*IOSR Journal of Research & Method in Education (IOSR-JRME)*
*e-ISSN: 2320–7388, p- ISSN: 2320-737x Volume 15, Issue 1 Ser. 3 (Jan. – Feb. 2025), 37-63*
*www.iosrjournals.org*

# Assessing The Implementation Of Competency-Based Education And Training In Kenya: A Case Study Of The Nyeri National Polytechnic, Kenya

Kibet Fredrick
*School Of Education, Arts And Social Sciences, KCA University, Kenya*

***Abstract:***
***Background****: Competency-based education and Training (CBET) is a modern approach to technical training that emphasises trainees' development of practical skills, knowledge, and attributes. Unlike traditional technical training methods focusing on theoretical or abstract knowledge, CBET facilitates trainees' development of practical skills they can apply in real-world employment, making them highly competent professionals. The Ministry of Education launched CBET in technical training in Kenya in 2018. However, technical training institutions have yet to phase out traditional knowledge-based technical training to implement CBET entirely. This study aimed to assess the implementation of CBET in Kenya using The Nyeri National Polytechnic (NNP) in Nyeri, Kenya, as the case study. The research focused on the following objectives: to determine the level of pedagogical knowledge of the CBET approach among CBET trainers at NNP, to explore instructional processes CBET trainers use in content delivery at NNP, and to find out the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at NNP.*
***Materials and Methods****: Vygotsky's constructivist theory of learning guided the study. This theory suggests that learners are not passive receivers of information but active constructors of knowledge. A descriptive research design, using the case study method, was employed in this study. The study targeted a population of 3887, including 265 CBET trainers and 3622 CBET trainees at NNP. The study sampled 363 respondents, including 25 CBET trainers and 338 CBET trainees. The researcher selected CBET trainers using purposive sampling and chose CBET trainees using stratified purposeful sampling. The researcher collected the data through questionnaires and coded this data using the SPSS. The researcher analysed the coded data using descriptive statistical methods such as frequency, percentage, and mean and presented them as explanatory narratives, tables, and charts.*
***Results****: The study's results indicated an Advanced Level (74%) of pedagogical knowledge of the CBET approach among the CBET trainers. This showed that the trainers firmly understood the CBET approach, though there was still room (26%) for improvement to reach the Expert Level (90% - 100%). Moreover, results indicate that CBET trainers' usage of Universal Design for Learning (UDL), active learning and learner-centred methods, practical sessions, and dual training averages 68.8%, while traditional training methods such as the four-month attachments account for 31.2%. The results also showed 38.9% reliance on traditional written assessment methods, including written assignments, discussion problems, research questions, and project preparations. Trainers evaluate trainees only once during their four-month industry attachments and use written assessments (CATs and end-of-term exams) to determine competence.*
***Conclusion:*** *Recommendations indicate a promising opportunity for further professional development aimed at advancing trainers' expertise to an Expert Level. Targeted interventions were recommended to refine instructional methods, increase resource availability, and strengthen partnerships for dual training opportunities. Additionally, it is crucial for CBET trainers to incorporate innovative assessment tools and approaches further, ensuring a thorough evaluation of trainees' competencies that aligns with industry standards and demands. This research provides valuable insights for stakeholders in the education sector, offering a foundation for evaluating the implementation of CBET across technical institutions. It holds implications for educational policymakers in refining strategies and frameworks to enhance the efficacy of CBET initiatives. Moreover, the findings contribute to the growing body of knowledge regarding CBET, serving as a resource for future research in this domain.*
***Key Word****: CBET; pedagogy; training; assessment; skills.*

---

Date of Submission: 02-02-2025 Date of Acceptance: 12-02-2025

---

# I. Introduction To The Study

**Background of Study**

Competency-Based Education and Training (CBET) is a skills-focused modern technical training approach that centres on trainees' development of competencies (Dambudzo, 2018). Competencies comprise trainees' practical skills, knowledge, and attitudes or worker behaviours. Competence is the ability to perform tasks or work to specified occupation standards. CBET produces graduates with quality practical skills who can meet real-world employment demands without additional training. According to Dambudzo (2018), CBET imparts practical skills to trainees for self and industry employment. This enables them to become highly competent professionals, unlike traditional technical training methods that primarily focus on theoretical or abstract knowledge.

The United States of America (USA) began implementing CBET in technical training between the 1950s and 1970s (Hodge, 2007). This implementation significantly enhanced the advancement of science and technology in the USA by producing graduates who are better aligned with the needs of employers, thus increasing the employability and self-employment opportunities for Technical and Vocational Education and Training (TVET) graduates, who, in turn, contribute to social and economic development (Rutayuga, 2014). Since 1968, the United Kingdom (UK), Australia, Netherlands, and Germany have also embraced and successfully implemented CBET, producing highly skilled and competent graduates. This success story of CBET in these developed countries instilled confidence in its potential for African countries.

South Africa was the first in Africa to introduce CBET during the late 1990s to tackle the severe shortage of skilled workers (Jwan, 2022). Subsequently, other African nations, including Malawi, Ghana, and Ethiopia, adopted this approach. Tanzania, a country belonging to the East African Community (EAC), started the implementation of CBET in the early 2000s (Rutayuga, 2014). African countries view CBET as emphasising the development of practical skills that trainees can apply rather than solely focusing on theoretical knowledge (Jwan, 2022). The CBET approach meets the evolving needs of trainees and society, allowing them to gain practical skills, knowledge, attitudes, and values that enable effective problem-solving in real-life situations. However, the urgent need for effective implementation is evident in African countries, including Kenya, which has not yet implemented it effectively.

In 2018, through the Ministry of Education (MOE), the Kenyan government took the initiative by introducing CBET in technical institutions. This move was in response to concerns that traditional knowledge-based technical training focused too much on theory and not enough on assessing competencies (The Republic of Kenya, 2008). The industry also influenced the government's decision, as employers stressed the need for graduates to be better prepared for employment. The introduction of CBET also aimed to enhance education in sciences, technology, engineering, and mathematics, aligning with Kenya's Vision 2030 and the BIG 4 agenda. These initiatives seek to elevate Kenya to a newly industrialising, middle-income country with high living standards for all citizens by 2030 in a clean and secure environment (The Republic of Kenya, 2008).

Kenyan government acknowledges the importance of cultivating a well-educated population with high skills to effectively participate in the ever-expanding global market (The World Bank, 2007). According to The World Bank (2007), technical training is instrumental in enhancing the productivity of skilled labour, which is a crucial factor in economic productivity and competitiveness. This underscores the significance of investing in training to bolster the country's economic performance and nurture skilled human capital. The persistently elevated level of youth unemployment in Kenya presents a significant challenge. This issue results from traditional knowledge-based technical training, which has consistently generated inadequately skilled graduates who struggle to meet industry standards (Bhurtel, 2015). In contrast, CBET offers a promising solution to this pressing problem. CBET produces high-performing graduates capable of meeting industry requirements by focusing on developing relevant skills. This unique aspect of CBET reduces the need for costly retraining of employees, fulfilling the demand for skilled and competent graduates who are well-prepared for success in their respective industries without additional training.

The rapid evolution of technology innovations worldwide has increased demand for CBET in technical training since it equips graduates with the skills necessary to adapt to changing job market requirements (KEPSA, 2024). To speed up the implementation of CBET in Kenya, the MOE, through the State Department for Technical Education, directed all TVET institutions to ensure they only admit all trainees into CBET courses during the September 2023 intake. Technical training institutions in Kenya continue to admit trainees into traditional knowledge-based technical training courses. They have yet to embrace CBET and fully transition from conventional training approaches. According to Osawa et al. (2023), TVET institutions in Kenya—including 12 National Polytechnics, 311 public Technical and Vocational Colleges (TVCs), 855 private TVCs, and 991 Vocational Training Centres (VTCs)—are still struggling to prepare for the implementation of Competency-Based Education and Training (CBET). This challenge stems from the adequacy of theory rooms, insufficient workshops and laboratories, inadequate technological equipment for training, and an overall deficiency in infrastructure.

The Nyeri National Polytechnic (NNP) in Nyeri, Kenya, introduced the CBET approach in 2019, according to the Office of the Deputy Principal (Academics). By April 2024, NNP had developed over 92 CBET programs, and over 250 trainers had undergone in-service training on instructional training and assessment methodologies in CBET. 3622 (51%) trainees were enrolled in these CBET courses, according to the Office of the Registrar (Administration), while 3499 (49%) trainees were enrolled in more than 100 traditional knowledge-based programs.

**Statement of the Problem**

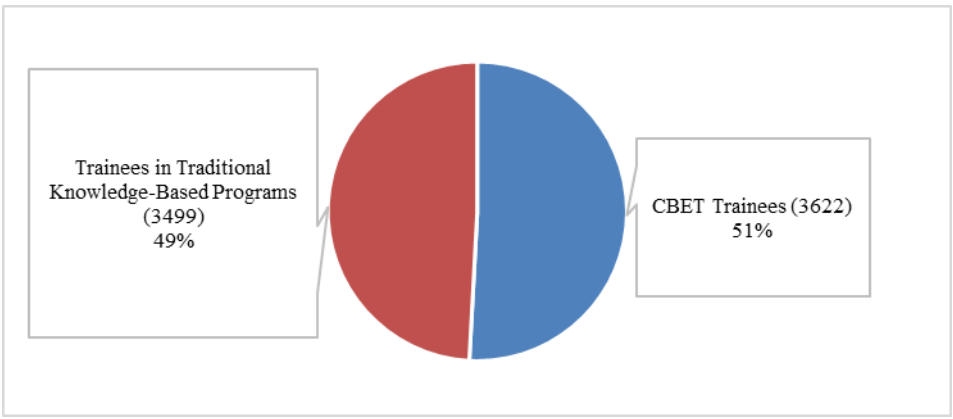
CBET is a skills-focused modern technical training approach that centres on trainees' development of practical skills, knowledge, and attitudes or worker behaviours (Dambudzo, 2018). According to Dambudzo (2018), CBET imparts practical skills to trainees for self- and industry employment. This enables them to become highly competent professionals, unlike traditional technical training methods that primarily focus on theoretical or abstract knowledge. In 2018, through the MOE, the Kenyan government introduced CBET in technical institutions in response to concerns that traditional knowledge-based technical training focused too much on theory and not enough on assessing competencies (The Republic of Kenya, 2008). To speed up the implementation of CBET, the MOE, through the State Department for Technical Education, directed all TVET institutions to ensure they only admit all trainees into CBET courses during the September 2023 intake.

Technical training institutions in Kenya continue to admit trainees into traditional knowledge-based technical training courses. They have yet to embrace CBET and fully transition from conventional training approaches. According to Osawa et al. (2023), TVET institutions in Kenya—including 12 National Polytechnics, 311 public Technical and Vocational Colleges (TVCs), 855 private TVCs, and 991 Vocational Training Centres (VTCs)—are still struggling to prepare for the implementation of Competency-Based Education and Training (CBET). This challenge stems from the adequacy of theory rooms, insufficient workshops and laboratories, inadequate technological equipment for training, and an overall deficiency in infrastructure.

The Nyeri National Polytechnic (NNP) in Nyeri, Kenya, introduced the CBET approach in 2019, according to the Office of the Deputy Principal (Academics). By April 2024, NNP had developed over 92 CBET programs, and over 250 trainers had undergone in-service training on instructional training and assessment methodologies in CBET. During the term ending April 2024, 51% of trainees in NNP were enrolled in these CBET programs. In comparison, 49% were enrolled in more than 100 traditional knowledge-based programs, as shown in Figure 1.

**Figure 1**

Total Number of Trainees at NNP




*Note*. This figure shows the number of NNP trainees enrolled in traditional knowledge-based and CBET programs during the term ending April 2024. The figure indicates that 3622 trainees in NNP were enrolled in these CBET courses, making up 51% of the total trainees. In comparison, 3499 trainees in NNP were enrolled in more than 100 traditional knowledge-based programs, making up 49% of the total trainees. These statistics showed the need to assess how technical institutions in Kenya implement CBET. This study aimed to assess the implementation of CBET in Kenya, using NNP in Nyeri, Kenya, as the case study. The researcher intended to propose recommendations to improve the implementation of CBET in technical training institutions in Kenya.

**Purpose of the Study**

This study aimed to assess the implementation of competency-based education and training (CBET) in Kenya, using The Nyeri National Polytechnic in Nyeri, Kenya, as the case study.

**Objectives of the Study**

To achieve the purpose of the study, the research focused on the following objectives:

a) To determine the level of pedagogical knowledge of the CBET approach among CBET trainers at The Nyeri National Polytechnic.
b) To explore instructional processes CBET trainers use in content delivery at The Nyeri National Polytechnic.
c) To find out the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at The Nyeri National Polytechnic.

**Research Questions**

The following research questions guided the researcher:

a) What is the level of pedagogical knowledge of the CBET approach among CBET trainers at The Nyeri National Polytechnic?
b) What instructional processes do CBET trainers use in content delivery at The Nyeri National Polytechnic?
c) What assessment methods do CBET trainers use to evaluate the competence levels developed by CBET trainees at Nyeri National Polytechnic?

**Assumptions of the Study**

The initial assumption in this study was that all respondents would be willing to cooperate and provide accurate information. This assumption is crucial for any research endeavour, as it significantly influences the data quality collected. If respondents are uncooperative or provide unreliable information, it can compromise the integrity of the findings. The study's validity relies on the trustworthiness of the data gathered from participants. Thus, ensuring respondent cooperation is essential for obtaining meaningful and credible results.

The second assumption posited that all CBET trainers had participated in in-service training focusing on CBET instructional methods and competency-based assessment (CBA). This training is essential because it equips the trainers with the necessary skills and knowledge to effectively educate and evaluate CBET trainees. With this foundational understanding, trainers could ensure that the training delivered is accurate and aligned with the competency standards, enhancing the quality of education and the effectiveness of the assessment process.

Lastly, the researcher assumed that all CBET trainers and trainees have a cheerful outlook toward CBET. This was vital in ensuring the smooth running of the training process. A cheerful outlook toward CBET implies that the trainers and trainees are willing to fully engage in the training process and, as a result, are likely to perform better. These assumptions formed the study's foundation and were pivotal in ensuring that it accomplished its objectives and that the results were accurate and dependable.

**Significance of the Study**

This study offers in-depth insights for all stakeholders in the education sector, establishing a solid foundation for evaluating the implementation of CBET. By thoroughly delving into this assessment, MOE and its educational planners can identify strengths and weaknesses in current practices. This understanding will enable them to develop more effective policies and frameworks to improve training quality. This comprehensive approach fosters a more robust educational environment, benefiting students, educators, and the broader community.

The study's findings provide valuable insights into trainers' implementation of Competency-CBET. It highlights the current practices and offers recommendations for continuous improvement. By increasing the knowledge and skills of CBET trainers, administrators, MOE, and other stakeholders in the education sector, the study aims to enhance the overall effectiveness of CBET implementation. This empowerment is crucial for fostering better educational outcomes and ensuring that trainers are well-equipped to meet the evolving needs of learners.

This study is an advocacy tool to promote effective CBET implementation in Kenya. The findings highlight the benefits of adopting CBET, which can enhance educational outcomes and prepare learners for the workforce. By outlining practical methods for training, learning, and assessment within the CBET framework, this research provides valuable insights that can assist educational institutions in designing and developing more robust and effective CBET programs. The goal is to encourage more institutions to embrace CBET, leading to improved academic standards and greater alignment with industry needs.

This study significantly enhances the existing knowledge base for researchers focused on CBET. By conducting thorough research and collecting pertinent data, the study offers valuable insights into the methods and practices of technical institutions in Kenya when implementing CBET. The findings contribute to a deeper understanding of CBET and serve as a resource for future researchers. They can use this information to explore various avenues for further improvement in the approach, leading to more effective educational strategies and outcomes in technical training.

**Scope and Limitations of the Study**

The study focused on assessing the implementation of CBET in Kenya. Using NNP in Nyeri, Kenya, as the case study, it determined the level of pedagogical knowledge of the CBET approach among CBET trainers at NNP, explored instructional processes CBET trainers use in content delivery at NNP, and found out the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at NNP.

The researcher, however, limited this study to NNP and did not conduct studies in any other TVET institution. NNP is among Kenya's first TVET institutions to provide training in CBET programs in 2019. Since then, it has developed 92 accredited CBET programs and trained over 250 trainers on instructional and assessment methodologies in CBET. NNP is also one of the TVET institutions in Kenya with the highest number of CBET trainees. Focusing on it alone reflects how other TVET institutions in Kenya implement CBET. The researcher also limited the study to a sample of 363 CBET trainers and CBET trainees at NNP because of time constraints and resource implications. This study has a target population of 3887, so a relevant sample was enough. The researcher used only questionnaires to collect data from CBET trainers due to the limitations of using Focus Group Discussions (FGDs), as the trainers were busy and unwilling to be tape-recorded.

## II. Literature Review

**Level of Pedagogical Knowledge of the CBET Approach Among CBET Trainers**

Trainers must possess modern pedagogical skills such as content knowledge, Information Communication Technology (ICT) usage, critical and creative thinking strategies, and research-based training and learning principles (Ganal et al., 2019). In a study conducted by Ganal et al. (2019) in Alicia, Isabela, Philippines, the researchers assessed the training needs of trainers on modern pedagogical skills and personal development. The study involved ninety-two teachers randomly selected from the Department of Education out of 307. The researchers used a survey questionnaire and informal interviews to collect data, and their analysis focused on descriptive statistics, including frequency, percentage, and mean. The results highlighted the significance of assessing trainers' training needs to plan and execute appropriate training programs for high-quality workplace performance. Furthermore, the researchers recommended that tailored training, designed to meet each trainer's specific needs, motivates trainers to enhance their training skills and boosts their confidence and job satisfaction by confirming the effectiveness of their training methods through the endorsement of trusted and respected colleagues.

Research has suggested that the successful implementation of CBET in TVET institutions is contingent upon the pedagogical knowledge of the trainers (Labani et al., 2019). Labani et al. (2019) conducted a quantitative study on CBET implementation in technical colleges in Arusha, Tanzania. Their study used purposive sampling to select twenty-four trainers from three technical institutions who responded to questionnaires. The researchers subjected the collected data to content analysis techniques. The findings revealed that while most trainers had undergone in-service training, more than half required a better understanding and awareness of the meaning and objectives of the CBET curriculum. The research concluded that the trainers must be aware and possess knowledge of any new training mode influenced by the training administrators provide them to acquaint them with any new training mode. Therefore, it is imperative to ensure that trainers are well-informed about the emphasis and goals of CBET, preparing them for effective implementation.

Langat et al. (2021) conducted a research study to assess the impact of trainers' pedagogical skills on training effectiveness in public TVET institutions in Kenya. The study used a descriptive research design and surveyed 55 of 181 TVET institutions. The participants included registrars, deputy principals, or principals who provided information through questionnaires. Using descriptive and inferential statistics, the study found a positive correlation between trainer pedagogy and training effectiveness. The researchers recommended that the government invest in professional development for trainers to improve the effectiveness of TVET institutions in Kenya.

**Instructional Processes CBET Trainers Use in Content Delivery**

Learner-centred approaches significantly enhance training and learning in the classroom (Filippos, 2023). Filippos (2023) researched instructional techniques to implement the learner-centred approach in Ioannina, Greece. After reviewing approximately 180 studies and research papers at national and international levels and searching databases such as Google Search, Filippos found that learner-centred approaches encompass activities like brainstorming, concept maps, group work, role-playing, problem-solving, debate, and De Bono's Six Thinking Hats. The researcher highlighted that learner-centred training techniques are innovative educational tools that prioritise the learner in the educational process, leading to successful learning outcomes. The study concluded that learner-centred approaches offer significant advantages, including addressing students' needs, increasing engagement, and improving trainees' self-confidence and collaborative skills.

Trainers should be familiar with the recommended training methods in CBET (Labani et al., 2019). Labani et al. (2019) conducted a quantitative study on CBET implementation in technical colleges in Arusha, Tanzania. Their study used purposive sampling to select twenty-four trainers from three technical institutions who responded to questionnaires. The researchers subjected the collected data to content analysis techniques. According to these researchers, it is essential for trainers to carefully choose training methods that align with the content trained and the skills that trainees need to develop during the training process. They also emphasised the significance of selecting methods that facilitate the acquisition of competencies highlighted in the CBET. Additionally, trainers should understand various active, learner-centred training methods and know when and how to implement them effectively.

MOE should offer additional instructional resources and training aids, including ICT equipment, to implement an outcome-based curriculum effectively (Wanjiku, 2022). Wanjiku (2022) conducted a study to explore the challenges faced by public primary schools in Northeastern Kenya when implementing the competency-based curriculum (CBC). The researcher used a combination of stratified, simple random, and purposive sampling to select a sample of fourteen head teachers, one hundred teachers, one education officer, and two quality assurance officers. The researcher collected the data through questionnaires and interviews and used qualitative and quantitative methods to analyse it. The study concluded that instructional tools such as audio-visual and ICT equipment should be readily available in addition to an ample supply of textbooks.

**Assessment Methods CBET Trainers Use to Evaluate the Competence Levels Developed by CBET Trainees**

Effective assessment practices for trainers in TVET include readiness assessment for careers or industries, establishing assessment systems to support instruction, and implementing collective and reflective assessment processes (Sarmiento et al., 2020). In a study conducted by Sarmiento et al. (2020), the researchers explored the assessment practices used by educators in higher education in the Philippines. They derived the data from state-funded research on STEAM (science, technology, engineering, arts, and maths) education in the Philippines. The researchers employed the Classroom Observation Protocol to gather information from 106 STEAM teachers across fourteen regions. The researchers analysed the data through condensation, display, and conclusion verification. The findings indicated that STEAM teachers effectively utilised traditional and authentic assessment tools and strategies with technology integration.

Evaluating trainees through various appropriate methods is critical in determining training effectiveness (Sewagegn, 2019). In a study examining the assessment methods used by teachers and the associated challenges in assessing learning at an Ethiopian university, Sewagegn (2019) employed a convergent parallel mixed-method design. Out of the 210 teachers sampled, 166 completed and returned the questionnaire. Additionally, six heads of departments and six teachers participated in interviews. The results indicated that teachers rely on traditional written assessment methods rather than exploring innovative alternatives that could reveal their students' creativity and proficiency in their areas of study. However, teachers need help with attempting unfamiliar assessment methods. The study highlighted that continuing with current assessment practices may hinder the development of students' creativity and proficiency in their respective study areas. Lastly, the study underscored the significance of practical assessment in assisting students in developing proficiency in their areas of study.

Labani et al. (2019) conducted a quantitative study on CBET implementation in technical colleges in Arusha, Tanzania. Their study used purposive sampling to select twenty-four trainers from three technical institutions who responded to questionnaires. The researchers subjected the collected data to content analysis techniques. These researchers highlighted the importance of assessment and evaluation in CBET, emphasising that these processes are vital for ensuring the validity of all implementation stages. Consequently, trainers must possess the necessary skills and knowledge of assessment and evaluation methods in CBET. Assessments in CBET encompass various techniques such as assignments, classroom tests, informal oral evaluations, informal observation, practical tasks, end-of-semester examinations, and product assessments (Labani et al., 2019).

To ensure objective assessments in CBET, all TVET institutions must incorporate industry exposure, natural work environments, or simulations into formative and summative assessments (Sima, 2021). Sima (2021) conducted a comprehensive study to evaluate the influence of CBET on the quality of nursing education in schools within Tanzania's Lake Zone region. The study used a descriptive survey design and employed questionnaires, interviews, and observations for data collection. The research concluded that trainers should meticulously prepare, moderate, and align assessments with industry standards.

Research indicates that written examinations are the most used method for assessing trainees, followed by projects and attachments (Moindi & Nyatuka, 2022). In their study, Moindi and Nyatuka (2022) evaluated the effectiveness of different assessment methods in developing the necessary competencies in trainees within TVET institutions in Kenya. The study used a cross-sectional research design and involved 412 trainees selected from three TVET institutions. The researchers collected the data through questionnaires and analysed it using

both descriptive and inferential statistics. The research revealed that the choice of assessment method had a more pronounced impact on acquiring ideas, opportunities, and resource competencies than the into-action competencies. The study recommends using tailored assessment methods based on specific training needs to enhance the acquisition of relevant competencies.

**Knowledge Gaps**

According to the literature, the quality of the trainers' training influences their grasp of any new training approach (Labani et al., 2019). Trainers need to fully comprehend the focus and goals of CBET. Alongside ongoing training, research must explore ways to upgrade and enhance trainers' skills within the industry. Given the rapid technological progress, trainers need regular short-term sessions in the industry to update their practical skills and knowledge. This will help to bridge the gap between what they train in TVET institutions and what employers require. Additionally, trainers must undergo industry training to stay abreast of current and emerging trends.

The literature suggests that learner-centred approaches significantly enhance training and learning in TVET institutions (Filippos, 2023). However, implementing CBET in Kenya hinges on integrating Dual TVET training as an instructional method. This instructional approach, in which trainees spend 50% of their training time gaining industry experience and the remaining 50% in classroom learning, is crucial for Kenya to stay current with emerging technologies and industry innovations. Reports indicate that Kenyan tertiary institutions lack adequate instructional tools and training aids for acquiring practical skills (Wanjiku, 2022). Dual TVET training can address this challenge by enabling trainees to develop innovative, industry-relevant skills associated with emerging technologies. Hence, incorporating dual TVET training as an instructional process is crucial for implementing CBET in Kenya.

Literature advocates the utilisation of industry settings, real-world work environments, or simulations for objective formative and summative assessments in CBET (Sima, 2021). Incorporating electronic assessment methods is also a crucial consideration in the context of CBA. Trainers should familiarise themselves with and employ technology-based assessment tools to offer immediate feedback and personalised, continuous assessment for learners. Within CBET, learners should be able to undertake assessments at their own pace until they have acquired the required competencies. Therefore, integrating technology into assessments is a fundamental area of focus that trainers should incorporate into the dialogue of CBET assessments. Administrators must assess the implementation of CBET in TVET institutions to understand its effectiveness and the challenges to its successful implementation. This requires a comprehensive and integrated examination of all its components and aspects.

**Theoretical Framework**

Implementing new training modes in the TVET sector aims to increase the relevance of training to trainees. Employers demand highly skilled employees who are well-updated with the industry's current and future technologies, as well as trainees' competence in practising skills and applying knowledge when employed. Training must be in tandem with a country's dynamic social, economic, and technological needs (Labani et al., 2019). To successfully implement CBET in TVET institutions in Kenya, trainers and administrators must believe in learning theories that guide the training and learning process. Thus, in assessing the implementation of CBET in Kenya, the researcher used Vygotsky's constructivist theory of learning (1970s to 1980s).

Vygotsky's constructivist learning theory states that trainees construct skills and knowledge rather than passively absorb information (Lane, 2022). As they experience and reflect on the world, they build their representations and incorporate the latest information into their preexisting knowledge. In his article on professional learning communities, Hord (2009) identified six fundamental principles important to Vygotsky's constructivist theory of learning. The first principle emphasises that learners bring unique prior knowledge, experience, and beliefs to a learning situation. The researcher used this principle to explore instructional processes CBET trainers use in content delivery at NNP. The discussion method is one learner-centred approach that trainers use during the lesson's bridge-in session. Bridge-in aims to introduce the topic to learners, grab their attention, engage them, motivate them, and establish relevance by assessing their prior knowledge.

The second principle states that trainees uniquely and individually construct knowledge through various authentic tools, resources, experiences, and contexts. The researcher used this tenet to determine the level of pedagogical knowledge of the CBET approach among CBET trainers at NNP. To improve and optimise teaching and learning for all learners based on their understanding of how they learn, trainers must employ a Universal Design for Learning (UDL) in the classroom. To cater to all learners, trainers must use visual, auditory, action, and reading methods when delivering content.

The third principle emphasises that learning is an interactive and reflective process. CBET philosophy suggests that individuals acquire new skills and knowledge by reflecting on their experiences rather than

memorising information through conventional teaching methods such as lecturing. This principle significantly reveals the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at NNP. Trainers should ensure that the methods used to assess trainees do not encourage memorisation but show the application of the acquired competencies. For trainers to declare trainees competent, trainees should be able to apply the skills and knowledge acquired during training and perform all the tasks according to occupational standards (OS). They must also reflect on and consider this during the assessments.

The fourth principle states that learning is a developmental process in which trainees construct new conceptual structures, meaningful representations, or mental models through accommodation, assimilation, or rejection. CBET is a training approach that emphasises practical and experiential learning. It encourages trainees to actively engage with the material and apply it in real-world contexts. The researcher used this principle to explore instructional processes CBET trainers use in content delivery at NNP.

According to the fifth principle, social interaction can be vital in developing and acquiring knowledge. This principle implies that when learners engage in social interaction, they can obtain multiple perspectives on a particular topic or concept through reflection, collaboration, negotiation, and shared meaning. This tenet holds specific significance in the context of CBET trainers at NNP. This principle helped the researcher determine the level of pedagogical knowledge of the CBET approach among CBET trainers at NNP by emphasising the importance of social interaction in learning. It can facilitate a collaborative and reflective approach to education, enhancing their ability to impart knowledge and skills effectively. By applying this principle in their training programs, CBET trainers can create a conducive learning environment that fosters multiple perspectives and enhances their trainees' learning outcomes.

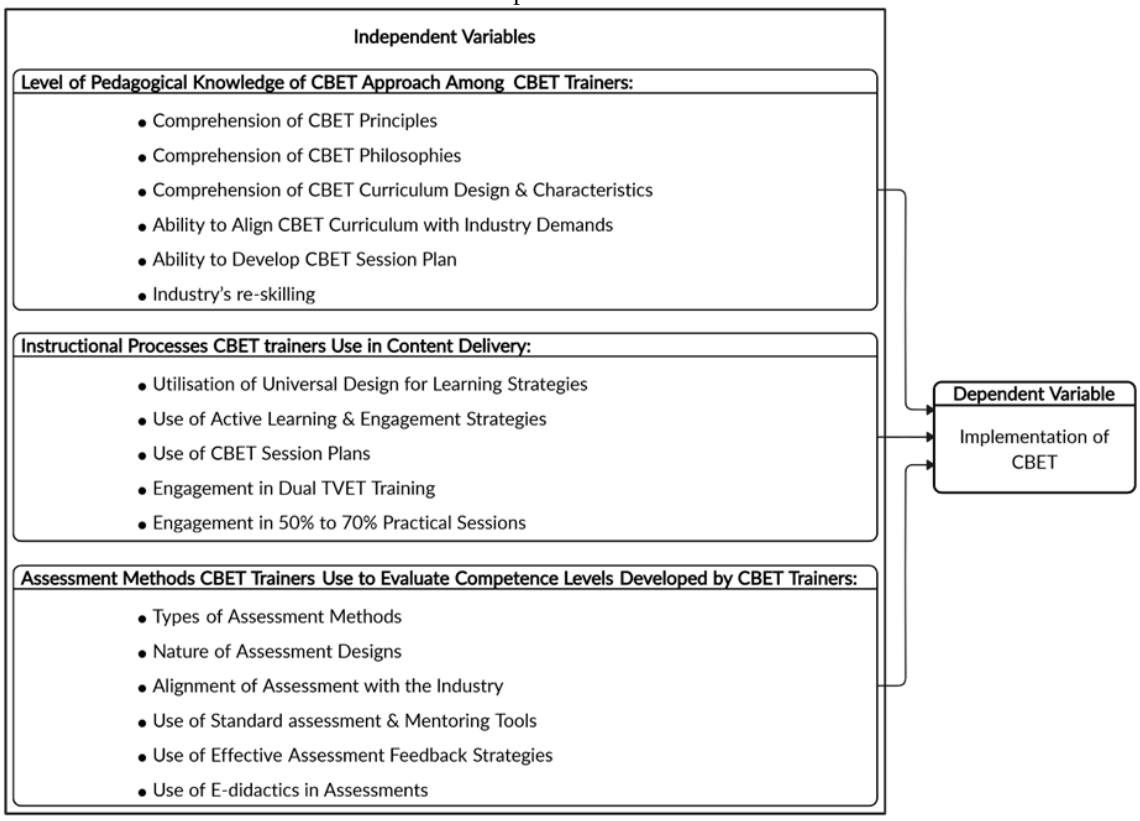
The sixth principle states that the learner controls and mediates learning internally. This tenet helped the researcher fulfil the following objectives of the study: to explore instructional processes CBET trainers use in content delivery at NNP and to find out the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at NNP. This principle helps to promote a sense of independence and empowerment in CBET trainees, which can be invaluable for achieving successful outcomes. Trainees can achieve this using technology-personalised learning methods such as a learning management system (LMS). Trainees can also use ICT tools like quizzes to personalise learning and assessment.

**Conceptual Framework**

Figure 2 shows the conceptual framework of the study.

**Figure 2**

Conceptual Framework



*Note*. This figure shows the conceptual Framework of the study. It illustrates that trainers' comprehension of CBET principles, philosophies, curriculum design, and characteristics affects their pedagogical knowledge of the CBET approach. Additionally, their ability to align the curriculum with industry demands and develop a session plan plays a role. Furthermore, the industry's re-skilling of CBET trainers influences their pedagogical knowledge of the CBET approach. CBET trainers' abilities to use Universal Design for Learning strategies, active learning and engagement strategies, and session plans influence their instructional processes. Additionally, engaging trainees in dual TVET training and 50% to 70 % practical sessions can affect CBET trainers' instructional processes in content delivery. The types and nature of CBET trainers' assessments, their alignment with the industry, and standard evaluation and mentoring tools influence the assessment methods CBET trainers use to evaluate the competence levels CBET trainees develop. Effective assessment feedback strategies and e-didactics also influence these methods. Thus, the level of pedagogical knowledge of the CBET approach among CBET trainers, the instructional processes CBET trainers use in content delivery, and the assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees influence the implementation of CBET.

## III. Research Methodology

**Study Design**

To assess the implementation of CBET in Kenya, the researcher used a descriptive study design using the case study method. The researcher chose this design for its ability to provide a comprehensive understanding of the social system, such as a TVET institution (Siedlecki, 2020) and will be instrumental in this research. The case study research method comprehensively examines one or more units, individuals, organisations, groups, entire communities, or regions to analyse the phenomenon's context and process (Coombs, 2022). Coombs (2022) further affirmed that this approach involves thorough investigations of these units. The researcher used NNP as a case study to assess the implementation of CBET in Kenya and used the findings to generalise the implementation of CBET in other TVET institutions in Kenya.

**Study Location**

The researcher conducted the study at The Nyeri National Polytechnic (NNP) in Nyeri County, Kenya. NNP is located along Mumbi Road, 2.8 km from Nyeri Town Centre, at the latitude of $0.4270^{o}$ S and longitude of $36.9455^{o}$ E. According to the Office of the Deputy Principal (Administration), NNP, formerly a Technical Training Institute (TTI), is a National Polytechnic established under Legal Order No. 91 of 2016. The legal order mandates NNP to independently design, develop, train, and implement curricula and award certificates. To assess the implementation of CBET in Kenya, the researcher selected NNP as the case study for five reasons.

First, NNP was a trailblazer among the first public TVET institutions in Kenya to embrace CBET, introducing it in 2019, a year after the MOE's mandate for technical institutions in 2018. This pioneering spirit has matured into five years of experience in CBET training and assessment at NNP. However, it is worth noting that 3499 (49%) of NNP trainees are still engaged in theoretical knowledge-based technical training that does not assess trainee competencies. This unique blend of history and current practice made NNP a compelling subject for this study.

Second, by 2023, NNP had not just developed but also accredited an impressive ninety-two CBET programs, the highest number by any TVET institution in Kenya, as confirmed by the Office of the Deputy Principal (Academics). By the end of April 2024, 3622 (51%) of NNP trainees were in these CBET programs. This percentage underscored the significant role NNP plays in technical education, making it a compelling case study.

Thirdly, NNP boasts the largest pool of CBET trainees for this study. As of the term ending in April 2024, 3622 CBET trainees were in 92 CBET programs, as reported by the Office of the Registrar (Administration). This substantial sample size ensured that the study's results were dependable and valid.

Moreover, NNP has conducted in-service training sessions on instructional training and assessment methodologies in CBET for over 250 trainers. However, NNP continues to offer traditional knowledge-based technical training programs. To put it succinctly, NNP also boasted the largest pool of CBET trainers for the study.

Additionally, in November and December 2023, NNP held its national summative exams, in which more than 661 CBET program trainees participated. This information was crucial in achieving the third objective of this study, which is to find out the various assessment methods CBET trainers use to evaluate the competence levels developed by CBET trainees at NNP.

**Study Duration**

The study lasted for two years, from January 2023 to October 2024.

**Study Population**

Mugenda and Mugenda (1999) define a population as a complete set of individual cases or objects with common observable characteristics. The study's target population was 3887, including 265 CBET trainers and 3622 CBET trainees at NNP, as shown in Table 1. Trainers are pivotal in implementing the curriculum as they receive, interpret, and execute it. Furthermore, they consider the diverse needs of the trainees they engage with. This study gathered insights from CBET Trainers at NNP regarding their pedagogical understanding of the CBET approach, the various instructional processes they employ for content delivery, and the assessment methods they use to evaluate the competence levels developed by CBET trainees. The contribution of CBET trainees is also crucial, as they possess extensive knowledge about CBET implementation, including the instructional strategies CBET trainers use in content delivery and the assessment methods CBET Trainers use to evaluate the competence levels they develop during their training.

**Table 1**

Study Population

| Groups | Population | Percentage of the Total Population |
|---|---|---|
| CBET Trainers | 265 | 6.82 % |
| CBET Trainees | 3622 | 93.18 % |
| **Total** | **3887** | **100 %** |

*Note*. This table shows the study's population of CBET trainers and trainees at NNP. The target population was 3887, including 265 CBET trainers and 3622 CBET trainees at NNP.

**Sampling Size**

The researcher used the Taro Yamane formula to select a sample of 363, including 25 CBET trainers and 338 CBET trainees at NNP, as shown in Table 2. The Taro Yamane formula enhances accuracy by determining a representative sample size with a reasonable margin of error (Baridam, 2001). Baridam (2001) stated the Taro Yamane formula as follows:

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

Here, $\boldsymbol{n}$ is the sample size, $\boldsymbol{N}$ is the target population, and $\boldsymbol{e}$ is the margin of error. For this study, there is a 95% confidence level (or 0.05 error margin) in the sample the researcher selected from the population. For this study, the researcher calculated the sample size as follows:

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

$$\boldsymbol{n = \frac{3887}{1 + 3887(0.05^2)} = 363}$$

**Table 2**

Study Sample Size

| Groups | Sample | Percentage of the Total Sample |
|---|---|---|
| CBET Trainers | 25 | 6.82 % |
| CBET Trainees | 338 | 93.18 % |
| **Total** | **363** | **100 %** |

*Note*. This table shows the study's selected sample of CBET trainers and trainees at NNP. The researcher selected a sample of 363, including 25 CBET trainers and 338 CBET trainees at NNP.

**Sampling Techniques**

The researcher employed purposive sampling to select all 25 CBET trainers for the study. To achieve this, the researcher chose at least two CBET trainers from the ten academic departments at NNP. These selected trainers had at least three years of experience training and assessing CBET trainees at NNP. The selected CBET trainers per department comprised at least one male and one female. As Cresswell and Plano (2011) noted, purposive sampling entails identifying and selecting individuals or groups with extensive knowledge or experience of the phenomenon of interest. Gathering data solely from CBET trainers of this type is crucial to achieve the best results. These trainers are responsible for implementing the curriculum, addressing trainees' needs, and employing diverse instructional and assessment techniques.

The researcher used stratified purposeful sampling to select all 338 CBET trainees for the study. The strata comprised the training levels (Levels 5 and 6), the year of training (years 1 and 2), the ten academic departments at NNP, and the trainees' gender (Male—M and Female—F). Fifty percent (50%) of the sampled CBET trainees were level 5, while the remainder were level 6. Fifty percent (50%) of the sampled CBET trainees were in year 2 of their training, while the remainder were in year 3. The proportion of male and female CBET trainees selected for the study depended on their ratios in each department, as shown in Table 3. Departments offering engineering courses had more male trainees than female trainees, while the rest had more female trainees than male. Researchers use stratified sampling for a heterogeneous population, resulting in more reliable and detailed information (Kothari, 2004). In educational and social sciences research, it is crucial for researchers to purposefully select a sample that effectively represents subgroups (or strata) in proportion to the population (Adam & Kamuzora, 2008).

**Table 3**

CBET Trainees Population and Sample Size

| Departments at NNP | Population | | | | Sample | | |
|---|---|---|---|---|---|---|---|
| | M | F | Total | % | M | F | Total |
| Applied Sciences | 38 | 139 | 177 | 4.9 | 4 | 12 | 16 |
| Building & Civil Engineering | 612 | 170 | 783 | 21.6 | 57 | 17 | 74 |
| Business Studies | 24 | 66 | 90 | 2.5 | 2 | 6 | 8 |
| Computing & Informatics | 202 | 171 | 373 | 10.3 | 19 | 16 | 35 |
| Electrical & Electronics Eng. | 477 | 103 | 580 | 16.0 | 44 | 10 | 54 |
| Fashion Design & Cosmetology | 40 | 460 | 500 | 13.8 | 4 | 43 | 47 |
| Health Sciences | 2 | 8 | 10 | 0.3 | 0 | 1 | 1 |
| Hospitality & Tourism | 104 | 274 | 378 | 10.4 | 9 | 26 | 35 |
| Liberal Studies | 18 | 90 | 108 | 3.0 | 2 | 8 | 10 |
| Mechanical & Automotive Eng. | 560 | 64 | 624 | 17.2 | 51 | 7 | 58 |
| **Total** | **2077** | **1545** | **3622** | **100** | **192** | **146** | **338** |

*Note*. This table illustrates the population of CBET trainees by department at NNP and the corresponding sample size for each department. It also details the population and sample of CBET trainers, categorised by gender. The CBET trainees hold significant knowledge regarding implementing CBET, instructional strategies, and the assessments they partake in, rendering them crucial sources of information for this study.

**Data Collection Techniques**

In this study, the researcher used a primary data collection approach that involves direct interaction with CBET trainers and trainees. This firsthand approach allowed the researcher to record first-hand information tailored to the study's objectives.

**Data Collection Tools**

The primary data collection tools the researcher used to collect the data were questionnaires. The researcher collected the data from 25 CBET trainers and 338 CBET trainees using questionnaires. Questionnaires are low-cost, and researchers can collect the data quickly (Omari, 2011). The questionnaires for CBET trainers included structured closed-ended and unstructured open-ended questions, whereas those for CBET trainees contained only structured closed-ended questions. In the case of structured closed-ended questions, respondents are presented with a list of answers and select the ones that best reflect their opinions. The researcher employed unstructured, open-ended questions to gain deeper insights into the study and to gather recommendations on how technical institutions in Kenya can improve the implementation of CBET.

**Ethical Considerations**

The researcher first obtained a letter of introduction from the School of Graduate Studies at KCA University and then sought permission from the National Commission for Science, Technology, and Innovation (NACOSTI) before collecting data. Additionally, the researcher requested authorisation from the Chief Principal of NNP to engage its CBET trainers and trainees in the study. Before data collection, the researcher obtained consent from these respondents, established a good rapport with them, and assured them that the researcher would keep any information collected confidential and use it only for the study's purposes.

**Pilot Study**

Roland and Vanora (2002) highlighted the importance of piloting in identifying misunderstandings, ambiguities, and inadequacies in research items. The researcher conducted a comprehensive piloting process to ensure the highest validity and reliability of the research instruments. Two CBET trainers—one male and one female—and two CBET trainees, one male and one female, were selected from The Eldoret National

Polytechnic to complete the questionnaires. The trainers chosen possessed three or more years of professional experience in CBET. One trainee was from level 5, and the other from level 6, both second-year students. After a two-day interval, the researcher administered the same questionnaires to these respondents to assess the reliability of the research instruments.

The Eldoret National Polytechnic is one of the 24 national polytechnics in Kenya. Like NNP, the institution independently designs curricula, delivers training, conducts assessments, and grants qualifications. Additionally, The Eldoret National Polytechnic shares similar characteristics with NNP, such as its status, the number of CBET trainees, CBET trainers, and CBET programs, and five years of experience in CBET training and assessment. These qualities make The Eldoret National Polytechnic an outstanding choice for the pilot study. Orodho (2004) stated that both responses to the test questionnaires will be similar if they reflect the same content for all respondents. Therefore, the researcher expected that the scores obtained by each respondent on the first and second tests would be close. The researcher adjusted the questions after consulting with the supervisors for any ambiguities.

**Validity of the Research Instruments**

The concept of a test's validity pertains to its accuracy in measuring what it claims to measure (Cherry, 2010). A test must be valid to make correct interpretations of the results. In data collection, validity relates to how research findings accurately depict the phenomenon under investigation. It establishes whether the research genuinely measures its intended targets or the veracity of the research outcomes. To ensure validity, the researcher used the revised questionnaires to ensure the instruments represent what they should measure. The researchers also performed independent data checks and verified the correctness of data captured by counter-checking the findings with respondents.

**Reliability of the Research Instruments**

Reliability pertains to the consistency of an instrument in generating consistent results over different instances (Drost, 2011). The test-retest method will validate the extent to which a specific measurement procedure yields consistent results across multiple trials. To determine whether the research instruments consistently produce the same response each time the researcher uses the tool, the researcher compared the resulting data from the pilot study using the Pearson Product-Moment Correlation Coefficient formula. Bird (2021) defines the Pearson Product-Moment Correlation Coefficient *(r)* as follows:

$$\boldsymbol{r} = \frac{\sum \boldsymbol{xy}}{\sqrt{\{(\sum \boldsymbol{x^2})(\sum \boldsymbol{y^2})\}}}$$

Where $\boldsymbol{x}$ is the deviations of $\mathbf{X}$ from $\overline{\mathbf{X}}$, $\boldsymbol{y}$ is the deviations of $\mathbf{Y}$ from $\overline{\mathbf{Y}}$, $\boldsymbol{X}$ comprises the results of the first trial, $\boldsymbol{Y}$ comprises the results of the second trial, $\overline{\boldsymbol{X}}$ is the average result of the first trial and $\overline{\boldsymbol{Y}}$ is the average result of the second trial. The male CBET trainer in the pilot study had a correlation coefficient of 0.97, the female CBET trainer had a correlation coefficient of 0.87, the male CBET trainee had a correlation coefficient of 0.99, and the female CBET trainee had a correlation coefficient of 0.96. A correlation coefficient of approximately 0.8 is high enough to deem the instrument dependable (Orodho, 2008).

**Data Analysis Techniques**

The researcher analysed the collected data using descriptive statistical methods, including frequencies, means, and percentages. To streamline the analysis and conceptualisation process and ensure accuracy and efficiency, the researcher input the collected data into powerful specialised statistical computer software, the Statistical Package of Social Sciences (SPSS) (Rahman & Muktadir, 2021). The researcher uses SPSS Version 27 to organise the data and compute frequencies, means, and percentages to extract significant insights and inform subsequent decisions on CBET implementation in Kenya.

The researcher presented the results in various formats, including descriptive narratives, tables, and charts. To communicate the analysis's findings clearly and quickly, researchers thoughtfully design these visual aids (Shabiralyani et al., 2015). The researcher took great care to ensure the visual aids were accurate and informative, highlighting the data's most essential and relevant aspects. The aim was to provide a comprehensive and insightful overview of the data that would be useful for decision-making purposes.

## IV. Data Analysis, Presentation, Interpretation And Discussions

**Response Rates**

The researcher issued questionnaires to 25 target CBET trainers and 338 target CBET trainees at NNP. Table 4 shows the study's response rate.

**Table 4**
Study's Response Rate

| Respondents | Sample Size | Responses | Response rate |
|---|---|---|---|
| CBET Trainers | 25 | 25 | 100% |
| CBET Trainees | 338 | 307 | 90.8% |

*Note*. This table shows the study's response rates. The researcher received 25 filled-out and completed questionnaires from all 25 CBET trainers, representing a 100% response rate. The researcher also received 307 filled-out and completed questionnaires from 307 CBET trainees, representing a 90.8% response rate. A 40% to 75% response rate is acceptable across various research areas (Sataloff & Vontela, 2021).

**Reliability Results**

The researcher conducted a pilot study to ensure the utmost reliability of the research instruments. Two CBET trainers (Male and Female) and two CBET trainees (also Male and Female) at The Eldoret National Polytechnic filled out and completed questionnaires. After two days, the researcher issued the same questionnaires to the same respondents to measure the reliability of the research instruments. These respondents filled out and completed questionnaires again. Using the test-retest method, the data from the pilot study were compared using the Pearson Product-Moment Correlation Coefficient formula. Table 5 shows the reliability results of the pilot study.

**Table 5**
Study's Reliability Results

| Respondents | Pearson Correlation Coefficient |
|---|---|
| Male CBET Trainer | 0.97 |
| Female CBET Trainer | 0.87 |
| Male CBET Trainee | 0.99 |
| Female CBET Trainee | 0.96 |

*Note*. This table shows the study's reliability results. The male CBET trainer had a correlation coefficient of 0.97, the female CBET trainer had a correlation coefficient of 0.87, the male CBET trainee had a correlation coefficient of 0.99, and the female CBET trainee had a correlation coefficient of 0.96. A correlation coefficient of 0.8 or higher is high enough to deem the instrument dependable (Orodho, 2008).

**Validity Tests**

The researcher thoroughly assessed the questionnaire's validity, ensuring accuracy and reliability. University supervisors were consulted to guarantee the questionnaire's quality, and their insightful recommendations led to necessary modifications, guaranteeing that the questionnaire effectively provided the data needed to address the study's research questions. The researcher further performed independent data checks and verified the correctness of data captured by counter-checking the findings with respondents.

**Respondents' Gender**

The researcher engaged both male and female respondents. Table 6 shows the number of male and female CBET trainers who filled out and completed the questionnaires in the study.

**Table 6**
CBET Trainers Respondents' Gender

| Gender | N | % |
|---|---|---|
| Male | 14 | 56.0% |
| Female | 11 | 44.0% |

*Note*. This table shows the number of male and female CBET trainers who filled out and completed the questionnaires. 14 of the 25 CBET trainers were male, representing 56%, and 11 were female, representing 44%. Also, 307 CBET trainees filled out and completed the research questionnaires. The researcher also engaged male and female CBET trainees in the study, as shown in Table 7.

**Table 7**
CBET Trainees Respondents' Gender

| Gender | N | % |
|---|---|---|
| Male | 177 | 57.7% |
| Female | 130 | 42.3% |

*Note*. This table shows the number of male and female CBET trainees who filled out and completed the questionnaires. 177 were male, representing 57.7%, and 130 were female, representing 42.3%.

**Respondents' Academic Departments**

The CBET trainers who filled out and completed the study questionnaires were purposively selected from the 10 academic departments at NNP, as shown in Table 8.

**Table 8**

CBET Trainers Respondents' Departments

| Departments | N | % |
|---|---|---|
| Applied Sciences | 2 | 8.0% |
| Building & Civil Engineering | 1 | 4.0% |
| Business Studies & Entrepreneurship | 2 | 8.0% |
| Computing & Informatics | 1 | 4.0% |
| Electrical & Electronics Engineering | 6 | 24.0% |
| Fashion Design & Cosmetology | 2 | 8.0% |
| Health Sciences | 1 | 4.0% |
| Hospitality & Tourism | 2 | 8.0% |
| Liberal Studies | 1 | 4.0% |
| Mechanical & Automotive Engineering | 7 | 28.0% |

*Note*. This table shows the number of CBET Trainers per department who filled out and completed the questionnaires. 4% belong to Liberal Studies, 28% belong to Mechanical and Automotive Engineering, 8% belong to Applied Sciences, 4% belong to Building and Civil Engineering, 8% belong to the Business Studies and Entrepreneurship, 4% belong to the Computing and Informatics, 24% belong to the Electrical and Electronics Engineering, 8% belong to the Fashion Design and Cosmetology, 4% belong to the Health Science. In comparison, 8% belong to the Hospitality and Tourism. CBET trainees who filled out and completed the study questionnaires were also selected from 10 academic departments at NNP, as shown in Table 9.

**Table 9**

CBET Trainees Respondents' Departments

| Departments | N | % |
|---|---|---|
| Applied Sciences | 15 | 4.9% |
| Building & Civil Engineering | 54 | 17.6% |
| Business Studies & Entrepreneurship | 3 | 1.0% |
| Computing & Informatics | 35 | 11.4% |
| Electrical & Electronics Engineering | 54 | 17.6% |
| Fashion Design & Cosmetology | 47 | 15.3% |
| Health Sciences | 1 | 0.3% |
| Hospitality & Tourism | 35 | 11.4% |
| Liberal Studies | 5 | 1.6% |
| Mechanical & Automotive Engineering | 58 | 18.9% |

*Note.* This table shows the number of CBET Trainees per department who filled out and completed the questionnaires. 1.6% belong to Liberal Studies, 18.9% belong to Mechanical and Automotive Engineering, 4.9% belong to Applied Sciences, 17.6% belong to Building and Civil Engineering, 1.0% belong to Business Studies and Entrepreneurship, 11.4% belong to Computing and Informatics, 17.6% belong to the Electrical and Electronics Engineering, 15.3% belong to the Fashion Design and Cosmetology, 0.3% belong to the Health Science, and 11.4% belong to the Hospitality and Tourism.

**Respondents' Professional Experience**

As shown in Table 10, all CBET trainers who filled out and completed questionnaires had at least three years of professional experience.

**Table 10**

CBET Trainers Respondents' Professional Experience

| Years | N | % |
|---|---|---|
| 3-5 years | 16 | 64.0% |
| Above five years | 9 | 36.0% |

*Note*. This table shows the number of CBET Trainers who filled out and completed questionnaires and their corresponding professional experience. 64% had 3 to 5 years of professional experience, and 36% had above

five years of professional experience. This ensured further reliability of the results as these trainers had extensive study knowledge.

**Level of Pedagogical Knowledge of the CBET Approach Among CBET Trainers**

The study's first objective was to determine the level of pedagogical knowledge of the CBET approach among CBET trainers at NNP. To achieve this objective, the researcher determined the CBET trainers' understanding of the meaning of the CBET approach, principles, teaching philosophies, and benefits. The researcher also determined the CBET trainers' knowledge of the meaning of OS, CBET curriculum components, characteristics and its development and the components of the quality session plan. The researcher further determined the practicality of trainers' in-service and industry training.

As shown in Table 11, the results indicate that 100% of CBET trainers understood the meaning of the CBET approach. Additionally, they were all aware of the benefits of this approach and completely understood the OS. However, only 84% of trainers grasped the CBET principles, while 48% understood the teaching philosophies behind CBET. Only 32% of trainers understood the CBET curriculum components, whereas 64% were familiar with the curriculum's characteristics. Moreover, 92% of CBET trainers understood the Backward Design Approach to Curriculum Development, and 72% comprehended the elements of a quality session plan. Regarding training experience, 76% of trainers had practical in-service training, while 48% had participated in industry training.

**Table 11**

Variables of CBET Trainers' Levels of Pedagogical Knowledge of the CBET Approach

| **Variables** | **%** |
|---|---|
| Meaning of the CBET approach | 100% |
| Benefits of this approach | 100% |
| Meaning of the OS | 100% |
| CBET principles | 84% |
| CBET philosophies | 48% |
| CBET curriculum components | 32% |
| CBET curriculum characteristics | 64% |
| Backward Design Approach to Curriculum Development | 92% |
| Elements of Quality Session Plan | 72% |
| Practical in-service training | 76% |
| Industry training | 48% |
| **Average** | **74%** |

*Note*. This table shows the variables of CBET Trainers' Levels of Pedagogical Knowledge of the CBET Approach. Results show that the average level of pedagogical knowledge of the CBET approach among CBET trainers was 74%. Table 12 shows the possible classification of this level of expertise among CBET trainers.

**Table 12**

CBET Trainers' Levels of Pedagogical Knowledge of CBET Approach

| **Levels** | **% Range** |
|---|---|
| Basic Level | 0% - 40% |
| Intermediate Level | 41% - 70% |
| Advanced Level | 71% - 90% |
| Expert Level | 91% - 100% |

*Note*. This table shows the possible classification of the level of pedagogical knowledge of the CBET approach among CBET trainers. Given this classification, a 74% average would fall into the Advanced Level. This indicates that the trainers strongly understand the CBET approach, though there is room for improvement to reach the Expert Level. This presents a gap in the pedagogical knowledge of the CBET approach among CBET trainers. Table 13 shows the understanding of the meaning of the CBET approach by the CBET trainers at NNP.

**Table 13**

CBET Trainers' Meaning of CBET

| **Definition of CBET** | **N** | **%** |
|---|---|---|
| CBET is an instructional approach that emphasises the specification, learning and demonstration of skills, knowledge, and attitudes central to a given career, activity, or task. | 25 | 100.0% |

*Note.* This table shows the understanding of the meaning of the CBET approach by the CBET trainers at NNP. The results show that CBET is an instructional approach that emphasises the specification, learning and demonstration of skills, knowledge, and attitudes central to a given career, activity, or task. The results of this study agree with those of Dambudzo (2018). According to Dambudzo, CBET imparts practical skills to trainees

for self and industry employment. This acquisition of skills enables trainees to become highly competent professionals. This contrasts with traditional technical training methods, which primarily focus on theoretical or abstract knowledge.

Besides understanding the meaning of the CBET approach, CBET trainers also need knowledge of its principles and teaching philosophies. As shown in Table 14, a small percentage (16%) need further training on CBET principles, while a high percentage (84%) understand CBET Principles. The study's results agree with the literature. In their research, Labani et al. (2019) found that CBET trainers were not well-informed about the emphasis and goals of CBET, leading to its ineffective implementation in Tanzania. CBET principles prepare trainers for effective implementation, and they need to be educated more through more targeted in-service training.

**Table 14**

CBET Trainers' Understanding of CBET Principles

| Understanding Level | N | % |
|---|---|---|
| **Aware**: Heard about CBET principles but need help understanding them. | 1 | 4.0% |
| **Essential Understanding**: Understand the fundamental concepts of CBET principles but may need help with more complex ideas or applications. | 2 | 8.0% |
| **Proficient**: Understand CBET principles and can apply the knowledge in various contexts. | 10 | 40.0% |
| **Expert**: Deeply understand CBET principles and can make connections between them. | 12 | 48.0% |

*Note.* This table shows the CBET trainers' understanding of CBET principles. According to the study's results, CBET principles include reflective training practice, industry alignment, clear, measurable learning objectives, a learner-centred approach, an inclusive learning environment, relevant activities, resources, and learning outcomes assessment. 48% deeply understand these principles and can make connections between them, 40% understand them and can apply the knowledge in various contexts, 8% understand its fundamental concepts but may need help with more complex ideas or applications, and 4% have heard about them but need help understanding them. Trainers must also believe in various CBET philosophies to motivate them to implement the CBET curriculum successfully.

Table 15 indicates the trainer's CBET philosophies of teaching. 12% of the trainers believe that good teaching is about mastering the subject matter and that trainers must represent the content accurately and efficiently. 12% of the trainers believe that effort from the heart nurtures success in learners with support from teachers and peers. 16% of the trainers believe that teaching should challenge the status quo and encourage learners to question established ways of thinking, awaken them to new values and perspectives and consider their position in society. 12% of the trainers believe that effective teachers help learners develop complex cognitive structures for understanding content by understanding how they think and reason for it. 48% of the trainers believe in various philosophies while training in CBET.

**Table 15**

CBET Trainers' CBET Teaching Philosophies

| Teaching Philosophies | N | % |
|---|---|---|
| Good teaching is about mastering the subject matter. Teachers must represent the content accurately and efficiently. | 3 | 12.0% |
| Effort from the heart nurtures success in learners with support from teachers and peers. | 3 | 12.0% |
| Teaching should challenge the status quo and encourage learners to question established ways of thinking, awaken them to new values and perspectives and consider their position in society. | 4 | 16.0% |
| Effective teachers help learners develop complex cognitive structures to understand content by understanding their thoughts and reasons. | 3 | 12.0% |
| All the above. | 12 | 48.0% |

*Note.* This table shows the trainer's CBET philosophies involving their teaching method. The results of the study agree with those of Ong'ondo and Jwan (2021), who found that trainers are confused regarding the philosophies of the CBET approach and require further in-service training to acquire and understand them more. CBET theory encompasses various perspectives and definitions grounded in philosophy. A combination of these philosophies sets the foundation for the success of the CBET approach since they promote concepts and variables in trainers' meaning-making of a CBET approach and its benefits. Table 16 shows the thinking of CBET trainers on the benefits of CBET.

**Table 16**

CBET Trainers' Significance of the CBET Approach

| Significance of CBET | N | % |
|---|---|---|
| CBET is beneficial to learners | 25 | 100.0% |

*Note.* This table shows the thinking of CBET trainers on the benefits of CBET. Results show that 100% of CBET trainers think that CBET benefits learners. Respondents indicated that CBET is skills-based rather than knowledge-based, emphasising practical, learner-centred, and industry-driven. This boosts trainees' confidence, enhances their employability and readiness for the job, and gives trainees broader chances to cope with industry needs. Furthermore, CBET instils a continuous learning and improvement mindset in trainees, empowering them to adapt to changing circumstances and pursue further education and training as needed. These assertions corroborate those of Miseda and Kitainge (2021), who indicated that CBET is structured to align with industry demands and equip individuals with the necessary skills and knowledge to meet the performance standards required in the workforce. Therefore, the CBET curriculum must be developed in collaboration with the industry to produce graduates with skills aligned with the industry. Results show that the CBET curriculum is derived from the industry's Occupation Standards (OS). Table 17 indicates the understanding of CBET trainers on the OS.

**Table 17**

CBET Trainers' Meaning of OS

| Definition of OS | N | % |
|---|---|---|
| A document developed by the industry outlining the knowledge, skills, and attitudes required for a specific occupation or job role. | 25 | 100.0% |

*Note.* This table shows the understanding of CBET trainers on OS. The results show that all trainers (100%) understand the meaning of OS, which is defined as a document developed by the industry outlining the knowledge, skills, and attitudes required for a specific occupation or job role. The study's results confirm those of Jwan (2022), who indicated that the curriculum development process involves collaborating with industry experts to ensure that graduates are prepared to meet the needs of the industry. Results also show that the CBET curriculum is derived from the OS and has components, which include learning outcomes, learning methods, assessment methods and criteria, and resource requirements. Table 18 indicates the understanding of CBET trainers on the components of the CBET curriculum.

**Table 18**

CBET Trainers' Understanding of CBET Curriculum Components

| Components | N | % |
|---|---|---|
| Elements | 8 | 32.0% |
| Learning Outcome | 3 | 12.0% |
| Learning Method | 9 | 36.0% |
| Resource requirement | 5 | 20.0% |

*Note*. This table shows the level of understanding of CBET trainers regarding the components of the CBET curriculum. 32% of the respondents indicated that an Element is not a component of the CBET curriculum. 12% of the respondents indicated that a Learning Outcome is not a component of the CBET curriculum. 36% of the respondents noted that the Learning Method is not a component of the CBET curriculum. 20% of the respondents indicated that a Resource Requirement is not a component of the CBET curriculum. The results show that 68% of CBET trainers do not understand the components of the CBET curriculum, with only 32% being aware of these components. Trainers must know the components of the CBET curriculum to interpret it effectively, leading to adequate successful implementation. They also need to know the characteristics of the CBET curriculum. Results show that the CBET curriculum's characteristics include coherence, relevance, rigour, flexibility, and currency. The study's results agree with those of the Republic of Kenya (2018), which considers CBET a flexible system that allows all populations to access rigorous and relevant training without barriers. The curriculum ensures that graduates acquire current and applicable skills that are directly transferable to the industry without needing further training. Table 19 indicates trainers' understanding of the CBET curriculum's characteristics.

**Table 19**

CBET Trainers' Understanding of CBET Curriculum Characteristics

| Characteristics | N | % |
|---|---|---|
| Coherence, Relevance, and Flexibility | 1 | 4.0% |
| Coherence, Relevance, Flexibility, and Currency | 2 | 8.0% |
| Relevance | 1 | 4.0% |
| Relevance and Flexibility | 2 | 8.0% |
| Relevance and Currency | 2 | 8.0% |
| Flexibility and Currency | 1 | 4.0% |
| All the above | 16 | 64.0% |

*Note*. This table shows the CBET trainers' understanding of the characteristics of the CBET curriculum. 4% of the respondents indicated that Coherence, Relevance, Rigor, Flexibility, and Currency are the characteristics of the CBET curriculum. 1% of the respondents indicated that Coherence, Relevance, and Flexibility are the characteristics of the CBET curriculum. 2% of the respondents indicated that Coherence, Relevance, Flexibility, and Currency are the characteristics of the CBET curriculum. 1% of the respondents indicated that Relevance is the characteristic of the CBET curriculum. 2% of the respondents indicated that Relevance and Flexibility are the characteristics of the CBET curriculum. 2% of the respondents indicated that Flexibility and Currency are the characteristics of the CBET curriculum. 48% of the respondents indicated that Coherence, Relevance, Rigor, Flexibility, and Currency are all the characteristics of the CBET curriculum. The study's results show that 64% of the CBET trainers clearly understand the CBET curriculum's characteristics. 12% understand a few characteristics of the CBET curriculum, while another 24% need training in understanding the characteristics of the CBET curriculum.

For a CBET curriculum to be considered to have all these characteristics, developers must understand the backward design approach to curriculum development. This approach begins with identifying the desired outcomes, then determining acceptable evidence, and concludes with delineating instructional strategies intended to achieve these outcomes (Burson, 2011). Table 20 indicates the understanding of CBET trainers on the backward design approach to curriculum development.

**Table 20**

CBET Trainers' Understanding of Backward Design Approach to Curriculum Development

| Understanding Level | N | % |
|---|---|---|
| Somewhat Clear. | 2 | 8.0% |
| Clear. | 10 | 40.0% |
| Very Clear. | 8 | 32.0% |
| Extremely Clear. | 5 | 20.0% |

*Note*. This table shows CBET trainers' understanding of the backward design approach to curriculum development. 8% had little knowledge of this approach, while 92% understood it clearly. This means that there is a small gap that needs more in-service training on this approach. The CBET trainers' understanding of the CBET curriculum components, characteristics, and design means that they can interpret it effectively and develop the relevant training and assessment tools for effective and successful implementation.

Table 21 indicates the understanding of CBET Trainers on the components of a quality session plan, one of the essential training tools that trainers use to prepare for active learning and authentic assessments. 72% of the respondents are familiar with all the components of a quality session plan, while 28% are not. Results show that a quality session plan has the following components: bridge-in, learning outcome, pre-assessment, participatory learning, post-assessment, and summary/bridge. Results show that trainers need resources and practical in-service training to improve their knowledge of preparing training tools such as a session plan.

**Table 21**

CBET Trainers' Understanding of Components of Quality Session Plan

| Components | N | % |
|---|---|---|
| Bridge-in. | 1 | 4.0% |
| Bridge-in, learning outcome, pre-assessment, participatory learning, and post-assessment. | 1 | 4.0% |
| Bridge-in, learning outcome, post-assessment, and bridge-out. | 1 | 4.0% |
| Bridge-in, learning outcome, and summary/bridge-out. | 1 | 4.0% |
| Bridge-in, pre-assessment, participatory learning, post-assessment, and bridge-out. | 1 | 4.0% |
| Bridge-in, participatory learning, and post-assessment. | 1 | 4.0% |
| Pre-assessment. | 1 | 4.0% |
| All the above | 20 | 80.0% |

*Note*. This table shows CBET Trainers' understanding of the components of a quality session plan. These results agree with those by Wanjiku (2022), who found that trainers require adequate training and learning resources to apply the knowledge and skills gained during the in-service training. Table 22 indicates the practicality of the in-service training for CBET trainers.

**Table 22**

CBET Trainers' In-Service Training

| Training | N | % |
|---|---|---|
| **Slightly Practical**: Had potential for classroom application but required significant resources or adjustments. | 1 | 4.0% |
| **Moderately Practical**: Can apply in the classroom with limitations. | 5 | 20.0% |

| | | |
|---|---|---|
| **Very Practical**: Easily applicable in the classroom and implementable with minimal effort or resources. | 15 | 60.0% |
| **Extremely Practical**: Applicable in the classroom, efficient, effective, and easy to implement. | 4 | 16.0% |

*Note*. This table shows the practicality of CBET-related professional development activities for CBET trainers. 4% of the respondents felt that the training was slightly practical, 20% thought it was moderately practical, 60% thought it was very practical, and 16% felt it was extremely practical. The results suggest that in-service training provided to CBET trainers must be practical in applying the knowledge and skills gained to implement CBET effectively. The results confirm those of Labani et al. (2019), who noted that effective implementation of the CBET curriculum relies on the types of in-service training to prepare trainers for implementation. One way to ensure practicality in trainers' training is to train them in the industry where the job is done. Table 23 indicates how helpful CBET industry-related professional development activities were for CBET trainers.

**Table 23**

CBET Trainers' Industry Training

| Training | N | % |
|---|---|---|
| I still need to be trained in the industry. | 7 | 28.0% |
| **Slightly Helpful**: Provided skills but did not significantly improve the situation. | 1 | 4.0% |
| **Moderately Helpful**: It was valuable and improved the situation. | 5 | 20.0% |
| **Very Helpful**: Greatly assisted in improving the situation and brought noticeable benefits. | 9 | 36.0% |
| **Extremely Helpful**: Provided maximum skills, significantly improved the situation, and brought substantial benefits. | 3 | 12.0% |

*Note*. This table shows how helpful CBET industry-related professional development activities are for CBET trainers. 28% of CBET trainers were not yet trainers in the industry. 4% indicated that CBET industry training was slightly helpful and provided skills but did not significantly improve the situation. 20% indicated it was moderately helpful and valuable and improved the situation. 36% indicated it was immensely helpful, improved the situation and brought noticeable benefits. 12% indicated it was extremely helpful, provided maximum skills, significantly improved the situation, and brought substantial benefits. Results show that 28% of trainers lack industry experience, which is relevant in aligning CBET training with the needs of the industry and keeping the trainers up to date with emerging technologies. The study results corroborate those of Burson (2011), who found that industry training is helpful when aligning curriculum with the needs of the industry to prepare graduates adequately for the market.

**Instructional Processes CBET Trainers Use in Content Delivery**

The study's second objective was to explore the instructional processes employed by CBET trainers in content delivery at NNP. The researcher identified critical aspects regarding the trainers, including their familiarity with Universal Design for Learning (UDL) and their use of active learning and learner engagement strategies. Additionally, the researcher examined various aspects related to CBET trainees, such as their involvement in student-centred learning strategies, the integration of technology in CBET, their understanding of the training scope, participation in practical sessions, and their engagement in Dual TVET Training.

The study's results show that CBET trainers acknowledge that trainees have diverse learning styles and, hence, the need to incorporate UDL in their training. This entails training using visual, auditory, kinaesthetic, and reading techniques to cater for all trainees. Table 24 indicates the familiarity of UDL by CBET trainers.

**Table 24**

CBET Trainers' Familiarity with Universal Design for Learning (UDL)

| UDL Familiarity | N | % |
|---|---|---|
| **Unfamiliar**: Have no knowledge or experience with UDL. | 2 | 8.0% |
| **Somewhat Familiar**: Have limited knowledge or experience and may not feel comfortable with UDL. | 1 | 4.0% |
| **Moderately Familiar**: Have knowledge and experience and feel comfortable with UDL. | 7 | 28.0% |
| **Very Familiar**: Have knowledge and experience; feel comfortable and easily explained UDL. | 11 | 44.0% |
| **Extremely Familiar**: Have extensive knowledge and experience; expert and confidently explained UDL. | 4 | 16.0% |

*Note*. This table shows the familiarity of UDL by CBET trainers. 8% were unfamiliar with UDL and had no knowledge or experience. 4% were familiar with it but had limited knowledge or experience and felt uncomfortable. 28% were moderately familiar with UDL, had knowledge and experience and felt comfortable with it. 44% were remarkably familiar with UDL and had knowledge and experience. They felt comfortable and quickly explained UDL. 16% were highly familiar with UDL and had extensive knowledge and experience. They were experts and confidently explained UDL. Results show that 12% of trainers had little or no knowledge

of UDL, while 88% were familiar with it. Results show that using various training and learning styles caters to all trainers with different learning methods. These assorted styles of training include visual (such as videos and YouTube), auditory (such as audio recordings), kinaesthetic (such as practical), and reading techniques. All these must be incorporated into the instructional content delivery process in CBET. Results support those of Wanjiku (2022), who reported that additional instructional resources and aids, including audio-visual and ICT equipment, are needed to implement CBET effectively. These resources also help trainers to prepare active learning and learner engagement strategies while training. Table 25 indicates the use of these strategies by CBET trainers during training sessions.

**Table 25**

CBET Trainers' Usage of Active Learning and Learner Engagement Strategies

| Using | N | % |
|---|---|---|
| Yes | 23 | 92.0% |
| No | 2 | 8.0% |

*Note*. This table shows the use of active learning and learner engagement strategies by CBET trainers during training sessions. 92% indicated using these strategies, while 8% did not. Results show that the methods used include mind mapping, case studies, think-pair-share, hot potato, buzz group, group discussion, question and answer, songs and role play, gallery walk, presentation, ask-it basket, brainstorming, simulation, muddiest point, KWL ("What I Know," "What I Want to Know," and "What I Learned"), exit ticket and practical. Results agree with those of Filippos (2023), who found that learner-centred approaches encompass brainstorming, concept maps, group work, role-playing, problem-solving, debate, and De Bono's Six Thinking Hats. The 8% of trainers who did not employ active learning strategies indicated that these strategies were time-consuming, used only during micro-teaching, and never applied in the classroom. As indicated in Table 26, the study results also showed that 74.6% of trainees use class/group discussions, fieldwork, case studies, research, brainstorming, and class presentations.

**Table 26**

CBET Trainees' Engagement in Student-Based Learning Strategies

| Usage | N | % |
|---|---|---|
| Never | 6 | 2.0% |
| Rarely | 12 | 3.9% |
| Sometimes | 60 | 19.5% |
| Often | 72 | 23.5% |
| Always | 157 | 51.1% |

*Note*. This table shows the frequency with which CBET trainees engage in class/group discussions, fieldwork, case studies, research, brainstorming, and class presentations related to the course content. 2% never used these strategies, 3.9% rarely used them, 19.5% sometimes used them, and 23.5% often used them. 51.1% always used them. Filippos (2023) found that learner-centred approaches encompass activities like brainstorming, concept maps, group work, role-playing, problem-solving, debate, and De Bono's Six Thinking Hats. When used with technology, these strategies prioritise the learner in training, leading to successful learning outcomes. Table 27 indicates the frequency with which CBET trainees use projectors, YouTube videos and audio, computer simulations, and the school's website or student portals to access learning materials to supplement studies. 4.2% indicated they had never used these tools. 14.7% rarely use them. 29.6% sometimes use them. 20.2% often use them. 31.3% always use them.

**Table 27**

CBET Trainees' Usage of Technology in CBET

| Usage | N | % |
|---|---|---|
| Never. | 13 | 4.2% |
| Rarely. | 45 | 14.7% |
| Sometimes. | 91 | 29.6% |
| Often. | 62 | 20.2% |
| Always. | 96 | 31.3% |

*Note*. This table shows the frequency with which trainees use technology in CBET. 4.2% indicated they had never used these tools. Results show that projectors, YouTube videos and audio, computer simulations, and the school's website or student portals supplement textbooks during training, making learning more active and real and engaging learners, leading to successful learning outcomes. Results support those of Wanjiku (2022), who found that instructional tools such as audiovisual and ICT equipment supplement textbooks to implement an outcome-based curriculum effectively. An outcome-based curriculum focuses more on trainees' acquisition of

practical skills. As shown in Table 28, 87% of trainees indicated that the CBET approach is practical, while 13% indicated that the CBET approach is theoretical.

**Table 28**
CBET Trainees' Understanding of CBET Training Scope

| CBET Focus | N | % |
|---|---|---|
| Theoretical concepts. | 40 | 13.0% |
| Practical application. | 267 | 87.0% |

*Note*. The table shows the nature of CBET training as indicated by CBET trainees. Practical application in CBET allows trainees to develop practical skills. This enables trainees to become highly competent professionals, unlike traditional technical training methods that primarily focus on theoretical or abstract knowledge. Therefore, techniques used in CBET training must lead to skills acquisition. Trainees must often or always attend practical sessions in the institution's laboratories and workshops. However, as indicated in Table 29, only 76.6% of CBET trainees engage in practical sessions at the polytechnic's laboratories and workshops, while the remaining 23.4% sometimes, rarely, or never participate in practical sessions. Respondents indicated that few laboratories and workshops are in technical institutions, with others lacking the necessary facilities. These hinder the acquisition of skills by trainees, leading to the unsuccessful implementation of CBET. The results also show the need for the government, through MOE, to build more labs and equip them to ensure that trainees are trained on practical applications directly transferable to the industry.

**Table 29**
CBET Trainees' Engagement in Practical Sessions

| Frequency | N | % |
|---|---|---|
| Never | 2 | 0.7% |
| Rarely | 17 | 5.5% |
| Sometimes | 53 | 17.3% |
| Often | 104 | 33.9% |
| Always | 131 | 42.7% |

*Note*. This table shows the frequency at which CBET trainees engage in practical sessions at the polytechnic's laboratories and workshops. 0.7% were never involved in any practical sessions. 5.5% rarely engage in any practical sessions. 17.3% sometimes engage in practical sessions. 33.9% often engage in practical sessions. 42.7% always engage in practical sessions. The results agree with Wanjiku (2022), who reported that Kenyan tertiary institutions lack adequate instructional tools and training aids for acquiring practical skills. Successful implementation of CBET in Kenya also hinges on integrating Dual TVET training as an instructional method. This is where trainees spend at least 50% of their training in the industry and the remaining time in the institution training. Dual training enables trainees to develop practical skills and acquire innovative, industry-relevant skills associated with emerging technologies. Table 30 shows the participation of CBET trainees in Dual TVET Training as indicated by their trainers.

**Table 30**
CBET Trainees' Participation in Dual TVET Training

| Participation | N | % |
|---|---|---|
| Yes | 10 | 40.0% |
| No | 15 | 60.0% |

*Note*. This table shows the participation of CBET trainees in Dual TVET Training as indicated by their trainers. 40% indicated that their CBET trainees participate in Dual TVET training, while 60% do not. Results pointed out that dual TVET training builds trainees' skills, acquires on-the-job training, exposes them to and provides them with experience for the workforce, sharpens their classroom training sessions, and keeps them up to date with current technologies. However, a substantial percentage (60%) are yet to participate in dual training. Results show that dual training programs have yet to be established for all CBET courses, and the institution has yet to develop linkages and MOUs for dual training with various companies and industries. Table 31 further indicates the frequency of CBET trainees engaging in dual TVET training.

**Table 31**
CBET Trainees' Engagement in Dual TVET Training

| Frequency | N | % |
|---|---|---|
| Never. | 73 | 23.8% |
| Rarely. | 48 | 15.6% |
| Sometimes. | 62 | 20.2% |

| | | |
|---|---|---|
| Often. | 45 | 14.7% |
| Always. | 79 | 25.7% |

*Note*. This table indicates the frequency of CBET trainees engaging in dual TVET training. 23.8% had never participated in Dual TVET training, 15.6% rarely attended, 20.2% sometimes attended, 14.7% often participated, and 25.7% always participated. The results indicate that technical institutions have a long way to go in providing dual TVET training for successfully implementing CBET, as only 40.4% of trainees engage in dual training. Results show that CBET trainees participate in traditional attachments, where trainees go for industrial training for not more than four months during their entire training period. This is insufficient for trainees to cover all the elements (or tasks) outlined in their OS. This results in half-baked trainees being unable to meet their job employers' requirements.

**Assessment Methods CBET Trainers Use to Evaluate the Competence Levels Developed by CBET Trainees**

The final objective of the study was to find out the assessment methods employed by CBET trainers to evaluate the competence levels of trainees at NNP. The researcher identified vital elements regarding the trainees' competence assessments, including authentic assessments, dual TVET training evaluations, and various CBET assessment techniques. Additionally, the researcher explored multiple aspects of CBET trainers, such as their familiarity with checklists, rating scales, and rubrics and their application of ICT tools and E-didactics in the CBET framework. To ensure objective assessments in CBET, all TVET institutions must incorporate authentic assessment methods such as industry exposure, natural work environments, or simulations into formative and summative assessments.

Table 32 indicates the usage of authentic assessment by CBET trainers. 84% indicated using authentic assessments, and 16% were not familiar with them and did not use them. The results revealed that authentic assessment methods include using industry exposure, natural work environments, or simulations in formative and summative assessments. These methods emphasise skills and enable trainers to evaluate the readiness of the trainees for the market. The results differed from those of Moindi and Nyatuka (2022), who found that written examinations were the most used method for assessing trainees, followed by projects and attachments (Moindi & Nyatuka, 2022).

**Table 32**

CBET Trainers' Usage of Authentic Assessment

| Usage | N | % |
|---|---|---|
| Yes | 21 | 84.0% |
| No | 4 | 16.0% |

*Note*. This table shows the usage of authentic assessments by CBET trainers. The study's results show that authentic assessment can be achieved by assessing trainees in dual TVET training. Trainees are evaluated while conducting the actual tasks in dual training. Table 33 indicates the frequency at which CBET trainers assess CBET trainees while in dual training.

**Table 33**

CBET Trainers' Assessment of CBET Trainees in Dual TVET Training

| Dual Assessment | N | % |
|---|---|---|
| Never | 9 | 36.0% |
| Rarely | 4 | 16.0% |
| Sometimes | 5 | 20.0% |
| Often | 5 | 20.0% |
| Always | 2 | 8.0% |

*Note*. This table shows the frequency at which CBET trainers assess CBET trainees while in Dual TVET training. 36% never assessed CBET trainees while in Dual TVET training. 16% rarely conducted this assessment, 20% sometimes did, 20% often, and 8% always did. Results, therefore, show that trainers continue with their traditional assessment methods where trainees go for a 4-month attachment and are only assessed once in their industry training. This may hinder the development of trainees' creativity and proficiency in their respective training areas. The results agree with those of Sarmiento et al. (2020), who, in their research, indicated that teachers effectively utilised traditional and authentic assessment tools and strategies with technology integration. These conventional strategies include assignments, discussion problems, research questions, and project preparations based on covered content. Table 34 indicates how frequently CBET trainees are presented with these methods. 1.3% of the respondents never used these techniques, 4.9% rarely used them, 17.3% sometimes used them, 27.2% often used them, and 48.9% always used them. The results show that these

methods are traditional written assessment methods and do not demonstrate trainees' ability to solve real-world problems.

**Table 34**
CBET Trainees' Responses to CBET Assessment Techniques

| Usage | N | % |
|---|---|---|
| Never | 4 | 1.3% |
| Rarely | 15 | 4.9% |
| Sometimes | 53 | 17.3% |
| Often | 85 | 27.7% |
| Always | 150 | 48.9% |

*Note*. This table shows how frequently CBET trainees are presented with written assignments, discussion problems, research questions, and project preparations based on covered content. Results show that most trainees (76.6%) often or always use written assessment methods in CBET. Only 23.4% sometimes, rarely, or never use these traditional assessment methods. The results agree with the study's literature. Sewagegn (2019) also indicated that teachers rely on traditional written assessment methods rather than exploring innovative alternatives that could reveal their students' creativity and proficiency in their areas of study. Innovative alternatives may include simulations, natural work environments, and the assessment of trainees while in industry. These methods require trainers to use checklists, rating scales, and rubrics as summative evaluation grading tools. Table 35 shows CBET trainers' familiarity with these assessment grading tools.

**Table 35**
CBET Trainers' Familiarity with Checklists, Rating Scales and Rubrics

| Familiarity | N | % |
|---|---|---|
| Not at all familiar. | 1 | 4.0% |
| Slightly familiar. | 3 | 12.0% |
| Moderately familiar. | 3 | 12.0% |
| Familiar. | 9 | 36.0% |
| Extremely familiar. | 9 | 36.0% |

*Note*. This table shows the familiarity of checklists, rating scales, and rubrics as summative evaluation grading tools by CBET trainers. 4% were unfamiliar with these tools. 12% were slightly familiar with them. 12% were moderately familiar, 36% were familiar, and 36% were highly familiar. Trainers use these grading tools to declare a candidate competent or not yet competent without bias. From the results,72% of CBET trainers use the CBET-recommended grading tools, while 28% are unfamiliar with and do not use them. 72% of trainers indicated using these tools only during practical examinations. Trainers instead use traditional written continuous assessment tests (CATs) and exams to determine a trainee's competence level. The results agree with those of Labani et al. (2019), who reported that assessments in CBET encompass various techniques such as assignments, classroom tests, informal oral evaluations, informal observation, practical tasks, end-of-semester examinations, and product assessments. Results show that trainers use these traditional written assessments with the integration of ICT tools, as indicated in Table 36.

**Table 36**
CBET Trainers' Usage of ICT Tools in CBET Assessment

| Tools | N | % |
|---|---|---|
| Quizizz, Padlet, E-portfolio, Mentimeter or Kahoot. | 23 | 92.0% |
| None | 2 | 8.0% |

*Note*. This table shows CBET trainers' usage of Quizizz, Pallet, E-portfolio, Mentimeter, or Kahoot. 92% used these ICT tools in their assessments, while 8% used none. When integrated into trainees' assessments, these ICT tools personalise them and help provide immediate feedback to trainees. Table 37 shows the frequency with which CBET trainees are assessed using E-portfolios, Padlet, Quizziz, Mentimeter, or Google Sites to assess trainees.

**Table 37**
CBET Trainees' Usage of E-didactics in CBET Assessment

| Usage | N | % |
|---|---|---|
| Never. | 32 | 10.4% |
| Rarely. | 25 | 8.1% |
| Sometimes. | 44 | 14.3% |
| Often. | 62 | 20.2% |
| Always. | 144 | 46.9% |

*Note*. This table shows the frequency with which CBET trainees are assessed using E-portfolios, Padlet, Quizziz, Mentimeter, or Google Sites to assess trainees. 10.4% of the CBET trainees indicated that they had never used these e-didactics, 8.1% rarely used them, 14.3% sometimes used them, 20.2% often used them, and 46.9% of the respondents always used them. The results agree with those of Sarmiento et al. (2020), whose findings revealed that teachers effectively utilised traditional and authentic assessment tools and strategies with technology integration. Trainers need modern assessment skills, including practical ICT usage and research-based assessment principles, to objectively assess trainees. Therefore, trainers need help with attempting unfamiliar assessment methods and tools.

## V. Summary Of The Findings

**Level of Pedagogical Knowledge of the CBET Approach Among CBET Trainers**

The results indicate that 100% of CBET trainers understood the meaning of the CBET approach. Additionally, they were all aware of the benefits of this approach and completely understood the OS. However, only 84% of trainers grasped the CBET principles, while 48% understood the teaching philosophies behind CBET. Only 32% of trainers understood the CBET curriculum components, whereas 64% were familiar with the curriculum's characteristics. Moreover, 92% of CBET trainers understood the Backward Design Approach to Curriculum Development, and 72% comprehended the elements of quality session plans. Regarding training experience, 76% of trainers had practical in-service training, while 48% had participated in industry training. The average level of pedagogical knowledge of the CBET approach among CBET trainers was 74%, which would fall into the Advanced Level. This indicates that the trainers strongly understand the CBET approach, though there is room for improvement to reach the Expert Level (90% to 100%). This presents a gap in the pedagogical knowledge of the CBET approach among CBET trainers.

**Instructional Processes CBET Trainers Use in Content Delivery**

A notable 88% of CBET trainers are familiar with Universal Design for Learning (UDL) and employ visual, auditory, kinaesthetic, and reading techniques to accommodate all trainees, reflecting their commitment to inclusivity in training. Furthermore, an impressive 92% of trainers use active learning and learner engagement strategies, fostering an interactive environment conducive to learning. These strategies encompass mind mapping, case studies, think-pair-share, hot potato, buzz groups, group discussions, question and answer sessions, songs and role play, gallery walks, presentations, ask-it baskets, brainstorming, simulations, muddiest points, and KWL (What I Know, What I Want to Know, and What I Learned), along with exit tickets and practical activities. Time constraints and lack of resources were found to limit trainers' application of active learning strategies. However, trainee engagement in student-centred learning strategies—such as class and group discussions, fieldwork, case studies, research, brainstorming, and class presentations—stands at 74.6%, indicating room for improvement. Additionally, while 51.5% of trainees use projectors, YouTube videos, audio resources, computer simulations, and the school's website or student portals for accessing learning materials, a substantial 87% recognise that the CBET approach is rooted in practical applications, demonstrating a solid understanding of the program's objectives.

Moreover, 76.6% of trainees participate in practical sessions at the institution, whereas participation in dual TVET training is noticeably lower, at approximately 40%. The institution had yet to establish dual training for all the programs, while other programs lacked linkages and MOUs for this dual training. The findings also indicate that CBET trainees participate in traditional attachments, where they undertake industrial training for no longer than four months during their entire training period. This duration is insufficient for trainees to cover all the elements outlined in their operational standards, resulting in underprepared graduates who may struggle to meet employers' requirements. Enhancing the instructional processes CBET trainers use in content delivery requires considerable improvement. Results indicate that CBET trainers' usage of UDL, active learning strategies, learner-centred methods, practical sessions, and dual training averages 68.8%, while traditional training methods account for 31.2%. These statistics highlight existing gaps in the instructional approaches employed by CBET trainers.

**Assessment Methods CBET Trainers Use to Evaluate the Competence Levels Developed by CBET Trainees**

The results indicate that 84% of CBET trainers employ authentic assessment methods, such as industry exposure, natural work environments, or simulations, for formative and summative assessments. However, only 28% of CBET trainers assess trainees within the framework of Dual TVET Training. Additionally, 76.6% of CBET trainees reported using written assessment methods, including written assignments, discussion problems, research questions, and project preparations. A substantial 72% of CBET trainers are familiar with tools such as checklists, rating scales, and rubrics. Furthermore, 92% of CBET trainers use platforms like Quizizz, Pallet, E-

portfolio, Mentimeter, or Kahoot in their assessments, while only 67.1% of CBET trainees acknowledged using these tools.

On average, the implementation of recommended methods for evaluating trainee competence by CBET trainers stands at 61.1%, contrasted with a 38.9% reliance on traditional written methods. These conventional approaches involve written assignments, discussion problems, research questions, and project preparations, assessing trainees solely once during their four-month industry attachments and employing written CATs and end-of-term exams to gauge competence. Such assessment practices hinder the development of trainees' practical skills, creativity, and proficiency in their respective training areas, resulting in significant gaps in the assessment methods used by CBET trainers to evaluate their trainees' competence levels.

## VI. Conclusion And Recommendations

**Conclusions of the Study**

Determining the level of pedagogical knowledge of the CBET approach among CBET trainers reveals a commendable understanding of the CBET approach, with an average pedagogical knowledge score of 74%, categorising them within the Advanced Level. The findings indicate that while trainers are well-informed about the fundamental aspects of the CBET methodology, including its benefits and the Backward Design Approach, there remain notable gaps in their comprehension of the underlying principles and curriculum components. This suggests an opportunity for further professional development to elevate the trainers' expertise to the Expert Level. By addressing these areas of improvement, the overall effectiveness of CBET training can be significantly enhanced, benefiting both trainers and trainees alike.

Exploring the instructional processes CBET trainers use in content delivery presents a mixed yet promising landscape for CBET trainers and trainees. While there is a commendable awareness of Universal Design for Learning and a strong inclination towards active learning strategies, significant challenges persist, particularly concerning the engagement levels of trainees and the adequacy of practical training. The low participation in dual TVET training and the limited duration of industrial attachments contribute to a skills gap that may leave graduates underprepared for the workforce. To enhance the overall effectiveness of the CBET program, targeted interventions are necessary to improve instructional methods, increase resource availability, and strengthen partnerships for dual training opportunities. By addressing these gaps, the program can better fulfil its objectives and equip trainees to meet the demands of employers.

Finding out the assessment methods used by CBET trainers to evaluate the level of competence of CBET trainees highlights a significant disparity in the assessment methods used by CBET trainers. While a substantial majority employs authentic assessment techniques that foster practical skills and real-world applications, a notable portion still relies heavily on traditional written assessments. This reliance on conventional methods limits the opportunity for holistic evaluation and hinders trainees' development in crucial areas such as creativity and practical proficiency. To bridge this gap and enhance the quality of training outcomes, it is essential for CBET trainers to integrate innovative assessment tools and approaches further, ensuring a comprehensive evaluation of trainees' competencies that aligns with industry standards and demands. Addressing this imbalance will contribute to more effective training programs and better-prepared trainees in their respective fields.

**Recommendations of the Study**

To ensure a robust discussion on enhancing practical learning within TVET institutions, it is imperative to emphasise the integration of Dual training systems and compulsory attachments across all departments. This methodology is instrumental in furnishing learners with firsthand experience, a cornerstone for their professional advancement. Nonetheless, the fruition of such endeavours is significantly contingent upon providing sufficient resources and establishing comprehensive operating frameworks. CBET paradigm emerges as a promising model in this context, though the insufficiency of essential learning resources within educational frameworks restricts its implementation. Strategies such as continuous assessment, the adoption of smaller class sizes to enhance pedagogical effectiveness, and the assurance of substantial financial support from the MOE should be employed to counteract these limitations. Moreover, updating the skills of trainers to align with industry standards and placing an elevated emphasis on practical exercises will narrow the chasm between theoretical instruction and real-world industry expectations.

The augmentation of resource allocation is pivotal for realising training congruent with industry benchmarks. This necessitates the modernisation of workshops by integrating pertinent tools and equipment and fostering partnerships with the industry to acquaint trainees with contemporary technology and machinery. The effectiveness of CBET would be notably increased by reducing the trainee-to-trainer ratio, facilitating a more immersive, practical learning experience. Additionally, diminishing the reliance on paperwork and enhancing the accessibility of learning materials can contribute to a more streamlined educational process. It is also critical

that training resources are compliant with industry standards and that instructors possess a profound comprehension of industrial operations.

Furthermore, the expansion of facilities and the provision of additional training opportunities constitute essential steps forward. Initiating civic education campaigns to inform parents and the broader society about the advantages and structure of CBET could engender widespread endorsement and support for the model. It is crucial for the training framework to not only cater to the industry's immediate needs but also proactively anticipate future sectoral demands, thereby ensuring that trainees are adequately prepared for the dynamic job market. This entails a deeper industrial engagement and a deliberate effort to synchronise training programs with industry requirements.

In summation, the effective implementation and refinement of CBET within TVET institutions demand a comprehensive approach that prioritises the development of practical skills, judicious resource management, and ongoing adaptation to industrial innovations. By addressing these critical facets, CBET can actualise its potential as a formidable model for vocational education and training, culminating in cultivating a workforce well-equipped to navigate the demands of the global marketplace.

**Recommendations for Further Research**

Future studies need to explore the implementation of CBET across various TVET institutions in Kenya. This comparative analysis will help validate the results of this study, which was only conducted in NNP. Additionally, it would be beneficial to research the long-term impact of CBET training on the employability and career progression of graduates from NNP and other institutions, providing valuable insights into the effectiveness of CBET in meeting the demands of the job market.

Implementing the CBET approach presents challenges for trainers and trainees. Key issues include inadequate resource allocation, insufficient training materials, and the lack of robust support systems. These challenges not only hinder the effectiveness of the training but also impact the overall learning experience. By closely examining these obstacles, valuable insights can be gleaned that may inform policy changes and improve resource distribution. Addressing these issues is crucial for enhancing the CBET implementation process and creating a more efficient and effective training environment that benefits all stakeholders.

Further research could delve into the development of innovative and practical assessment methodologies tailored for CBET programs. By focusing on measuring competence levels more effectively, these methodologies would not only enhance the evaluation process but also ensure that the assessments are aligned with industry standards. This alignment is crucial for bridging the gap between education and the workforce, leading to graduates who are better prepared for real-world challenges. By exploring diverse assessment strategies, such as portfolios, simulations, and performance-based evaluations, researchers can identify best practices that contribute to a more comprehensive understanding of learner competencies and their application in various vocational contexts. This effort could significantly improve the quality and relevance of training programs, fostering a skilled workforce that meets the industry's evolving demands.

Future research should focus on how CBET programs can evolve to integrate emerging skills and technologies in line with the fast-paced changes in industry demands. This involves incorporating digital tools into training methodologies and assessment processes, ensuring learners have relevant competencies. Additionally, studies could examine CBET programs' initiative-taking measures to anticipate and respond to future skill requirements, particularly in a technology-driven economy. By understanding these dynamics, educators and stakeholders can better prepare learners for the increasingly complex job market, ensuring that training remains aligned with the evolving needs of industries.

## References

[1] Adam, J., & Kamuzora, F. (2008). Research Methods For Business And Social Studies. Mzumbe Book Project.
[2] Baridam, D. M. (2001). Research Methods In Administrative Sciences (3rd Ed.). Sherbrooke Associates.
[3] Bird, J. (2021). Higher Engineering Mathematics. Routledge.
[4] Bhurtel, A. (2015). Technical And Vocational Education And Training In The Workforce Development. Journal Of Training And Development, 1, 77-84. Https://Doi.Org/10.3126/Jtd.V1i0.13094.
[5] Burson, T. (2011). The Effects Of Backward-Designed Curriculum And Instruction On Classroom Management. [Doctorate's Dissertation, Lindenwood University]. Https://Digitalcommons.Lindenwood.Edu/Dissertations/520.
[6] Coombs, H. (2022). Case Study Research: Single Or Multiple [White Paper]. Southern Utah University. Https://Doi.Org/10.5281/Zenodo.7604301.
[7] Cherry, K. (2010). What Is Validity? Http://Www.Psychology.About.Com.
[8] Cresswell, J.W., & Plano, V.L (2011). Designing And Conducting Mixed-Method Research. Thousand Oaks.
[9] Dambudzo, I. I. (2018). Competence-Based Education And Training For Social-Economic Transformation. Advances In Social Sciences Research Journal, 5(3) 83-94.
[10] Doody, O., Slevin, E., & Taggart, L. (2013). Focus Group Interviews Part 3: Analysis. British Journal Of Nursing, 22(5), 266–269. Http://Doi.Org/10.12968/Bjon.2013.22.5.266.
[11] Drost, E.A. (2011). Validity And Reliability In Social Science Research. Education Research And Perspectives, 38 (1), 105–124.

[12] Filippos, E. (2023). Teaching Techniques For Developing The Learner-Centred Approaches In The Classroom. Http://Dx.Doi.Org/10.46827/Ejes.V10i2.4667.
[13] Ganal, N.N., Guiab, M.R., & Sario, M.L.P. (2019). Assessing The Training Needs Of Teachers On The 21st-Century Pedagogical Skills And Personal Development. The Normal Lights, 13(2), 177-200.
[14] Hodge, S. (2007). The Origins Of Competency-Based Training. Australian Journal Of Adult Learning, 47(2), 187-209.
[15] Hord, S. (2009). Professional Learning Communities. Journal Of Staff Development, 30(1), 40–43, 78.
[16] Jwan, S.T. (2022). Competency-Based Education And Training (CBET) In Kenya: Policies, Opportunities And Challenges. Https://Hdl.Handle.Net/10520/Ejc-Alt_V39_Nsed_A13.
[17] KEPSA. (2024). Dual TVET Training Program: Unleashing Opportunities For The Youth And PWDS In Kenya. Https://Kepsa.Or.Ke/Kepsanews/Dual-Tvet-Training-Program-Unleashing-Opportunities-For-The-Youth-And-Pwds-In-Kenya.
[18] Kothari, C. R. (2004). Research Methodology, 2nd Ed. New Age.
[19] Labani, K., Noah, M., & Heike, W. (2019). Implementation Of A Competence-Based Curriculum In Technical Colleges: The Case Of Arusha City,
[20] Tanzania. International Journal Of Vocational And Technical Education, 11(1), 1-20. Http://Www.Academicjournals.Org/IJVTE.
[21] Lane, S. (2022). Vygotsky's Constructivist Theory Of Learning. Https://Eduedify.Com/Vygotskys-Constructivist-Theory-Of-Learning/
[22] Langat, K., Omboto, D.B., Ambuli, A.M., & Ngeno, J.K. (2021). The Effects Of Trainer Competencies On Training Effectiveness: A Survey Of Public TVET Institutions In Kenya. Technical And Vocational & Training Authority.
[23] Moindi, R., & Nyatuka, B. (2022). Competency-Based Assessment In Entrepreneurship Education In Kenya's Tertiary Institutions. African Journal Of Teacher Education, 11(1), 100–120. Https://Doi.Org/10.21083/Ajote.V11i1.7052.
[24] Miseda, C., & Kitainge, P.K. (2021). The Effects Of Instructional Design Processes On The Quality Of Implementing Electrical Installation CBET System In Kenya. Africa Journal Of Technical And Vocational Education And Training 6(1), 35-45. Http://Afritvet.Org/Index.Php/Afritvet/Article/View/121.
[25] Mugenda, O., & Mugenda, A. (1999). Research Methods: Qualitative And Quantitative Approaches. Acts Press.
[26] Omari, M.I. (2011). Concepts And Methods In Education Research. Oxford University Press.
[27] Orodho, A. (2004). Techniques Of Writing Research Proposals And Reports In Education. Mazda Publishers.
[28] Orodho, A. (2008). Techniques Of Writing Research Proposals And Reports In Education And Social Sciences. Kanezja HP Enterprises.
[29] The Republic Of Kenya. (2018). Competency-Based Education And Training Policy Framework. Directorate Of Technical Education And Vocational Education And Training.
[30] The Republic Of Kenya. (2017). Basic Education Curriculum Framework. Kenya Institute Of Curriculum Development.
[31] The Republic Of Kenya. (2008). Kenya Vision 2030. Https://Vision2030.Go.Ke/
[32] Rahman, A., & Muktadir, M.G. (2021). SPSS: An Imperative Quantitative Data Analysis Tool For Social Science Research. International Journal Of Research And Innovation, 5(10). 300-302, Https://Dx.Doi.Org/10.47772/IJRISS.2021.51012.
[33] Roland, E., & Vanora, H. (2002). Nursing Standards: Official Newspaper Of The Royal College Of Nursing, 16(40), 33-9. Https://Doi.Org/10.7748/Ns2002.06.16.40.33.C3214.
[34] Rutayuga, A.B. (2014). The Emerging Tanzania Concept Of Competence: Condition For Successful Implementation And Future Development [Doctoral Dissertation, University Of London]. Https://Discovery.Ucl.Ac.Uk/Id/Eprint/10021640
[35] Sarmiento, C.P., Marie, M.P.E., Elipane, L.E., & Palomar, B.C. (2020). Assessment Practices In Philippine Higher STEAM Education. Journal Of University Teaching & Learning Practice, 17(5), 2020. Https://Ro.Uow.Edu.Au/Jutlp/Vol17/Iss5/18.
[36] Sataloff, R.T., & Vontela, S. (2021). Response Rates In Survey Research. Journal Of Voice, 35(5), 683-684. Https://Doi: 10.1016/J.Jvoice.2020.12.043.
[37] Sewagegn, A. A. (2019). A Study On The Assessment Methods And Experiences Of Teachers At An Ethiopian University. International Journal Of Instruction, 12(2), 605-622. Https://Doi.Org/10.29333/Iji.2019.12238a.
[38] Sima, F.S. (2021). Assessment Of Competency-Based And Training Curriculum On Improving Quality Of Training In Schools Of Nursing Laake
[39] Zone, Tanzania [Masters' Dissertation, The Open University Of Tanzania]. Http://Repository.Out.Ac.Tz/3403/1/SIMA%20FERDNARD%20SIMA%20-DISSERTATION-01-06-2021.Doc.
[40] Siedlecki, S.L. (2020). Understanding Descriptive Research Designs And Methods. Clinical Nurse Specialist, 34(1), 8-12. Https://Doi.Org/10.1097/NUR.0000000000000493.
[41] Schmidt, M. (2015). Quantitative Analysis Of Focus Group Interviews. In A. Manrai & H. Meadow (Eds.), Developments In Marketing Science: Proceedings Of The Academy Of Marketing Science (Global Per). Springer, Cham. Http://Doi.Org/Https://Doi.Org/10.1007/978-3-319-17356-6_6.
[42] Shabiralyani, G., Hasan, K.S., Hamad, N., & Iqbal, N. (2015). Impact Of Visual Aids In Enhancing The Learning Case Research: District Dera Ghazi Khan. Journal Of Education And Practice, 6(19). 226–233. Https://Api.Semanticscholar.Org/Corpusid:41964870.
[43] Wanjiku, M.C. (2022). Factors Affecting Effective Execution Of The Competency-Based Curriculum In Primary Schools Of Northeastern, Kenya
[44] [Research Project, UNICAF University]. Https://Cdn.Unicaf.Org/Websites/Unicaf/Wp-Content/Uploads/2022/10/ MURIUKI_CAROLINE_WANJIKU_Thesis.Pdf
[45] World Bank. (2007). Strategy To Revitalize Technical And Vocational Education And Training (TVET) In Africa. African Union.