, the objectives, research questions and the limitation of the study are also discussed in this chapter.

1.2 Background of the Study

Technology has become an important part of everyday life. It has improved the way in which people communicate, work, and live. Technology has been widely adopted in both business and education sectors. In the education sector adoption of technology has made it possible for learning and training to take place outside the traditional classroom, this type of education is known as Remote learning. Remote learning includes online classes, video conferencing, email correspondence and other formalities of digital communication (Stever & Janet, 1998).

Remote learning dates back as early as 1800's, learning took place by use of the available technology by that time, Postal system, educational content was designed and mailed to learners who were not able to attend the traditional classrooms, assignment was also mailed to the learners, who would work on it and send it back to their teachers who corrected them graded and sent back the work to the learners. This initial remote learning was referred as Correspondence education, this remote learning benefited mostly women, professional people, physically disabled people and those who lived in areas that schools never existed (Simonson et al., 2000). By late 1800's correspondence learning had been adopted by many institutions especially universities that would award bachelor and

graduate degrees without being physically present in classes. Despite its adoption some educators still felt that this method of remote learning by correspondence was a slow method of teaching and the certificates awarded were of low value (Simonson & Berg, 2016).

Remote learning in the early 1900s was highly favored by the invention of radio and television, these new technologies helped to cut cost of tuition as it reduced the paper work used in correspondence education, it also hastened the communication between the educators and the learners. Learning sessions could also be recorded, latter be aired or sent to the learners. These new technologies helped improve remote education process in addition with correspondence (Simonson et al., 2000). In Britain, The University of The Air, was established in 1963, it merged radio, television and correspondence where learners could receive materials via mail and listen to radio or television for live classroom discussions. The low cost of tuition made thousands of learners to opt for this learning method (Pregowska et al., 2021). In Kenya use of radio in remote learning is dated back 1963 as a school of broadcasting unit of the ministry of information and broadcasting based in Mombasa house in Nairobi, latter the ministry of education Kenya took over the schools broadcast service, this service has been running up to present time (Oloo, 2019).

In late 1900s, Computer and the Internet brought a breakthrough in remote learning, use of these new technologies helped merge all the technologies that preceded them, the postal mailing service was replaced by the electronic mailing service, E-mail, and the internet enabled support of audio, video, text and immersion teaching methods. In 1984 the University of Toronto pioneered the first fully online course (Harasim, 2000). The

wide availability of Internet led to more development of online courses and distance learning programs. In recent years the development of Video-Conferencing technology has made remote educational advance greatly by making it possible to have live and interactive online classes. This technology advances have made remote learning easier for trainers and trainees to interact and share course material.

Today remote learning has become more prevalent especially after the Covid-19 pandemic which crippled the educational sector physical learning and forced adoption of remote education as a means of learning. During this period remote learning became the only way education could continue while maintaining social distancing protocals. Education sector adopted technologies like Zoom and Google Meet to be able to continue with learning with safe distances being achieved between them (Bragazzi et al., 2020; Saeed et al., 2020; Sumikawa & Yamamoto, 2021). Remote learning continues to be widely adopted due to the convenience and flexibility it offers and its ability to reach students with limitation to attend to physical classes.

1.3 Statement of the Problem

TVET programmes typically involve school-based training, a combination of classroom, workshops, laboratories and workplace-based training. Its focus on practical skills and work-readiness makes remote learning particularly challenging. Practical skills are often acquired through learning-by-doing, which occurs in school-based workshops and laboratories or through hands-on experience at the workplace. Remote learning approaches are a weak substitute for practical exercises when they require the use of equipment or materials not usually found inside their home. Most providers are unable to deliver or assess practical skills training remotely. (Masina & Mawonedzo, 2022)

In TVET programmes, practical training is a critical dimension and one that is not easily deliverable through remote modalities for many occupations. In addition to the practical training modules provided in workshops and laboratories, which include a work-based learning component wherein trainees participate in hands-on training at the workplace in the form of apprenticeships and internships (Kogias et al., 2022). It is therefore hard to assess remotely learning outcomes related to practical skills developed in workshops or laboratories, or through work-based learning and apprenticeships. It is for this reason the researcher aimed to understand just how effective remote learning in teaching and training in technical institutions in Bungoma County, Kenya.

1.4 Purpose of the Study

The aim of this research was to describe the efficacy of remote learning in Technical and Vocational Education and Training (TVET) institutions in Bungoma County, Kenya

1.5 Research Objectives

1.5.1 Main Research Objective

The objective of this research was to investigate the efficacy of remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

1.5.2 The Specific Objectives

The specific objectives of this study were:

1. To determine competence of trainers in remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

2. To determine competence of trainees in remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

3. To assess the trainers' attitude towards remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

4. To assess the trainees' attitude towards remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

5. To determine the remote learning tools used in technical training in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya.

1.6 Research questions

To address the above objectives, the following questions were formulated:

1. How competent were the trainers in remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya

2. How competent were the trainees in remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya

3. What was the trainers' attitude towards remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya?

4. What was the trainees' attitude towards remote learning in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya?

5. Which remote learning tools are used in technical training in technical and vocational education and training (TVET) institutions in Bungoma County, Kenya?

1.7 Justification of the study

Across the world we are living in, the rate of technology adoption and assimilation is rapidly taking human operations to greater heights of efficiency, effectiveness and hence quality service and living standards (Siagian et al., 2020). There are numerous advantages as to why technology adoption in education would increase the capability of trainees to adapt to the dynamic essence of the societies, we live in. This section outlines the reasons as to why the researcher decided to work on this study and is thus splitted into two sections. Under research justification, you may have academic justification and policy justification (Cook et al., 2008).

1.7.1 Academic Justification

Knowledge acquisition is a continuous process and hence research is utilized as a critical tool of gathering new information related to a viable subject of study (Pickard, 2013). Findings obtained from this study will constitute a basis for further academic research and as a reference point for other scholarly articles and publications. Since the study was conducted with primary data collected from the field, then there was a higher reliability to the information obtained and hence the right to be used by other researchers.

1.7.2 Research Justification

Governments are always in charge of policy development and changes. In Kenya, policy development can be done under both the national and the county government (Wangila, 2017). The national government can implement the policy by ensuring budgetary allocation from the national treasury to facilitate awareness forums and purchase of technology resources especially for the public institutions. Under the county government, the County Education Board (CEB) is mandated by section 18 of the Basic Education Act to oversee the execution of academic programmes at the county level (Wango, 2011). Therefore, the CEB may certify the recommendations of this research to be used through policy formulation in Bungoma County. Once done, the results and inferences obtained can be used by the government both at the national and the county levels to come up with strategies of hastening the adoption and embrace of technology use in TVET institutions to ease learning and efficiency of operations, the results are anticipated to strengthen the existing remote learning activities of our TVET institutions and convincingly adopt remote learning as a viable teaching and learning strategy. The government relies on such details to know how to address specific issues facing societies.

1.8 Significance of the Study

It is anticipated that the findings from the study may assist educational strategists, policymakers, remote learning system designers and other stakeholders involved in planning and making well-suited decisions regarding the utilization of online training within the Technical and Vocational Education and Training (TVET) sector. The results from the study will also help trainers and researchers to address the common challenges encountered while using online training on teaching practice in TVET institutions.

1.9 Assumptions of the Study

The scholar assumes that the responses to be obtained from the research were genuine and gave a reflection of the actual situations that are experienced by TVET institutions with regards to the adoption of remote learning.

1.10 Scope and Limitations of the Study

1.10.1 Scope of the Study

Scope entails the extent to which the researcher will explore a given research problem and hence helps in concentrating time and finances to the specified study objectives (Barba, 2018). The research was carried out in Bungoma County. The study focused on TVET institution administrators, trainers and trainees' experiences during the pandemic closure and how the adoption of technology could have made the experience better.

1.10.2 Limitations of the Study

Financial constraints - The funds needed for data collection, typing, printing, photocopying, binding and transportation from one area to another. This was solved by personal savings.

1.11 Theoretical Framework

This research is founded on the Theory of Diffusion of Innovations (DIT) (Rogers, 1995). Diffusion of Innovations theory seeks to explain how, why, and at what rate new ideas and technology spreads through culture. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses through a specific population or social system. The theory is based on the innovation, communication channels, time and social systems incorporated to see to the success of technology and concept adoption. The theory tries to explain why, how and how fast a new idea is being integrated into the

way people lead their lives. The result of this diffusion is that people, as part of a social system, adopt a new idea, behaviour or product. According to Rodgers (1995), diffusion of innovation occurs in five stages: awareness, interest, evaluation, trial and adoption respectively. Awareness exposes the trainers to innovation, that is, technology and the exposure leads the trainer to become interested in the technology and therefore craves more information about it. Evaluation of the information follows where individuals try to apply the innovation using the information available. Finally, the individuals adapt to the innovation and continue using it. The importance of Diffusion of Innovations Theory in the integration of remote technologies in teaching and learning is that integration is likely to succeed if focus is based on satisfying the needs of the trainers and trainees.

1.12 Conceptual Framework

The following diagram shows a conceptual framework for this research. It shows the association between the independent variables and the dependent variable.

Independent Variables
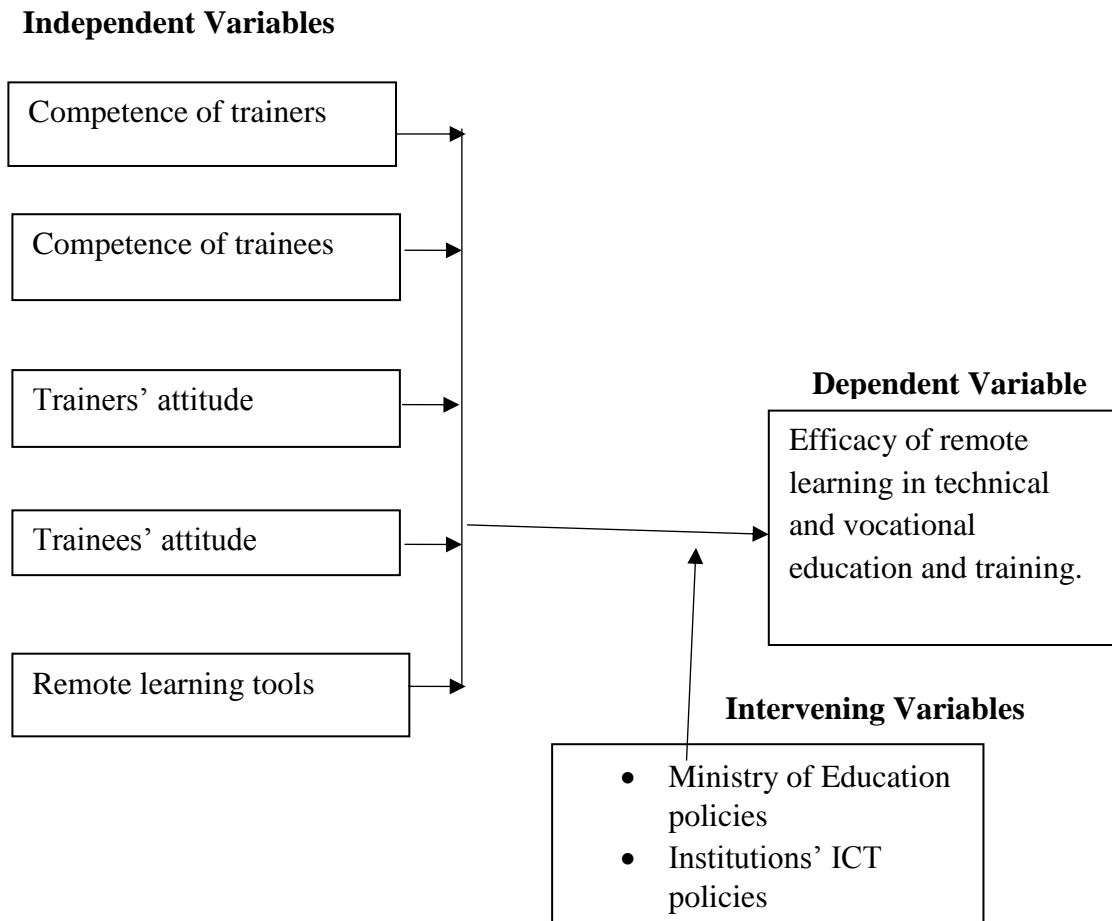
Figure 1.1 Conceptual Framework (Author, 2023)

The conceptual framework explains the association between the independent, dependent and intervening variables of the research. The study had five independent variables, namely; competence of trainers, competence of trainees, Trainer's attitude, trainees' attitude, and remote learning tools. The dependent variable of the research was efficacy of remote learning in technical training institutes and vocational centers within the study area.

Competence of trainees and trainers was measured by their capacity to operate technology related aspects to warrant the success of course delivery. In this study, competence was determined by the technological know-how of the study participants to interact in a virtual classroom while delivering technical related courses. The capacity of the trainer to deliver the course content effectively and interactively yields effectiveness in remote learning. The acceptance of remote learning by the study participants plays a critical role in ensuring the success of learning within an institution.

The attitude of the study participants affects the efficacy of remote learning. A negative attitude derails the efforts by an institution to have a fruitful remote learning session, while the vice versa is true. Lastly, the accessibility of remote learning tools such as websites, internet connectivity, discussion boards and virtual classroom platforms offers an effective delivery of remote learning. Despite, handling the independent variables of the study, presence of intervening variables such as implementation of government policies related to remote learning plays a critical role towards the success of a remote learning session within an institution.

1.13 Operational Definition of Terms

The following definitions are formulated according to their use in this study.

Acceptance: This is the act of agreeing to a methodology of teaching and learning.

Attitudes: These are beliefs and feelings about something, for example the emotions which the trainers have towards the use of computers in content delivery.

Blended Learning: This refers to a learning approach that mix traditional in-person class instruction with remote learning components. In a blended learning environment, students

receive instruction and engage in learning activities through a combination of face-to-face interactions with teachers or peers and digital resources delivered through technology.

Competence: This is an already existing experience on something for example, trainer's prior computer knowledge and skills in the use of computers in the delivery of contents.

Computer competence: This is the demonstrated ability to use information technology. It includes understanding the basic concepts of computer operation; handling computer files, word processing, using spreadsheets and databases; creating presentations; obtaining information and communicating using computers; and the ability to use the internet and other resources.

Distance learning: This refers to a modality where learning takes place between the trainer and the trainees who are geographically remote from each other during instruction. This modality has three types, namely: Modular Distance Learning, Online Distance Learning, and Television/Radio-Based Instruction. This is most viable for independent trainees, and trainees supported by periodic supervision of parents or guardians.

Efficacy: the measure of how well the remote learning information is intercepted by trainees measured with their participation.

Face-to-face: This refers to a modality where the trainees and the trainer are both physically present in the classroom, and there are opportunities for active engagement, immediate feedback, and socio-emotional development of trainees. Notably, this modality is feasible only in very low risk areas with no history of infection, easily

monitored external contacts, and with trainers and trainees living in the vicinity of the school.

ICT tools are the latest technology or devices and concepts used in Information and Communication Technology among trainees to trainees, trainees to trainer interaction.

Remote learning tools: various digital technologies and software applications that are used to facilitate and enhance the process of education when students and instructors are physically separated. These tools leverage the power of computers, the internet, and communication technologies to deliver educational content, enable interaction between students and educators, and support various aspects of remote learning.

Remote learning: This is where the trainee and the instructor, or source of information, are not physically present in a traditional classroom environment. Information is conveyed through technology, such as discussion boards, video conferencing, and online assessments. Remote learning can occur either synchronously, involving real-time peer-to-peer interaction and collaboration, or asynchronously, where individuals engage in self-paced learning activities independently of the instructor.**.**

Teaching and Learning: Giving information, ideas, knowledge and facts to someone who needs it, especially trainees through computer technologies in a classroom situation.

1.14 Summary

This Chapter introduces the study on the history and growth of remote learning. It highlights the background of remote learning, which has evolved with the advancement of technology, from early correspondence education to the integration of radio, television, and the internet. The problem statement identifies the challenge of effectively delivering

practical skills training through remote modalities. The study aimed to assess the efficacy of remote learning in TVET institutions in Bungoma County. The research objectives are to determine the competence of trainers and trainees, assess their attitudes towards remote learning, and identify the remote learning tools used. The study's theoretical framework is founded on the Theory of Diffusion of Innovations, and a conceptual framework illustrates the association between independent and dependent variables. The significance, assumptions, scope, and limitations of the research are also considered to provide context for the research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

This chapter presents the relevant literature review in in fields connected to the study's objectives. The literature was examined through a variety of sources, including textbooks, academic journals, newspapers, general periodicals, online resources, databases, archives, reports, and records. It focuses on the concept of remote learning and its relation to social-demographic, competence, attitude and tools used.

2.2 Concept of Remote Learning

The concept of 'remote learning' has existed since the second half of the 1990s (Howe & Knutzen, 2012). However, the use of the term has not always been consistent (Strittmatter & Niegemann, 2000). When addressing the topic of digital media, one can observe a range of terminology that is employed interchangeably with the term "e-learning". As a result of the rapid advancement of information and communication technologies, various terms have emerged to describe digital education approaches. These terms encompass computer- or web-based training, multimedia learning, computer-aided learning, mobile learning, online learning, distance learning, electronic learning, tele-learning, tele-teaching, and distance education (Beleya, 2018).

The term 'remote learning' is used to provide to individuals in far-off or isolated locations via hardcopies, voice, graphics using computer technologies, it includes both synchronous and asynchronous instruction" (Cain, Marrara, Pitre, & Armour, 2003). Moore and Galyen (2011) define remote learning as a form of learning that depend on internet networks with accessibility, connectivity, flexibility, and the capacity to bring up

several types of learning activities. According to Milman (2015), the usage of technology enables the learning process to take place with trainees and trainees at different places.

Within the realm of remote education, two distinct types of communication can be identified: synchronous and asynchronous. Synchronous communication technologies needs users to work together at the same time (Bates & Poole, 2003). Examples of a synchronous communication are live one-way broadcast like in YouTube live stream, and live two-way engagement among several trainees and trainers like in Zoom or google meet online classes. Asynchronous communication technologies do not require participants to be actively engaged in a live session at the same time. Instead, methods like discussion forums and emails can be employed, and sessions are often prerecorded.

In their study, Zhao et al. (2005) observed the impact of the communication method in online education. Their discovery indicated that courses that integrated a combination of both synchronous and asynchronous communication methods were more successful than courses that relied solely on one type of communication. A research by Allen et al. (2004) revealed that there is no discernible difference in the effectiveness of synchronous and asynchronous communication in remote learning and consequently concluded that neither type of communication held a superiority over the other. Evidence suggests that a combination of various learning modes, often referred to as 'blended learning,' tends to yield the most favorable outcomes (Bates & Poole, 2003; Bullen, 1998; Rennie, 2003). This blended learning approach encompasses a diverse set of delivery methods, such as print materials, asynchronous, and synchronous interactions, and has been noted for offering maximum flexibility and a sense of security for learners (Rennie). Rennie's research indicated that "a mixed format spreads the risks and benefits of synchronous and

asynchronous support between a wide range of 'high' and 'low' technologies and provides a backup" (Rennie).

However, it's important to note that the availability of these varied learning modes can be influenced by cultural, geographic, and economic factors, impacting trainee access to them (Mills, Marchessou, Nonyhongo, & Tau, 2005).

2.3.1 Social-Demographic of Trainees and Trainers

Socio-demographic information in research allows for the researcher and other scholars to identify the capacity of a study population to acquire knowledge, maneuver well and integrate skill together with competencies in carrying out specific tasks (Gouda, 2022). Some of the main socio-demographic characteristics to look at in the practice and adoption of ICT resources in digital and remote learning include age, level of education, gender, residency details and the degree of experience of both educators and the trainees with regards to the usage of ICT resources in digital and remote learning (Gagnon et al., 2012). Age comes as a critical factor in determining an individual's social, academic and economic schedules. With heavy burdens and responsibilities piling up with increase in age, many individuals both trainees and educators get bored and dissatisfied with distance digital and remote learning. Some research works have identified age to have an inverse relationship between individual satisfaction with remote education (Walker & Kelly, 2007), while others have found no significant correlation between the two variables, individual satisfaction with remote education (Simonds & Brock, 2014; Kimber & Wyatt, 2010). Despite having an impact on an individual's schedule, intellectual capacity and digital device literacy has been proven by some studies to have a negative correlation with the individual's age and this may be manifested in the general perception of

integration and adoption of information communication technology to remote learning programs. In many cases, individuals who are younger have been found to enjoy more remote learning strategies as compared to the older teaching fraternity who enjoy more interactive class sessions as they disseminate knowledge (Ellis-Thompson et al., 2020).

2.3.2 Competence of Trainers

For teaching and learning to be effective and efficient, trainers must be competent enough in the methodologies exercised in the dissemination of instruction. Trainers tend to use techniques in which they feel skilled Gachenga, (2007). Trainers are required to be computer competent. Computer proficiency is defined as the capability to proficiently manage a wide range of varying computer applications for different purposes (Tondeur et al., 2008).

A study by Wang and Li (2021) found that trainers who possess high levels of digital literacy and proficiency in using various e-learning tools were more effective in engaging trainees and creating interactive online learning experiences. This technological competence includes proficiency in navigating learning management systems, conducting live virtual sessions, managing online assessments, and utilizing multimedia resources effectively (Rosen et al., 2020). According to Koros (2022) for successful adaptation of remote learning trainers need to be competent with the remote learning tools.

Beyond technological competence, trainers need to possess strong pedagogical skills to effectively deliver content in a remote setting. According to Conrad and Donaldson (2011), trainers should adapt their instructional strategies to suit the remote learning environment, emphasizing learner-centered approaches that promote active engagement and collaborative learning. Trainers should also be skilled in providing timely feedback,

creating discussion forums, and designing meaningful learning activities to enhance trainees' understanding and knowledge retention (Kerres & de Witt, 2003).

Effective communication and interaction are fundamental components of successful remote learning. Trainers need to foster a supportive and inclusive online learning environment, as lack of face-to-face interaction can lead to feelings of isolation and disconnection among trainees. Zhang et al. (2020) emphasize that trainers should utilize various communication channels, such as video conferencing, discussion boards, and instant messaging, to maintain regular contact with trainees and address their queries promptly.

Trainers in remote learning settings must be adaptable and sensitive to the diverse needs of their trainees. Research by Van Oss et al. (2021) highlights the significance of integrating universal model for learning principles in remote instruction, ensuring that content is accessible to all trainees, including those with disabilities or varying learning preferences. Trainers should provide multiple means of representation, engagement, and expression to accommodate individual differences and foster an inclusive learning environment.

To stay abreast of the latest trends and best practices in remote learning, trainers must engage in continuous professional development. As technology and online pedagogy continue to evolve, trainers need to participate in workshops, webinars, and online courses to enhance their skills and knowledge (Kontoghiorghes et al., 2020). Such professional development opportunities not only improve trainer competence but also contribute to the overall quality of remote learning experiences for trainees.

2.3.3 Competence of Trainees

Trainees' digital literacy and technology skills are critical for effective participation in remote learning. According to Kirschner and van Merriënboer (2013), trainees should possess basic computer skills, such as navigating the internet, using email, and managing files. Moreover, they need to be proficient in using online learning platforms, participating in virtual classrooms, and accessing multimedia content. Research by Ractham and Firpo (2016) emphasizes that trainees' digital literacy positively influences their engagement in remote learning activities and their ability to manage online coursework efficiently.

Active engagement and participation are crucial for trainees to derive maximum benefit from remote learning. Trainees' level of engagement influences their motivation, learning outcomes, and satisfaction with the online learning experience (Picciano, 2017). Zepke and Leach (2010) argue that engaged trainees are more probable to participate in discussions, collaborate with peers, and seek help from trainers, leading to a more understanding of the course material.

2.3.4 Trainers' attitudes

Attitudes are beliefs and emotions that one has towards something which can be positive or negative. Oskamp and Schultz (2005) have described the word attitude as a prepared state, formed through experience, exerting a directive or dynamic impact on how individuals respond to everything with which it is associated. Attitude is a predisposition to respond favourable or unfavourable to an object, person or event (Ajzen, 1988).

Attitudes are a combination of feelings and reactions towards a certain subject of concern. In this aspect, attitudes can be termed as positive or negative when observed at a

general scope. In human psychology, the term refers to the belief systems and behaviors projected towards an individual, a subject or any other existing phenomenon (Zabadi et al., 2016). Attitudes have a strong impact on the turnout of events, anticipation of results and even the way people relate towards each other and towards the subject of concern.

Trainers play a crucial role in the success of remote learning initiatives as their attitudes towards this mode of instruction profoundly shapes the learning experiences of trainees.

Trainers' acceptance of remote learning is a critical factor in its successful implementation. A study by Johnson et al. (2020) found that trainers who perceived remote learning as an opportunity for innovation and a means to engage a broader audience were more inclined to embrace and integrate technology efficiently into their instructional practices. Conversely, trainers with unfavorable views towards remote learning, perceiving it as an additional burden or lacking in interactive elements, were less inclined to fully utilize its potential (Kaur & Sidhu, 2019).

Trainers' attitudes towards remote learning can be influenced by the challenges and concerns they encounter in its implementation. An investigation by Smith and Taylor (2021) revealed that some trainers expressed concerns about the potential loss of personal interaction and difficulties in building a rapport with trainees in the virtual environment. Others cited technical challenges, such as internet connectivity issues and lack of familiarity with e-learning platforms, as barriers to adopting remote learning effectively.

Despite the challenges, trainers also recognize several benefits and advantages of remote learning. A study by Wilson et al. (2022) highlighted that trainers appreciated the flexibility and accessibility of remote learning, which allowed them to reach a broader

and more diverse group of trainees. They also acknowledged the potential for personalized learning experiences and the ability to provide asynchronous learning opportunities to accommodate individual learning paces (Panigrahi et al., 2018).

Trainers' attitudes towards remote learning can significantly impact the effectiveness of online instruction. A positive attitude fosters a constructive and supportive learning environment, promoting trainees' motivation and engagement (Bao, 2020). Conversely, negative attitudes may lead to resistance in embracing technology, resulting in less interactive and engaging learning experiences for trainees (Sahin & Shelley, 2020). Trainers who maintain an open mindset and actively seek professional development opportunities to improve their remote teaching skills are more likely to achieve better learning outcomes (Al-Azawei et al., 2017).

Continuing professional development plays a crucial role in shaping trainers' attitudes towards remote learning. As they engage in workshops, training sessions, and peer discussions, trainers are exposed to best practices and innovative strategies for effective online instruction (Leung & Leung, 2021). This exposure can positively influence their attitudes, helping them embrace technology and adopt learner-centered approaches in their online teaching practices.

2.3.5 Trainees' attitudes

A trainee's capacity of comprehending concepts and their performance is influenced by various factors, the biggest share being taken by their attitudes towards the entire learning process (Bertea, 2009). A study by Chen et al. (2020) revealed that trainees who had positive attitudes towards remote learning perceived it as a convenient and flexible mode

of instruction, allowing them to evaluate their intellectual pursuits with other responsibilities. On the other hand, trainees with negative attitudes expressed concerns about the absence of face-to-face interactions and the perceived difficulty of navigating online platforms (Al-Fraihat et al., 2019).

Trainees may encounter challenges and express concerns about remote learning, affecting their attitudes towards this mode of instruction. For instance, a study by Smith and Jones (2021) identified issues such as inadequate internet connectivity, limited access to technology devices, and feelings of isolation as barriers to trainees' acceptance of remote learning. Additionally, trainees may worry about the effectiveness of remote learning in delivering hands-on practical experiences, particularly in technical and vocational education and training (TVET) programs (Levy & Murphy, 2018).

Despite challenges, trainees also recognize several benefits and advantages of remote learning. A research conducted by Johnson et al. (2022) highlighted that trainee appreciated the flexibility and convenience of remote learning, enabling them to study at their own speed and within the comfort of their preferred learning environment. Trainees also acknowledged the accessibility of diverse online resources, including recorded lectures and multimedia materials, which cater to different learning styles (Almaiah et al., 2020).

Trainees' attitudes towards remote learning can significantly impact their learning outcomes. An optimistic attitude is associated with higher motivation, engagement, and course completion rates (Hew et al., 2019). Trainees who possess positive attitudes are more inclined to actively participate in discussions, collaborate with peers, and seek support from trainers when needed (Nicolaidou & Philippou, 2017). Conversely, trainees

with negative attitudes may disengage from the learning process, resulting in lower academic performance (Güzer & Caner, 2014).

Several factors influence trainees' attitudes towards remote learning. A study by Wang and Wu (2021) identified perceived ease of use, prior experience with technology, and trainer support as significant factor that positively affects trainees' attitudes towards remote learning. Trainees who receive clear instructions, timely feedback, and adequate technical support are more prone to cultivate positive attitudes and achieve successful learning outcomes (Liu & He, 2020).

2.3.6 Remote learning tools

Remote learning tools have become indispensable in modern education, transforming the way trainers deliver content and trainees engage with course materials. With the advancement of technology, a wide array of remote learning tools has emerged, ranging from learning management systems and video conferencing platforms to multimedia resources and collaboration tools (Yeap et al., 2021).

Constructivist approaches emphasize the significance of trainees' active construction of knowledge and learning during their educational experiences. These approaches advocate for trainers to create a realistic and authentic learning environment that challenges trainees and fosters intrinsic motivation (Martens, Bastiaens, & Kirschner, 2007). However, despite technology's role in providing materials to remote trainees, their geographical isolation poses several barriers that hinder the delivery of truly authentic learning experiences. Meta-analyses have highlighted substantial variations in the effectiveness of distance programs and identified multiple course-related factors. Moore (1997) identifies three crucial factors in distance learning transactions: dialogue,

structure, and trainee autonomy. Schullo et al. (2007) further support the importance of ongoing and regular interaction between trainers and trainees in remote education, particularly through synchronous systems. Such interactions not only improve attitudes and coursework completion but also lead to better performance in tests, deeper learning opportunities, increased retention rates, and the formation of learning communities. Fisher et al. (2006) also advocates for synchronous systems, noting that they enhance trainee motivation, support group identity, provide timely and high-quality feedback, and aid trainees in structuring their learning and setting study priorities. Additionally, McBrien et al. (2009) highlight that synchronous communication, with its two-way interaction, enhances dialogue more effectively than one-way communication methods in remote learning settings. (Gonçalves et al., 2020) identifies the tools and equipment used in remote learning as:

2.3.6.1 Online Learning Tools

- Email

- Videochat

- International communication platform e.g., Zoom, Google Hangouts, Google meet….

- Conference Calls

- Chat – Chatrooms

- Video Conferencing Tools

2.3.6.2 Equipment

- Desktop computer

- Laptop

- Tablet

- Smartphone

2.4 Summary

Chapter two provides a comprehensive literature review on remote learning, focusing on its concept, social-demographic factors, computer competence, attitudes, and the tools used. The concept of remote learning has evolved since the late 1990s, with various terms used interchangeably, such as e-learning, computer-aided learning, online learning, and more. Remote learning encompasses both synchronous and asynchronous instruction, offering flexibility and accessibility to learners. The review investigates the impact of socio-demographic factors, such as age, on both trainers' and trainees' attitudes towards remote learning. Competence of trainers is highlighted, emphasizing the importance of technological proficiency, pedagogical skills, effective communication, and adaptability in delivering successful remote learning experiences. Similarly, trainees' competence is discussed, with a focus on digital literacy and active engagement in remote learning activities. The chapter also delves into trainers' and trainees' attitudes towards remote learning, outlining how positive attitudes lead to more effective learning outcomes. Finally, the review explores various remote learning tools and equipment, including online learning tools like video conferencing platforms and equipment such as laptops and smartphones, which have become essential components of remote learning.

2.5 Research Gap

Despite research being conducted on the implementation of remote learning technology as a medium of equitable educational access to all in Kenya and the world at large there is a noticeable research gap regarding the effective integration of remote learning

technology in Technical and Vocational Education and Training (TVET) in technical skills training. While studies have explored the use of remote learning in teaching contexts, there is limited research specifically examining its potential in training technical skills. Therefore, this study aimed at understanding the efficacy of remote learning in technical and vocational education and training institutions in Bungoma County, Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter furnishes details on the methodology used in the study, research design, the target population and sampling design, data gathering methods, research process, the methodology for data analysis and a summary of the chapter.

3.2 Philosophical Research Paradigm

Research paradigm pertains to the conceptual lens through which the researcher examines the methodological aspects of their research to determine research methods to be utilized and how data was analyzed (Kivunja & Kuyini, 2017). The researcher employed Interpretivist Paradigm as he aiming to delve into the subjective realm of human experience (Gumba & Lincoln, 1989). Phenomenology method was used to describes people's experiences, this method is also suitable as it seeks to understand, describe, and interpret human behavior and meaning because of experience (Tuffour, 2017).

3.3 Research Design

A research design is the organization of elements involved in gathering and analysis of data with the goal of combining relevance to the research objectives while maintaining process efficiency (Kothari, 2004). It is the conceptual framework within which a study is conducted; it outlines the structure for the gathered, measured, and analysed. As such the design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the ultimate data analysis stage. The research design selected for this research catered for both descriptive and correlational aspects for the research. The descriptive design describes phenomena or characteristics present within

the population and estimate proportions of population that have these characteristics. The correlational design assesses associations among different variables. The correlational design will enable associations among different variables to be determined to determine which are the most important factors affecting remote learning adoption. The study will also have an element of ex post factorial research. The method of data collection will entail interviews interrogation/communication and administration of structured questionnaires to the respondents to obtain their responses.

3.4 Study Area

The area of study was TVET institutions in Bungoma County. This is county number 39 of the 47 counties in Kenya in the former Western Province. Bungoma County is situated in the western region of Kenya. It borders counties like Teso and Busia to the Southwest, Mumias to the South, Trans-Nzoia, Lugari and Kakamega to the North East. Its capital is Bungoma town and holds a population of 1,670,570 persons, 5th out of the 47 (KNBS, 2019) and 8 Technical and Vocational Colleges. The area is rich in agricultural activities including growing maize, sugar cane and livestock farming, subsistence farming which provides employment source of income or livelihood for some families that helps them to subsidence resources. The area consistently receives substantial rainfall throughout the year, and is known to have several large rivers, which are utilized for small-scale irrigation purposes. The research area was chosen due to it developing nature, and high number of institutions.

3.5 Target Population

A population is defined as an entire group of extents or items having common observable characteristics. A target population is that population to which the researcher intends to

apply or generalize the results of a study (Mugenda & Mugenda, 1999). The study focused on 8 Principals, 653 trainers and 16,129 trainees in the eight Technical and Vocational Colleges.

3.6 Sample size and Sampling Procedure

Sampling is the method of choosing a subgroup of arguments to make inferences about the entire group. A sample is a relatively small portion of large population which is believed to accurately represent the characteristics of an entire population (Orodho, 2003). As Cohen (2003) points out, factors such as expenditures, time and accessibility often limit researchers from gathering data from the entire population. For this study, the determination of the sample size is based on Krejcie and Morgan (1970) sample size determination formula as cited by Kasomo (2001). The formula is given as:

$$n = \frac{X^2 * N * P(1-P)}{\left(ME^2 * (N-1)\right) + (X^2 * P * (1-P))}$$

Where;

n=Sample size

X^2=Chi Square for the specified confidence level at 1 degree of freedom = (3.841) from tables

N=Population size

P=Population proportion (.50 in the table)

ME=Desired margin of error (expressed as a proportion=0.05).

For trainees the sample size was;

=3.841x 16129 x 0.5 (1-0.5)/ 0.05x0.05 (16129-1) +3.841x0.5 (1-0.5)

=376

For trainers the sample size was;

=3.841x 653 x 0.5 (1-0.5)/ 0.05x0.05 (653-1) +3.841x0.5 (1-0.5)

=242

The study's sample size consisted 376 trainees and 242 trainers participated. The sample size as per each institution is presented in Table 3.1

Table 3. 1 Sample size

Division	Target population		Sample size	
	Trainers	Trainees	Trainers	Trainees
Bungoma North TVC	32	600	12	14
Cardinal Otunga TVC	50	1260	19	29
Kisiwa TTI	136	3972	50	93
Matili TTI	94	2200	35	51
Musakasa TTI	56	1396	21	33
Sangálo TTI	152	3968	56	93
Sirisia TVC	72	1200	27	28
Webuye West TVC	61	1533	23	36
Total	653	16129	242	376

3.7 Research Instruments

The research employed a combination of methods, including questionnaires, document analysis, and interview schedules to cater information relevant to this study.

3.7.1 Questionnaire

The study made use of structured and unstructured questions to the target population expected to provide information remote learning in technical training institution. Questionnaires are commonly used to obtain important information about about remote learning in technical training institutions (Mugenda & Mugenda, 1999). Questionnaires

are very effective, efficient, and easily administered to the target group. According to Orodho (2005), a questionnaire has the capacity to collect large amount of information in a reasonably quick space of time. Furthermore, it also gauge the likelihood of direct, straightforward, and unambiguous responses. This can be advantageous compared to interviews as interpersonal dynamics play a significant role in a face-to-face situation and this may prevent a person from expressing views they perceive to be socially or professionally acceptable views. Questionnaires served as the primary data collection method from trainees and trainers within the selected technical institutes in the study area.

3.7.2 Interview Schedule

Interviews can be administered face-to-face encounters or can be through telephone. Interview schedules were conducted to the principals who helped identify the different tools the institutions used while administering online learning (Gall, Gall, & Borg, 2007).

3.8 Validity and reliability of the instruments.

The subsection presents details on how the research instrument's, validity and reliability, were assessed.

3.8.1 Validity of the Research Instruments

According to Orodho (2005), validity is concerned with establishing whether the questionnaire content is measuring what it is intended to measure. Validity is fundamentally concerned with the precision and significance of the conclusions drawn from the research findings (Mugenda & Mugenda, 1999; Kombo & Tromp, 2006).) noted that by using a panel of experts to review the test specification and the selection of item, the content validity of a test can be improved.

The experts were able to assess the item and comment on whether the item covers a representative sample of the behavior domain. In the case of this research, the instruments were availed to a board of University of Eldoret research experts together with the supervisors to review the instruments. The comments from the experts were integrated into the final instrument revisions to improve validity.

3.8.2 Reliability of the research instruments

According to Walizer and Wiener (1978), piloting enables a researcher to find out if people can understand the wording of questions if directions are clear to subjects and answers mean the same thing to subjects as they do to researchers. Orodho (2005) observes that pilot study makes it possible to do a preliminary check on the validity and reliability of the questions.

Drost (2011) points out that if a measure is reliable, one should get the same similar value for each person or unit measured every time he/she measures. Thus, the reliability of the research addressed the similarity of results through repeated trials. The pilot study was done at Ol'lessos Technical Training Institute. After getting permission from the institution's principal to conduct piloting, questionnaires and interview schedule were administered. The process was done twice to allow comparisons to be made on the responses and thus facilitate determination if the instrument was reliable.

The reliability coefficient of the instruments was assessed by calculating the Pearson correlation coefficient. This analysis aimed to evaluate the degree to which the questionnaire's content consistently generated the same responses each time the instrument was administered. The feedback was instrumental in the validation of the instruments in readiness for the actual study. A reliability coefficient of at least 0.7 is

accepted as recommended by Wiersma and Jurs (2005). The research instruments demonstrated reliability as they had a reliability coefficient of 0.8.

3.9 Data Collection Procedures

The research permit to collect data was acquired from the National Commission for Science, Technology and Innovation (NACOSTI) in Nairobi. The researcher got consent from the selected principals to conduct research. The principals to be sampled were asked to read and sign an informed consent letter after which was requested for interview schedules. They were assured of confidentiality and anonymity. Interview schedule for the principals, and questionnaires administered to both trainers and trainees were gathered for data analysis by the researcher.

3.10 Data Analysis Procedures

Data analysis involves organization, interpretation and presentation of collected data in order to reduce the field information to a usable size (Onen & Oso, 2005). The data obtained from the testing instrument was organized, coded and analyzed by utilizing a combination of descriptive and inferential statistics. Descriptive statistics involved the use of frequencies, percentages and means. Coding will involve assigning values to the objective responses made by the respondents on the questionnaires. Code values were arranged from it depending on the number of responses made. There was subsequent analysis including using frequencies and cross tabulation, question with multiple responses was treated differently with tallying being employed on responses made. This allowed descriptive, statistical techniques, which include percentages, mean, mode, frequencies to be used. The analysis of qualitative data was conducted in accordance with the nature of the responses and the objectives of the study. Responses of the open-ended

questionnaires were recorded word for word to determine the frequencies of each response the number of respondents expressing the same opinion was converted to percentages to illustrate relative levels of opinion.

3.11 Ethical Considerations

According to Akaranga and Makau (2016), ethics are the established standards of conduct that differentiate between what is acceptable and unacceptable behaviour. There are ethical issues relevant to this study and the social setting within which research is carried out. First the researcher sought for permission to conduct the study from relevant authorities before conducting research such as University of Eldoret, NACOSTI and the institution principals. Secondly, the researcher gave assurance to all the respondents regarding privacy and confidentiality of information they provided. All respondents were treated with respect and equality, published and unpublished literature used was cited in the bibliography (Driscod & Brizee, 2010). Thirdly, the principle of free and informed consent was adhered to by emphasizing voluntarism, clear explanation, and comprehensive explanation of the research's nature and procedures. The objective of the study and benefits were explained to the participants.

3.12 Summary

This chapter provides a summary of the methodology employed in the research. It discusses the research paradigm, specifically the interpretivist paradigm and phenomenology method, chosen to grasp the subjective experiences of individuals. The chapter then delves into the research design, which combines descriptive and correlational aspects to assess associations among different variables related to remote learning adoption. The study was carried in TVET institutions in Bungoma County,

Kenya, chosen for its developing nature and high number of institutions. The target population included principals, trainers, and trainees from eight technical and vocational colleges. The sample size was determined using the Krejcie and Morgan formula, resulting in 376 trainees and 242 trainers as participants. Data was gathered via the use of questionnaires, document analysis, and interviews, and the validity and reliability of the tools was confirmed through expert review and piloting. The collected data were analyzed using descriptive and inferential statistics, and ethical principles were followed throughout the research process, including obtaining permissions and ensuring confidentiality and voluntary participation of respondents.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter provides the presentation of research findings aligned to the research objectives of the study. The chapter is structured into five key thematic areas namely, competence of trainers, competence of trainees, trainers' attitudes, trainees' attitude and remote learning tools.

4.2 Response rates

The study response rate was 97 % (n=235) for trainers, 93.8% (n=353) for trainees and 87.5% (n=7) for principals. According to Pinsonneault and Kraemer (1993), a response rate of 50% is believed to be sufficient, 60% good and above 70% very good. The response rate met the authentication criteria required to represent the study area in Bungoma county.

4.3 Demographics

4.3.1 Gender

The gender of trainer respondents was 57.5 % (n=135) male, and 42.5% (n=100) female. The gender of trainee respondents is illustrated in Figure 4.1. The male 73.1% (n=258) and 26.9% (n=95). The study outcome reveals a male dominance in the technical and vocational training institutes within Bungoma County. The result disagrees with the vision 2030, social pillar on integration information, communication and technology into teaching and learning through the provision of ICT infrastructure for schools carrying out

capacity development of ICT (Kenya Vision, 2030), which requires both genders to have equal access to education.
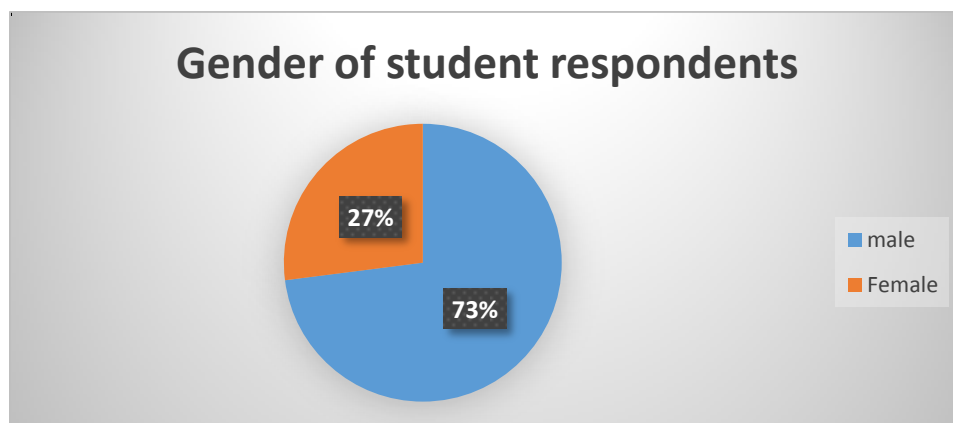
Figure 4.1: Figure showing the gender of trainee respondent.

4.3.2 Age

The mean age of the trainer respondents from the study area was 31.17 years, with the youngest trainer aged 21 years old and the oldest was 55 years old. The mean age of the trainees' respondents was 23.53 years, with the minimum age of 18 years and a maximum age of 45 years. The study's respondents demonstrated a young age that is fit for them to understand the dynamics of ICT and its usage in remote learning.

4.3.3 Department

Figure 4.2 shows the departments taught by the trainers who responded to the study. According to the study, majority of the participants from the selected Bungoma Technical and vocational training institutes, taught in various departments as shown in Figure 4.2. Most of the respondents taught Hospitality 20.7%, ICT 16.6% and business 11.9%.
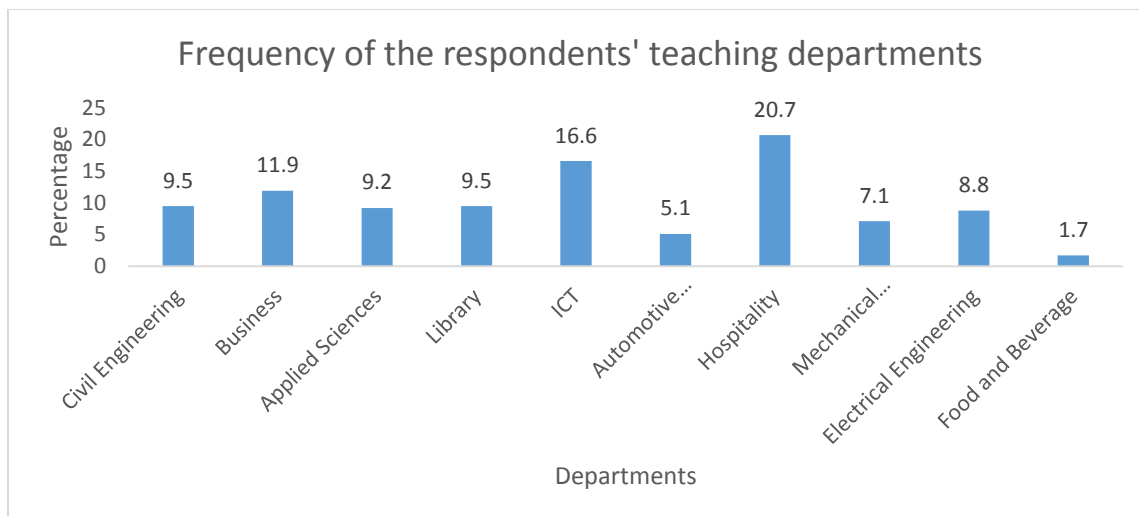
Figure 4.2: Figure showing the departments of trainer's respondents

The trainees' respondents were sampled from all the departments within the institution, for those who participate in remote learning as indicated in Figure 4.3. From the findings, 51% (n=110) of the participants attended remote learning for electrical and electronic engineering and its related courses. Other respondents reported taking plumbing 4.25% (n=20), mechatronics 7.24% (n=34), ICT 7.45% (n=35), Fashion and design 2.98% (n=14), Human resource management 1.06% (n=5), and accounting 1.91% (n=9).
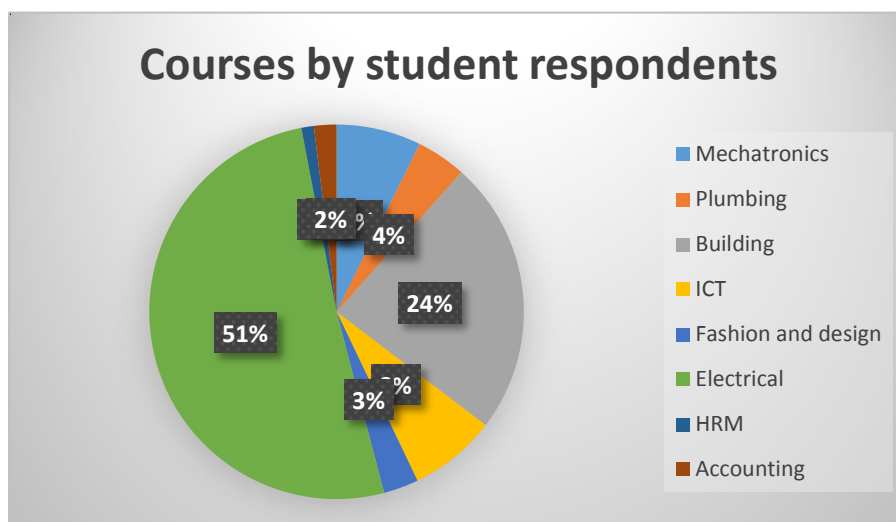
Figure 4.3: Figure showing courses taken by trainee respondents.

4.4 Competence of Trainers

The first objective of the study aimed at assessing the competence of trainers in technical and vocational education and training institutions in Bungoma County. In the study, competence was assessed using the following variables: knowledge, performance, and collaboration. Trainers' knowledge, they need to understand how the technology works by receiving instructions and training. Trainers' performance, the capacity to successfully complete tasks or activities connected to a specific domain. This can be demonstrated through the quality of work produced, meeting deadlines, or achieving desired outcomes. Trainers' collaborations this is the capacity to work effectively as a team, contribute to collective goals, and engage in cooperative problem-solving. This can be demonstrated through group projects, team-based assignments, or observations of collaborative behaviors and interactions.

On knowledge the study finding revealed that 39% of the trainer respondents (n=92) reported receiving clear instructions on how to conduct remote learning. These instructions were provided in PDF format with step-by-step guidelines, ensuring confidence among the trainers in administering online learning. On performance, the study found that 48.4% (n=143) did not keep up with schoolwork remotely, while 28.5% (n=84) were able to keep up with schoolwork remotely the rest 22.4% (n=66) were neutral. This aligns with research conducted by Johnson et al. (2019) underscored the significance of performance challenges encountered by trainers during remote teaching. Their findings indicated that 50.2% of trainers experienced difficulties in maintaining instructional momentum, aligning with the present study's identification of adaptation obstacles within the remote learning landscape.

On collaboration, the study found that 26.5% (n=78) agreed that their co-workers were helpful while teaching remotely, 57.9% (n=171) reported to disagree that their co-workers were helpful. Interview from the principals suggested that most of the trainers had been trained to teach remotely, 57.14 (n=4) of the principals had trained most of their trainers to teach remotely. The study aligns with a study by Smith and Anderson (2018) delved into collaborative dynamics among trainers and found a parallel trend, with only 28% of trainers affirming the helpfulness of co-workers during remote instruction, whereas a substantial majority (62.7%) expressed disagreement. These outcomes resonate with the current study's observations of deficient collaborative behaviors among peers in the remote teaching context, further underscoring potential implications for student learning experiences.

While a significant portion of trainers received clear instructions and guidelines for remote learning, there are challenges related to performance and collaboration that may need to be addressed to enhance the overall effectiveness of remote teaching in the region.

4.5 Competence of Trainees

This objective is aimed at assessing the competence of trainees. In the research, the competence was assessed using the following variables: trainees' knowledge, they must acquire an understanding of how the technology works by receiving instructions, and trainees performance, this is their ability to successfully complete tasks or activities.

The study result revealed that only 34.1% (n=121) of the trainee respondents received clear instructions on how to access the instructional material for their classes, while the

rest did not. This attributes to over 65.9% of the trainees did not receive clear instructions on the materials used for remote learning. In the end, the trainees who did not meet the class attendance quorum were not allowed to sit for exams, thus delaying the completion time of the trainees. The instructions were provided in PDF formats with step-by-step guidelines, thus providing confidence to the trainer when administering online learning.

The study found out that 43.6% (n=155) of the trainee respondents found assignments difficult remotely while 12.5% (n=44) remained neutral and 43.6% (n=154) disagreed that assignments were difficult remotely. 50.4 % (n=178) found it easy to submit assignments remotely while 40% (n=141) had challenges submitting their work remotely.

Overall, the findings reveal a lack of clear instructions provided to trainees regarding accessing instructional materials for remote learning. This has led to difficulties in completing assignments and hindered the progress of trainees.

4.6 Trainers' Attitudes

Positive statements relating to the perception towards remote learning were given by trainee respondents and scored using Likert scale running from 1 for Strongly Disagreed (SD) up to 5 for Strongly Agree (SA). The descriptive statistics on responses are presented in Table 4.1

Table 4.1: Table showing trainers' attitudes on teaching remotely

Attitudes	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Do you agree that remote learning easy	52.5%(n=123)	27.1%(n=64)	2.4%(n=6)	14.2%(n=33)	3.7%(n=9)
Do you agree that remote learning is effective?	56.3%(n=132)	22.4%(n=53)	4.1%(n=10)	12.2%(n=29)	5.1%(n=12)
Do you agree that institutions provide resources for you while at home?	29.2%(n=69)	26.8%(n=63)	5.1%(n=12)	20.0%(n=47)	19%(n=45)
Do you agree that it is easy to manage your time well while teaching remotely?	15.6%(n=36)	49.2%(n=116)	11.2%(n=26)	13.9%(n=33)	8.8%(n=21)
Do you agree that teaching remotely at home is better than physical classes?	9.5%(n=22)	21.4%(n=50)	13.6%(n=32)	34.2%(n=80)	20.7%(n=49)
Do you agree that co-workers are helpful while teaching at home?	10.2%(n=24)	16.3%(n=38)	10.8%(n=25)	36.9%(n=87)	21%(n=49)
Do you agree that keep up with your schoolwork remotely as much as physically	9.2%(n=22)	19.3%(n=45)	22.4%(n=53)	38.6%(n=91)	9.8%(n=23)

The study findings on the attitudes of trainers towards teaching remotely are shown in Table 4.1. The study steered that 3.7% (n=9) strongly disagreed and 14.2% (n=33) disagreed that remote learning is easy. While 79.6% (n=187) of the trainer respondents agreed that remote teaching was easy; 52.5% (n=123) strongly agreed and 27.1% (n=64) agreed that remote teaching was easy. The response was attributed to a favorable attitude to remote teaching by trainers of technical and vocational training institutes in Bungoma County. Studies related remote teaching to the capacity of trainers to develop a positive resilience thus allows trainees to adopt the pedagogical skills effectively (Liu, Zhao, & Su, 2022).

The study discovered out that 9.5 % (n=22) strongly agreed and 21.4% (n=50) agreed that teaching remotely at home is better than physical classes, while 34.2% (n=80) disagreed and 20.7% (n=49) strongly disagreed. The study indicated a spectrum of viewpoints, with a significant portion of respondents disagreeing or strongly disagreeing with the statement. The study corroborates Ferri et al (2020) who in their study identified that many people value the advantages of traditional in-person learning, such as social interaction and engagement. Garrison (2009) argues that physical classes provide important opportunities for students to interact with their peers and instructors. These interactions promote social development, teamwork, and networking, which are often missing in remote settings. Ferri et al (2020) study shows that technology barriers also attribute to a negative attitude towards remote teaching, the primarily technological barriers related to a lack of internet connectivity and electronic devices.

According to the results in table 4.1 it is evident that despite trainers having a positive attitude towards remote learning, trainers have noted with concern that remote teaching

deprives one of teamwork, and assistance from their co-workers. An interview from the principals had the following to say; *"Sometime our trainers face challenges related to mastering the syllabus contents, especially engineering mathematics, where they need to help with fellow mathematical tutor but considering the nature of virtual classroom set-up. It becomes difficult for our trainers to instill the knowledge to trainees, this has contributed to some trainers skipping the topics, and this costs our trainees deeply especially during KNEC examinations"*. The study agreed with the questionnaire schedule that found that 36.9% (n=87) disagreed and 21% (n=49) strongly disagreed that co-workers were helpful while working remotely (Table 4.1). The study finding was in line with who found that remote learning typically cut trainers off from the routine conversations and interactions, and not just meetings that make up regular school life (Hargreaves, 2021).

4.7 Trainees' Attitudes

Table 4.2 trainees' attitude towards remote learning

Acceptance	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Do you agree that remote learning is enjoyable?	13.9%(n=49)	31.4%(n=111)	11.3%(n=40)	22.1%(n=78)	21.2%(n=75)
Do you agree that remote learning is effective?	19.3%(n=68)	36.8%(n=130)	16.4%(n=58)	13%(n=46)	14.4%(n=51)
Do you agree that learning remotely is better than physical.	5.7%(n=20)	14.2%(n=50)	10.2%(n=36)	32%(n=113)	38%(n=134)
Do you agree that assignments are difficult online?	16.4%(n=58)	27.2%(n=96)	12.5%(n=44)	31.2%(n=110)	12.7%(n=45)
Do you agree that it easy to submit assignments to your trainers?	13%(n=46)	37.4%(n=132)	9.6%(n=34)	25.8%(n=91)	14.2%(n=50)
Do you agree that it is easy to interact with other trainees?	18.4%(n=65)	36%(n=127)	10.2%(n=36)	15.6%(n=55)	19.8%(n=70)

Based on the study results, 45.3% (n=160) trainees find remote learning enjoyable; 11.3% (n=40) were neutral, 22.1% (n=78) disagreed and 21.2% (n=75) strongly disagreed. On asked why they did not enjoy remote learning trainees reported that they found the concepts introduced to be strange since sometimes the trainer was too fast, internet connectivity and device setting would render the trainer inaudible. Some of the

reasons also included background disruptions from home, where they did not get the chance to fully concentrate.

The study found out that 5.9% (n=20) strongly agreed and 14.2% (n=50) agreed that learning remotely at home is better than physical classes, while 32% (n=113) disagreed and 38% (n=134) strongly disagreed. The study indicated a range of opinions, with a substantial number of respondents disagreeing or strongly disagreeing with the statement. The most common response among the respondents was either disagreement or strong disagreement, a combined 70% (n=247) of respondents. This suggests that a substantial majority either prefers or values physical classes or has reservations about remote learning. The study was in line with Serhan (2020) who's study found that many trainees favored the traditional classroom instruction in comparison to the remote learning. Doggett (2007) reported similar findings; the majority of the students (80%) indicated that they would have been more comfortable in a traditional classroom setting. Ferri et al (2020) study shows that technology barriers also attribute to a negative attitude towards remote teaching, the primarily technological barriers related to a lack of internet connectivity and electronic devices.

Trainee respondents reported disagreement on remote learning since they argued that physical learning was better, since they can develop eye contact and other communications cues with their trainers. Another challenge reported by trainees was online assignment submission, the challenges such as inability to access a device, and stable internet connectivity had most trainees locked out of the e-learning platforms before they were able to submit their examinations, assignments, and CATs to the system.

4.8 Remote learning tools used in technical training in Bungoma County

This objective was sought by assessing the tools used by both trainers and trainees to access remote learning solutions. The trainee respondents accessed remote learning sessions and platforms using varied devices. The study finding indicated that trainee respondents used the following devices to access remote lectures and related learning materials; 8.8% (n=31) laptops, 1.1 % (n=4) desktops, 1.1% (n=4) tablets and 81.7% (n=288) smartphones (Figure 4.4). Trainer respondents used the following devices to train remotely 37% (n=86) laptops, 2% (n=5) desktops, 1 % (n=3) tablets and 60% (n=140) smartphones (Figure 4.3). Devices used to access online learning systems are important since it determines the level of interaction between the trainer and the trainee. Few trainees have access to laptops and desktops, and this limits their effectiveness in attending remote lectures and assignments and responding to canvas or class discussion online. Majority of the trainers and trainees use smartphones. Smartphone is a device used to answer and make calls, however, when used as a learning tool reduces its functionality. Smartphones have many disturbances and harm the trainees due to disruptions from calls, WhatsApp, Facebook, Twitter, and short message services from friends during the lesson.
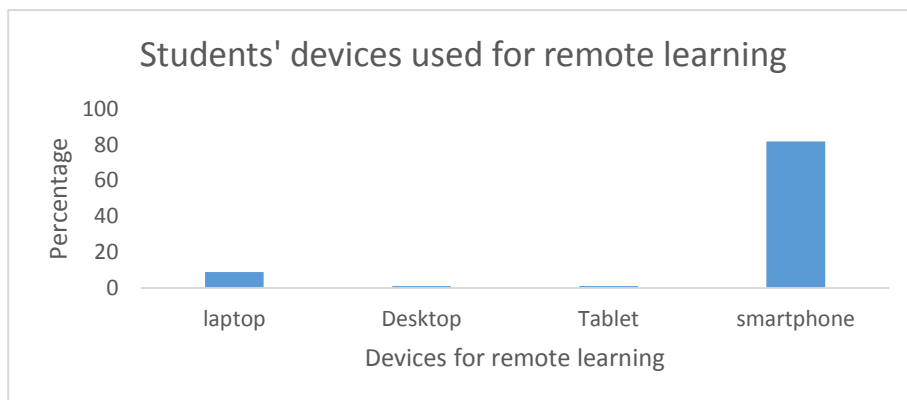
Figure 4.4: Figure showing the devices used by trainees for remote learning.
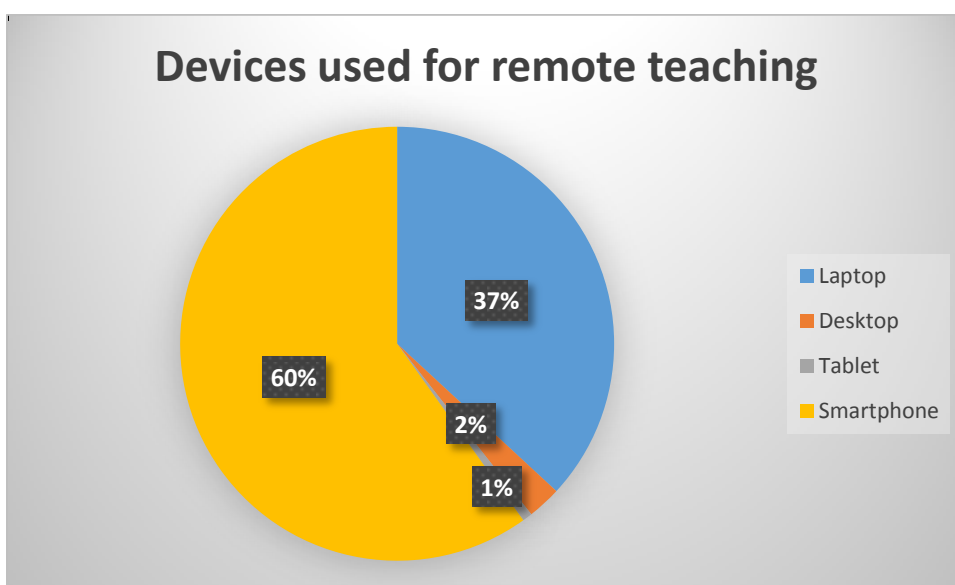
Figure 4.5: Figure showing the devices used by trainers for remote teaching.

Table 4.3 shows the trainees perception on the use of online tools during remote learning. Approximately 70 of trainee respondents had a challenge using emails; based on the study 6.7% (n=24) of the respondents reported email usage to be hard, and 13.1% (n=46) very hard. Emails are digital messages sent and received over a medium, such as Gmail, Yahoo, and Outlook.com among others. Institutions use emails to communicate

effectively and timely to their staff trainees and stakeholders. It is the modern-day postal address.

Online platforms interaction with trainers was a challenge with 22.9% (n=81) found it hard and 14.5% found it very hard. About 43.2%, 23.2% (n=82) found using the e-learning platforms to be hard and 20% (n=71) found it to be very hard. Challenges in using and interacting with trainers on e-learning platforms prevent trainees from understanding the concepts and participating in online sessions. This study was congruent to Fatimah (2020), who in her study noted that teaching staff and the faculty should possess the following online teaching and competencies (a) pedagogical skills, (b) content skills, (c) design skills, (d) technological skills, (e) management and institutional skills, and (f) social and communication skills for an effective online learning session. The study noted that, tutors technological literacy was necessary for an effective online course delivery.

Table 4.3: Table showing trainees' ease of use on online tools

Tools used	Very easy	Easy	Hard	Very hard
Email	21.8%(n=77)	47.3%(n=167)	10.5%(n=37)	20.4%(n=72)
Video chat	41.9%(n=148)	42.8%(n=151)	7.4%(n=26)	7.9%(n=28)
Online platforms e.g zoom, Google meet	18.4%(n=65)	27.2%(n=96)	33.4%(n=118)	21%(n=74)
E-learning platform	9.1%(n=32)	12.2%(n=43)	23.2%(n=82)	20%(n=71)

The study sought to find out whether the technical and vocational institutions had tools used in remote learning in place. According to the results, 54.6% (n=128) of the trainers reported using video conferencing tools such as Google meet, Zoom, Skype and discord. 8.8% (n=21) of the trainer respondent reported using institutional generated emails to communicate with their trainees. The communication entailed sharing of course learning materials, assignments, assignment feedback, and class attendance links. The trainers argued that emails were efficient means of communication with trainees, however, it had come to their attention that some trainees take too long to respond due to poor internet connectivity and low skills to handle emails. The study was in line with Onyema et al (2019) in their study who found online discussion forums as effective communication tools between trainees and their trainers, however, it had more challenges to the users.

Based on the study, the institution had developed different tools to support remote learning as shown in Figure 4.6. The results depict a supportive move by institutions to ensure full implementation of remote learning, however, there are challenges which include inadequate funding to allow the institutions to upgrade their fiber optic and internet bandwidths, poor policies that prevents institutions from provision of ICT related services to their trainees. For example, in Bungoma County, a resource center could be constructed within the communities to allow people on remote learning to use them. However, lack of this subject trainees to missing remote lectures.

Percentage of tools developed by Instituions to support remote learning
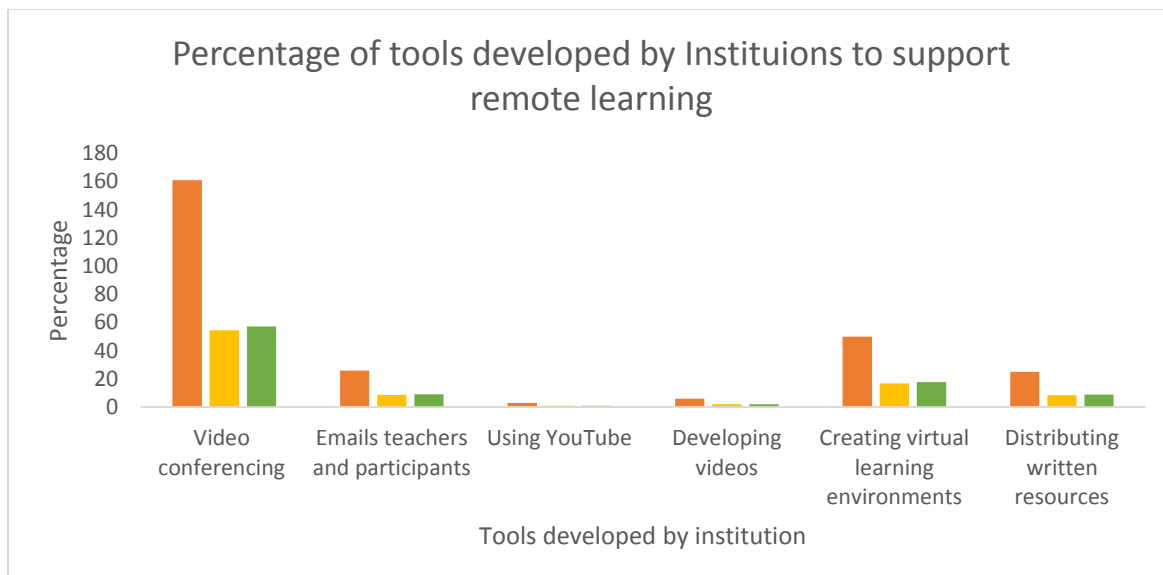
Figure 4.6: Figure showing tools developed by institutions to support remote learning

The study finding indicated that 48.6% (n=172) of the trainees had access to the internet, while 28.4% (n=100) had internet access, it didn't work well and 20.8% (n=73) did not have access to internet as shown in Figure 4.7 An interview from the principals found that the institutions support remote learning by providing internet access at the institution. Internet access is a prerequisite requirement for one to enroll in a remote learning course, failure of the internet service provider to supply constant internet to its clients, deprives most trainees learning remotely the chance to complete their studies on time. TVET and TVC play a great role in offering technical and handwork courses to people who need self-employable skills. The study agreed with Wasike et al. (2020) who found that ICT infrastructures correlate with trainee enrolments in TVET institutions in Bungoma County.
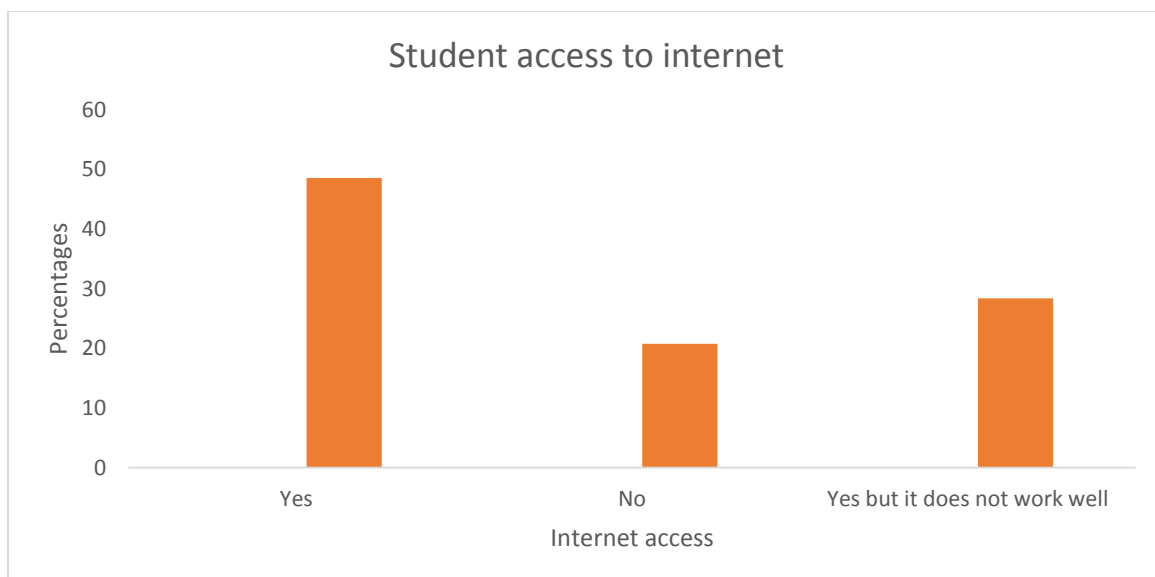
Figure 4.7: Figure showing trainee access to internet.

Asking whether the trainees had a device used to access remote learning platforms 34.5%(n=121) of the trainee respondents agreed, 28.2%(n=100) reported having a device but doesn't work well, due to non-functional battery, poor connectivity or wireless networks, device lacking enough memory to have learning apps such as Zoom , and Moodle installed.

The study trainer respondents revealed that 78.6% (n=185) had been trained to teach remotely, and only 64.7% (n=152) reported to be teaching remotely. Despite being trained most of the trainers were not teaching remotely, due to the challenges emanating from the ability to use and adopt the online pedagogical skills. The study finding revealed that 66.1% (n=155) of the trainer respondents reported having internet access. 81% (n=190) had access to devices used for online learning; however, 10.8% (n=25) reported having a device used to access online learning, but it doesn't work well.

4.9 Chapter Summary

The chapter focused on five thematic areas: competence of trainers, competence of trainees, trainers' attitudes, trainees' attitudes and remote learning tools used. The study achieved a high response rate, with 97% of trainers (n=235) and 93.8% of trainees (n=353) participating. The demographics of the respondents indicated a male dominance among trainers and most young trainees. The competence assessment revealed that clear instructions for accessing instructional materials were lacking for trainees, leading to difficulties in completing assignments and delays in completion time. However, trainers received clear instructions and guidelines, instilling confidence in their ability to administer online learning effectively. Trainees and trainers expressed mixed attitudes towards remote learning, with some finding it enjoyable and effective while others preferred physical learning. Challenges in using online tools and limited internet access were identified, impacting the effectiveness of remote learning. The study emphasized the need for improved communication, technical support, and continuous training to enhance remote learning outcomes.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The study findings can be summarized as follows.

5.1.1   Competence of Trainers

Competence was measured based on knowledge, performance, and collaboration. Trainers' knowledge refers to their understanding of how technology works, and the study found that 39% of the trainer respondents reported receiving clear instructions on how to conduct remote learning. These instructions were provided in PDF format with step-by-step guidelines, which contributed to their confidence in effectively administering online learning, this agreed with Travers and Watts (2020) on the importance of trainers' technological proficiency, highlighting how respondents reported receiving explicit instructions on remote instruction methodologies. These structured guidelines were instrumental in enhancing trainers' confidence and competence in delivering effective online education. Findings from this study are similar to Donnelly and McAvinia (2012) whose study concluded that many academics have had no training and little experience in the use of remote learning as an educational tool.

The study also revealed some concerning aspects related to performance. Specifically, 48.4% of trainers reported not being able to keep up with schoolwork remotely, indicating challenges in adapting to the remote learning environment and possibly affecting the quality of education provided. Additionally, a study by Johnson et al. (2019) underscored the significance of performance challenges encountered by trainers during remote teaching. Their findings indicated that 50.2% of trainers experienced difficulties

in maintaining instructional momentum, aligning with the present study's identification of adaptation obstacles within the remote learning landscape.

Furthermore, the aspect of collaboration was evaluated, which involves the ability of trainers to work effectively as part of a team, contribute to collective goals, and engage in cooperative problem-solving. The findings showed that only 26.5% of trainers agreed that their co-workers were helpful while teaching remotely, while a significant majority (57.9%) disagreed with this statement. This indicates a lack of supportive collaborative behaviors among co-workers, which can have negative implications for the overall learning experience and outcomes of students. A study by Smith and Anderson (2018) delved into collaborative dynamics among trainers and found a parallel trend, with only 28% of trainers affirming the helpfulness of co-workers during remote instruction, whereas a substantial majority (62.7%) expressed disagreement. These outcomes resonate with the current study's observations of deficient collaborative behaviors among peers in the remote teaching context, further underscoring potential implications for student learning experiences.

The study's results highlight the importance of addressing performance and collaboration challenges faced by trainers in remote teaching. It may involve providing additional training and support to improve their ability to handle remote teaching effectively, fostering a collaborative work environment, and addressing any technical or resource-related issues that hinder performance. By addressing these issues, the overall effectiveness of remote teaching in the region can be significantly enhanced, leading to better educational outcomes for both trainers and trainees.

5.1.2 Competence of Trainees

Competence was measured based on knowledge and understanding of technology, as well as the performance of trainees and trainers in completing tasks and activities. The findings revealed that only 34.1% (n=121) of the trainee respondents received clear instructions on how to access instructional materials for their remote classes, while the majority did not. This lack of clear instructions affected over 65% of the trainees, leading to difficulties in completing assignments and delaying their completion time. Trainees who didn't meet class attendance requirements were not allowed to sit for exams, which further hindered their progress. The study also found that 43.6% of the trainees perceived assignments as difficult in the remote learning environment. Additionally, 40% faced challenges in submitting their work remotely. Overall, the findings highlight the need to provide clear instructions to trainees regarding accessing instructional materials for remote learning to improve their performance and learning outcomes. This agreed with a study by Schmidt and DeSchryver (2022) that found that trainees who demonstrated greater comfort and familiarity with digital tools and platforms exhibited higher levels of competence in navigating online coursework, accessing resources, and participating in virtual discussions.

5.1.3 Trainers' Attitudes

The study examined the attitudes of trainers towards remote learning, trainers generally displayed a positive attitude towards teaching remotely. The study found that 79.6% of trainers agreed that remote teaching was easy, with 52.5% strongly agreeing. A study by Johnson et al. (2018) revealed that trainers who held positive attitudes towards remote learning perceived it as an opportunity to engage diverse learners, facilitate flexible

schedules, and promote self-directed learning. However, trainers expressed concerns about the lack of teamwork and assistance from their colleagues in a remote teaching environment. The nature of remote classrooms made it hard for trainers to effectively impart knowledge, especially in complex subjects like engineering mathematics. The study also revealed that a significant portion of trainers disagreed with the helpfulness of co-workers while working remotely. Trainers, on the other hand, generally had a positive attitude towards remote teaching, but acknowledged the limitations and challenges associated with the lack of teamwork and support from colleagues in the virtual classroom setting. This is in line with Garcia & Wong (2022) study that indicate that lack of support from colleagues and teamwork in remote learning environments influences trainers' attitudes.

5.1.4 Trainees' Attitudes

The study examined the attitudes of trainees towards remote learning. Trainees were asked to provide their perception of remote learning using a Likert scale. The results showed that 45.3% of trainees found remote learning enjoyable, while 22.1% disagreed and 21.2% strongly disagreed. Trainees who did not enjoy remote learning mentioned that they found the concepts introduced to be unfamiliar, and issues such as fast-paced teaching, poor internet connectivity, and disruptive home environments hindered their learning experience. Trainees also expressed a preference for physical learning. Online assignment submission was highlighted as a challenge, with difficulties in accessing devices and stable internet connectivity causing many trainees to be unable to submit their work on time. This coincides with previous studies that highlights that technological confidence impact on their attitudes towards online instruction (Smith & Brown 2019).

The study found that trainers who felt competent in navigating digital platforms and incorporating multimedia resources were more likely to have favorable attitudes towards remote learning, viewing it as an effective means of enhancing teaching and learning experiences.

5.1.5 Remote learning tools used in technical training.

The objective of this study was to identify the remote learning tools used by trainers and trainees in technical training institutions in Bungoma County. The findings revealed that trainees accessed remote learning sessions and platforms using various devices, with 81.7% using smartphones, 8.8% using laptops, 1.1% using desktops, and 1.1% using tablets. Trainers, on the other hand, used laptops (37%), smartphones (60%), tablets (1%), and desktops (2%) for remote teaching. Most of both trainers and trainees relied on smartphones for accessing online learning systems. These results were in line with the findings of Miseda & Wanami (2022) who found that most trainers and trainees depended on their smartphones as the main remote learning tool and smartphones were inadequate because of their small screen sizes.

However, the study highlighted limitations associated with using smartphones for learning. Trainees faced distractions from calls, messaging apps, and social media platforms, which hindered their concentration during remote lectures. Moreover, the small screen size and limited functionality of smartphones made it challenging for trainees to effectively engage with learning materials and participate in online discussions.

The study also identified the trainees' ease of use with online tools. It was found that a significant portion of trainees (30.3%) reported email usage as easy, while 6.7% found it hard and 13.1% found it very hard. When it came to online platforms and e-learning platforms, a considerable number of trainees found them hard (22.9% and 23.2%, respectively) or very hard (14.5% and 20%, respectively) to use. These challenges in using online tools hindered trainees' understanding of concepts and their ability to actively participate in online sessions.

In terms of the tools implemented by institutions to support remote learning, the study found that 54.6% of trainers used video conferencing tools such as Google Meet, Zoom, Skype, and Discord. Additionally, 8.8% of trainers utilized institutional emails to communicate with trainees and share learning materials, assignments, and feedback. However, trainers noted that some trainees had difficulties responding to emails due to poor internet connectivity and low skills in handling emails.

The study also highlighted the challenges faced by institutions in fully implementing remote learning. These challenges included inadequate funding for upgrading internet bandwidth, lack of policies that support the provision of ICT services to trainees, and the absence of resource centers within communities to facilitate remote learning.

Bastola, et al., (2019) established that remote learning tools are very critical in implementation of effective remote learning. This finding agreed with earlier finding from a survey at Sydney, University in Australia which found that that poor technological infrastructure was one of the key reasons why adoption of distance education was a challenge (El Zein et al., 2021). Therefore, limited remote tools compromises the

effectiveness of e-learning programs. The provision of adequate digital infrastructure is therefore one of the ways through which the benefits that accure from remote learning can be tapped.

Overall, while there were efforts made by institutions to implement remote learning tools, there were limitations and challenges faced by both trainers and trainees in effectively utilizing these tools.

5.2 Conclusion

The study findings were concluded based on their findings as follows:

The demographic analysis revealed a male dominance among trainers, contradicting the goal of gender equality that aims to achieve gender equality and women's empowerment in national development. The age distribution of both trainers and trainees indicated a young population, which is advantageous in terms of understanding and utilizing technology effectively.

Assessing the competence of trainers, the study found that while many received clear instructions on remote teaching, some struggled to keep up with schoolwork and faced challenges in collaborating with co-workers during remote teaching. Addressing these issues could enhance the effectiveness of remote teaching.

On the competence of trainees, a significant portion faced difficulties in accessing instructional materials, leading to delays in completing assignments. This highlights the importance of clear instructions and support for trainees in remote learning.

Trainers generally demonstrated positive attitudes towards remote learning, with a majority finding it easy and effective. However, they also expressed concerns about the lack of teamwork and assistance from co-workers, which may impact the overall learning experience.

Trainees' attitudes towards remote learning varied, with a considerable proportion finding it enjoyable, while others disagreed. Challenges cited by trainees included the pace of teaching, internet connectivity issues, and distractions at home. Some preferred physical learning for better communication cues with trainers.

The study also assessed the remote learning tools used in technical training. Trainees primarily accessed remote learning through smartphones, which posed distractions and limited their learning experience. Challenges with using online tools, such as emails and e-learning platforms, were also reported by trainees.

In conclusion, the findings of this chapter provide valuable insights into the competence, attitudes, tools, and challenges associated with remote learning in technical training institutes in Bungoma County. Addressing these challenges and promoting a positive attitude towards remote learning can contribute to the successful implementation of remote learning initiatives in the region.

5.3 Recommendations

The study recommended the following in line with the research objectives, findings and conclusion:

1. Gender Equality and Diversity: Given the gender disparity amongst trainers and also amongst trainees, efforts should be made to promote gender equality in technical training institutes. The government should encourage and support the recruitment and professional development of female trainers to ensure a more balanced representation. There is also a need to encourage and support female trainees to join technical training institutes.

2. Train trainers in online pedagogical skills: Despite being trained, some trainers face challenges in effectively delivering remote learning. Institutions should provide ongoing training and support to enhance trainers' online pedagogical skills, including effective use of digital tools, fostering engagement, and addressing the unique challenges of remote teaching.

3. Provide clear instructions and support: Trainees need clear instructions on how to access instructional materials and navigate online learning platforms. Institutions should provide comprehensive guidelines and support to ensure trainees can effectively participate in remote learning activities.

4. Foster a positive attitude towards remote learning: Institutions should work towards cultivating a positive attitude towards remote learning among both trainers and trainees. This can be achieved by highlighting the benefits of remote learning, providing support for challenges faced, and creating a conducive virtual learning environment.

5. Diverse Learning Preferences: Acknowledge the varying attitudes of trainees towards remote learning. Institutions should offer flexibility in teaching methods and consider a blended approaches that combine both remote and physical learning to accommodate different learning preferences and communication needs.

6. Develop user-friendly online tools: Online platforms and tools used for remote learning should be user-friendly and accessible, taking into consideration the technological literacy of both trainers and trainees. Institutions should invest in user-friendly platforms and provide training on their effective use. Also given that trainees primarily use smartphones for remote learning, ensure that the technical infrastructure supports mobile learning effectively.

7. Address challenges of remote assessment: Institutions should explore innovative approaches to remote assessment to ensure that trainees' progress is accurately evaluated. This may involve using a combination of online quizzes, assignments, projects, and virtual exams while maintaining academic integrity.

5.4 Areas of further research

Areas for further research include:

- Exploring alternative assessment methods of assessment that are suitable for remote learning in technical training institutes.

- Investigating the role of institutional policies, guidelines, and support systems in promoting effective remote learning practices in TVET institutions.

- The research focused on TVC in Bungoma County. Therefore, there is need to conduct comparative studies across different counties and countries to identify best practices and lessons learned in implementing remote learning in technical training institutes.

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APPENDICES

Appendix I: Letter of Introduction

Muiruri Peter Mose

University of Eldoret

P.O. Box 1125 30100,

Eldoret.

The Principal

_____

_____

Dear Sir/Madam

RE: REQUEST TO CONDUCT A RESEARCH

I am a post graduate (MEd) trainee at University of Eldoret, Main Campus, currently caring out a study on "**Efficacy of Remote Learning in Technical and Vocational Education and Training Institutions in Bungoma County, Kenya.**". Please allow me to gather information from your institution. I kindly request the respondents in your institution to respond to the attached questionnaire and I do assure them that, the information provided was handled with utmost confidentiality and is exclusively intended for the purposes of the study only. I do request all respondents to be honest and accurate as much as possible in their responses.

Thank you in advance,

Yours faithfully,

Peter Mose

SEDU/TED/M/008/20

Appendix II: Informed Consent

Muiruri Peter Mose

University of Eldoret

P.O. Box 1125 30100,

Eldoret.

Dear Participant,

You have been selected to participate in the research on Efficacy of Remote Learning in Technical and Vocational Education and Training Institutions in Bungoma County, Kenya.

The information collected will help to assess and strengthen the existing remote learning activities of our TVET institutions and convincingly adopt remote learning as a viable teaching and learning strategy.

To ensure confidentiality, do not write your name or anything that will lead to your identification.

Your assistance and co-operation is highly appreciated.

Respondent's signature……………………

Date………………………………………

Muiruri Peter Mose

SEDU/TED/M/008/20

Appendix III: Questionnaire for the Trainers

I am Peter Mose, a Masters trainee in the University of Eldoret, carrying out a study on "**Efficacy of Remote Learning in Technical and Vocational Education and Training Institutions in Bungoma County, Kenya.**". The information collected will help to assess and strengthen the existing remote learning activities of our TVETs and convincingly adopt remote learning as a viable teaching and learning strategy.

Kindly respond honestly and accurately to questions listed below.

Section A: Demographic Information

1) Please indicate your gender.

a) Male ( ) b) Female ( )

2) How old are you? _____

3) Department _____

4) Indicate teaching experience _____

5) County of residence_____

SECTION B. Competence of remote learning

6) Have you been trained on how to teach remotely?

a) Yes ( )   b) No ( )

7) Do you teach remotely?

a) Yes ( )   b) No ( )

8) Do you have access to internet?

a) Yes ( )   b) No ( )

9) Do you have access to a device for learning online?

- ( )   Yes
- ( )   No, I share with others

10) What device do you use for remote teaching?

- ( )   Laptop
- ( )   Desktop
- ( )   Tablet

- ( ) Smartphone

11) How much time do you spend each day on average on remote education?

- ( ) Less than 1 hour
- ( ) 1-3 hours
- ( ) 3-5 hours
- ( ) 5+ hours
- ( ) Not sure

12) Has your school provided you clear instructions or training for how to conduct remote learning?

No [ ]   Yes [ ]

13) What are the tools is your institution developing or expanding to increase remote learning?

- ( ) Video conference
- ( ) Using YouTube
- ( ) Developing videos
- ( ) Creating virtual learning environments
- ( ) Developing new written resources
- ( ) Distributing written resources
- ( ) Developing blogs, discussion forums
- ( ) Simulators, virtual reality
- ( ) or augmented reality tools
- ( ) Using podcasts
- ( ) Using TV

Section C. attitude towards remote learning

Please indicate your agreement/disagreement on the following statements. SD= Strongly Disagree; D= Disagree, UD= Undecided, A = Agree and SA= Strongly Agree.

	SD	D	UD	A	SA
1. Do you agree that remote learning is effective?					
2. Do you agree that your institution provide resources for you while at home?					
3. Do you agree that trainees class attendance decrease while teaching remotely?					
4. Do you agree that teaching remotely at home is better than physical classes?					
5. Do you agree that you have full control of the trainees in the remote class?					

Please indicate your agreement/disagreement on the following statements. SD= Strongly Disagree; D= Disagree, UD= Undecided, A = Agree and SA= Strongly Agree.

	SD	D	UD	A	SA
1. Do you agree that remote learning easy?					
2. Do you agree that it easy to manage your time well while teaching remotely?					
3. Do you agree that your co-workers are helpful while teaching at home?					
4. Do you agree that your trainees are stressed or challenged by learning remotely?					
5. Do you agree that assessing trainees' progress is easy?					
6. Do you agree that trainee's interaction is easy remotely?					

D: Tools used.

Kindly check and tick (✓) the tools that you used to teach during the remotely and

indicate their ease of use (you can select multiple)

ICT tools	Check if used ( )	Very easy	easy	hard	Very hard
Email					
Videochat					
International communication platform e.g., Zoom, Google Hangouts, Google meet….					
E-learning platforms (LMS)					

14. What difficulties did you face in remote learning?

_____

_____

_____

_____

_____

_____

_____

15. What recommendations would you endorse for advancing remote learning?

_____

_____

_____

_____

_____

Thank you for your participation in this very important study.

Appendix IV: Questionnaire for the Trainees

I am Peter Mose, a final year trainee in the University of Eldoret, carrying out a study on "**Efficacy of Remote Learning in Technical and Vocational Education and Training Institutions in Bungoma County, Kenya.**". The information gathered will help to assess and strengthen the existing remote learning activities of our TVET institutions and convincingly adopt remote learning as a viable teaching and learning strategy.

Kindly respond honestly and accurately to questions listed below.

Section A: Demographic Information

1) Please indicate your gender.

  a) Male ( ) b) Female ( )

2) How old are you? _____

3) Course? _____

4) Indicate Year of study?

  a) first, I ( ) b) second, II ( ) c) Third, III ( ) d) Fourth, IV ( )

5) Are you working? a) Yes ( ) b) No ( )

  If yes, name occupation. _____

Section B. Competence

6) Do you learn remotely?

  a) Yes ( ) b) No ( )

7) Do you have access to internet?

  a) Yes ( ) b) No ( )

8) Do you have access to a device for learning online?

- ( ) Yes
- ( ) No

9) What device do you use for remote learning?

 a) ( ) Laptop

b) ( ) Desktop

c) ( ) Tablet

d) ( ) Smartphone

10) How much time do you spend each day on average on remote learning?

- ( ) Less than 1 hour
- ( ) 1-3 hours
- ( ) 3-5 hours
- ( ) 5+ hours
- ( ) Not sure

11) Has your institution provided you clear instructions for how to access the instructional materials for your classes?

No [ ]   Yes [ ]

Section C: Attitudes

Please indicate your agreement/disagreement on the following statements. SD= Strongly Disagree; D= Disagree, UD= Undecided, A = Agree and SA= Strongly Agree.

	SD	D	UD	A	SA
1. Do you agree that remote learning is enjoyable					
2. Do you agree that remote learning is effective					
3. Do you agree that learning remotely is better than physical					
4. Do you agree that assignment are difficult online					
5. Do you agree that it is easy to submit assignment to your trainers					
6. Do you agree that it is easy to interact with other trainees					

Please indicate your agreement/disagreement on the following statements. SD= Strongly
Disagree; D= Disagree, UD= Undecided, A = Agree and SA= Strongly Agree.

	SD	D	UD	A	SA
1. Do you agree that you keep up with your schoolwork as much while learning remotely as physically					
2. Do you agree that technical skill is gained in your area while studying remotely					
3. Do you agree that knowledge is gained in your area while studying remotely					
4. Do you agree to continuing having your classes remotely					
5. Do you agree that keeping up with your schoolwork remotely is same as physically					

Section D: Tools used.

Kindly check and tick (✓) the tools that are used to teach remotely and indicate their
ease of use (you can select multiple)

ICT tools	Check if used( )	Very easy	easy	hard	Very hard
Email					
Videochat					
International communication platform e.g., Zoom, Google Hangouts, Google meet….					
E-learning platforms (LMS)					

14. What difficulties did you encounter in remote learning?

_____

_____

15. What proposals would you endorse improving remote learning?

_____

_____

_____

Thank you for your participation in this very important study.

Appendix V: Interview schedule for the Principals

I am Peter Mose, a Masters trainee in the University of Eldoret, working on a study on "**Efficacy of Remote Learning in Technical and Vocational Education and Training Institutions in Bungoma County, Kenya.**". The information gathered will help to assess and strengthen the existing remote learning activities of our TVET institutions and convincingly adopt remote learning as a viable teaching and learning strategy.

Kindly respond honestly and accurately to questions list below.

Section A: Demographic Information

1) Observe gender   Male [   ]   Female [   ]

2) How many years have you served as a Principal? _____

3) How many years have you been in the current institution? _____

4) Does your Institution have internet access.

_____speed/bandwidth_____

5) Does the institution teach remotely?

Section B: Competence

6) Have trainers been trained on remote learning?

----

7) What support does the institution provide to trainers and trainees?

----

8) How does your institution assess trainees' progress remotely?

_____

_____

_____

_____

Section C: Attitude

9 a) Do you think you would be comfortable to allow trainees who have learnt remotely to sit for KNEC exams?

----

b) Trainees who have been exposed to remote learning how do they perform in KNEC exams?

----

c) Do you think remote learning affected their performance?

----

10) Do you think remote learning is effective in training technical skills?

Section E: Tools

11) What device do you recommend trainees and trainers to use for distance teaching?

----

12) What are the tools or resources you are developing or expanding to increase online and/or offline distance learning?

----

13) What are some of the challenges that your institution experience?

----

14) What recommendations do you think would help to make remote learning more effective?

Thank you for your participation in this very important study.

Appendix VI: Map of the Study Area

Appendix VII: Research Permit

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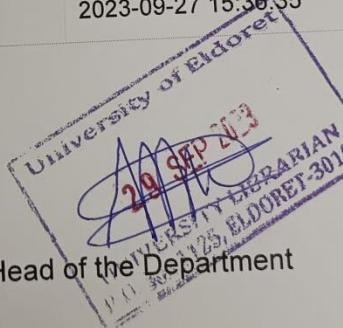
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