Track: Gender, technology and innovation in open education

Enhancing Online Practicum Assessment: Addressing the Challenges of Evaluating Practical Competencies in TVET

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Abstract

The shift to online learning has created a major challenge for Technical and Vocational Education and Training (TVET): assessing practical competencies in virtual environments. Traditional hands-on evaluation methods are difficult to replicate online, raising concerns about validity, reliability, and equity. This study examines how a public higher education TVET institution in urban Jamaica addresses these challenges through innovative online practicum assessment strategies. Using a qualitative approach case study, the research explores digital tools, remote supervision, and competency-based assessment models to overcome limitations. Through semi-structured interviews, and document analysis, it examines the experiences of students, technical experts and instructors/assessors, focusing on barriers such as technological accessibility, student preparedness, and instructor workload. The study highlights how adaptive learning technologies, virtual simulations, and AI-driven feedback enhance assessment accuracy, student engagement, and competency validation. Findings reveal that while online practicum assessment initially posed challenges, digital integration has improved evaluation fairness and reliability. However, disparities in digital access and readiness, particularly among gender groups, impact student performance. The study recommends integrating AI-driven assessment tools and virtual simulations, implementing gender-responsive digital literacy training, and adopting a hybrid assessment model that blends online and in-person evaluation. These strategies ensure an inclusive, effective, and scalable approach to TVET practicum assessment in open and distance learning environments.

Keywords: Online Practicum Assessment, TVET, Digital Innovation, Competency-Based Learning, Remote Evaluation, Higher Education

Introduction

This section introduces the statement of the problem and the research aim, and questions for this study, "*Enhancing Online Practicum Assessment: Addressing the Challenges of Evaluating Practical Competencies in TVET*." In addition, it outlines the study's assumptions, delimitations, key definitions and significance.

The shift to online learning has created significant challenges for Technical and Vocational Education and Training (TVET), particularly in assessing practical competencies in virtual environments. Research highlights that online learning in TVET institutions offers challenges with assessing practical skills (Mutebi, Kerre, et al, 2023). These challenges include: (1) the concerns about validity and reliability when conducting online practical assessments since traditional hands-on evaluation methods are difficult to replicate online, (Gikandi et al., 2011); and (2) there is the lack of effective online assessment strategies which exacerbate existing inequities or lead to disparities in student performance, particularly among marginalized groups (Kim & Lee, 2018). There is no doubt that practical skills are essential for occupational competence and TVET programmes require students to develop practical skills, which can be difficult to assess online (Wheelahan & Moodie, 2017).

Given the importance of validity, reliability and equity in practical assessment to ensure students' practical skills meet industry standard, the purpose of this study is to explore and evaluate innovative online practicum assessment strategies that can enhance the validity, reliability, and equity of practical competency evaluation in TVET.

Specifically, this research seeks to:

1. investigate the challenges and limitations of current online practicum assessment methods in TVET
2. examine the impact of digital tools, remote supervision, and competency-based assessment models on student and instructor experiences
3. develop recommendations for integrating technology-enhanced assessment strategies that promote inclusivity, effectiveness, and scalability in TVET practicum assessment.

The following questions guided the research:

1. What are the current challenges and limitations of online practicum assessment methods in TVET?
2. What are the key components of an effective online practicum assessment framework in TVET?
3. How can the proposed online practicum assessment framework be implemented and evaluated in TVET settings?

Research Assumption

According to Creswell (2014), an assumption is a statement believed to be true although there is no empirical evidence. This study assumes that online practicum assessment can enhance validity, reliability, and equity, which is supported by Garrison and Kanuka's (2004) findings that blended learning environments can promote effective assessment. It also assumes that digital tools and technologies can support the development of modern online practicum assessment strategies, as maintained by Herrington and Herrington (2006).

Research Delimitation

The study is delimited to explore online practicum assessments at a TVET higher education institute, focusing on participants' experiences. The online practicum assessments include assessing competencies in agro-process, nail technology, library and information services and deliver quality service to customers.

The study focuses on a group comprising three students, four technical experts and three assessors from Kingston and Clarendon, Jamaica, with most participants being from Kingston. Kingston is the smallest parish, and it is a metropolitan city in Jamaica. In contrast, Clarendon is the third largest parish in Jamaica and is known for its major agricultural practices (Statistical Institute of Jamaica, 2011).

Key Terms

The following are definitions of key terms:

1. *Online Practicum Assessment*: Practicum assessment refers to "the evaluation of students' practical skills and competencies in a real-world setting" (Herrington & Herrington, 2006, p. 12). Online practicum assessment involves conducting these evaluations in an online environment.
2. *TVET (Technical and Vocational Education and Training):* TVET refers to "education and training that provides individuals with the skills and knowledge needed for specific occupations or industries" (UNESCO, 2018, p. 2).
3. *Higher Education:* Higher education refers to "post-secondary education that provides advanced knowledge and skills in a specific field or discipline" (OECD, 2019, p. 1).
4. *Competency-Based Assessment*: Competency-based assessment involves "evaluating students' mastery of specific competencies or skills" (Jones & Voorhees, 2002, p. 3).

Significance of Study

This study "*Enhancing Online Practicum Assessment: Addressing the Challenges of Evaluating Practical Competencies in TVET,"* can lead to several research innovations. In fact, confronting the challenges of evaluating practical competencies online, the study can contribute to the development of more valid and reliable assessment methods, facilitating accurate assessment of students' skills. Moreover, addressing these challenges will contribute to more equitable and accessible assessment methods, ensuring all students, regardless of their needs, have the necessary resources for fair online practicum assessments. Furthermore, the study may explore new technologies, such as virtual and augmented reality, artificial intelligence or simulation-based assessment, to enhance online practicum assessment. Additionally, by addressing challenges and incorporating emerging technologies, an enhanced online assessment framework can be developed to assess practical competencies online. Essentially, the findings of this research are significant to the TVET online assessment environment, as they will highlight the need to address existing challenges, incorporate resources to meet students' needs and include new technologies, ensuring students' competencies meet industry requirements. Ultimately, this study will contribute to transforming online practicum assessment, making it more effective, equitable and industry relevant.

Literature Review

This study explored the challenges and opportunities of online practicum assessment in TVET. A comprehensive literature review informs the research questions revealing gaps in current understanding and practice (Burns & Groves, 1997). This research aimed to address these gaps, contributing to the development of more effective online practicum assessment strategies.

Therefore, understanding the nuances of TVET is particularly crucial in the context of online practicum assessment, where the acquisition of practical skills and competencies is paramount. According to UNESCO-UNIVOC International Centre (2018), the term "technical and vocational education" (TVE) was replaced by "technical and vocational education and training" (TVET) in 2001. The term, TVET, refers to areas "of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (p. 7).

In contrast, the term "general education, according to UNESCO Institute of Statistics (2011), "is defined as education programmes that are designed to develop learners' general knowledge, skills and competencies, as well as literacy and numeracy skills, often to prepare participants for more advanced education programmes at the same or a higher International Standard Classification of Education (ISCED) level and to lay the foundation for lifelong learning" (p. 16).

Given UNESCO-UNIVOC's (2018) and UNESCO Institute of Statistic's (2011) definitions, there should be no separation between general education and TVET. The difference is that the general education does not emphasise digital technology and this is not sufficient for the industry demands in the workplace. However, TVET emphasises digital technology, along with the use of general education. Consequently, in Jamaica, TVET is a necessary improvement in the education system to prepare students for work and to respond to globalisation. If this is so, it is therefore imperative to be able to, with the use of technology, replicate hands on practicum on the online platform.

Competency-based training is seen as "a structured training and assessment system that allows individuals to acquire skills and knowledge to perform work activities to a specified standard" (UNESCO and ILO, 2020, p. 10).

Despite the emphasis on graduates being able to perform work activities to a specified standard, the challenges of evaluating online practical assessment at the higher education level in TVET programmes can determine if individuals are hired or not or hired with the right competencies. According to Boud and Falchikov (2007), "we are failing to prepare them for the rest of their lives" (p. 5). Moreover, Boud and Falchikov's (2007) research confirms the "limited research in assessment as well as the lack of focus on assessing practical competencies" (p. 5). They further lament that there is limited exploration of validity, reliability, equity as well as industry relevance (Boud and Falchikov, 2007). Despite the growing adoption of online practicum assessments in TVET, there is a notable scarcity of research exploring the specific challenges and opportunities associated with evaluating practical competencies in online environments, particularly in relation to ensuring equity, accessibility, and industry relevance.

Similarly, Jamaica's education system faces challenges in providing relevant skills training, despite TVET programmes aiming to address industry needs. The absence of organizational coherence in education governance (The Jamaica Education Transformation Commission, 2021) further complicates TVET delivery, including online practicum assessments.

The challenges can be addressed by developing a blended approach framework that enhances validity, reliability and equity when evaluating online practicum assessments

In summary, the acquisition of knowledge, appropriate attitude, practical skills and competencies relating to the various occupation sectors is paramount in the TVET System. The TVET system highlights digital technology, technical knowledge and practical skills for preparing students for the various industries. Evaluating the practical competencies online poses challenges, including validity, reliability, equity and industry relevance. Furthermore, there is limited research on online practicum assessments in TVET, particularly in Jamaica. In addition, Jamaica's education system faces challenges in providing relevant skills training, exacerbated by lack of organizational coherence in governance. Consequently, there is a need for effective online practicum strategies aim at addressing the gaps and contributing to the development of an effective framework.

Methodology

This study employed a qualitative research approach which is ideal to explore a problem or issue, such as challenges of evaluating practical competencies in TVET online. In fact, research highlights that online learning in TVET institutions offers challenges with assessing practical skills (Mutebi, Kerre, et al, 2023). Moreover, Creswell (2013) states, "We conduct qualitative research because a problem or issue needs to be explored. This exploration is needed, in turn, because of a need to study a group or population, identify variables that cannot be easily measured, or hear silenced voices" (pp. 47-48). Furthermore, qualitative approach "involves an interpretive, naturalistic approach to the world, studying things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2005, p. 3). In essence, this approach will provide the necessary in-depth insights to develop an online practicum assessment framework at the higher education level of the Jamaican TVET, addressing the issues relating to validity, reliability and equity.

The philosophical construct which guided the study was interpretivism. Denzin and Lincoln (2011) agree that contextual understanding and subjective experience are characteristics of interpretivism. To gain a better understanding of the problem, contextual understanding and the various experiences were analysed. Experiences included participants whose competencies were being assessed for agro-processing, nail technology, library and information services and customer service.

Another characteristic of interpretivism is that knowledge is co-created between the researcher and participants. This team effort is necessary for developing a framework that addresses the issues of validity, reliability and equity. In fact, Creswell (2013) argues that features of imperialism include co-creation of knowledge while foregrounding contextual sensitivity.

Intrpretivism is also known to reject universal truth and generability across contexts which is particularly relevant for the topic, *"Enhancing Online Practicum Assessment: Addressing the Challenges of Evaluating Practical Competencies in TVET."* Online practicum assessment is known for assessing competencies in different areas of specialisation because of the various occupational fields. Schwandt (2000) pontificates that challenging universal truth and generalsability is a feature of interpretivism which is necessary in the field of academic research as well as for the different contexts involve in the study.

In addition, the study used an exploratory case study, focusing on detailed examination of the case. The features of the case study design is in alignment with a qualitative approach and the philosophy of interpretivism design will be used (Yin, 2018). According to Yin (2014), a case study involves an in-depth examination of a single case or a small number of cases. In this study, the focus will be on a single case. Yin (2014) further notes that a case study is conducted in the real-life context of the case, rather than in a controlled environment. Other important factors to note about case studies which are relevant to this study are an exploratory case study investigates an area where little is known, helping to identify research questions, variables, and develop hypotheses for future research; case studies allow for flexibility in data collection and analysis, enabling the researcher to adapt to emerging themes and issues; they provide a rich understanding of the context in which the case operates, including the social, cultural, and historical factors that influence the case; and they often involve data triangulation, where multiple data sources and methods are used to validate findings (Yin, 2014).

Data Collection Methods

The following data collection methods were used to achieve the objectives of the study:

1) Semi-structured interviews: Interviews will be conducted with TVET leaders, educators, and students to gather data on their experiences and perspectives.
2) Document analysis: Relevant documents, such as institutional policies, reports, and strategic plans, will be analyzed to provide context and background information.

Data Analysis Methods

The data collected will be analyzed using the following methods:

1) Thematic analysis: Thematic analysis will be used to identify patterns and themes in the data.
2) Content analysis: Content analysis will be used to analyze the documents and institutional policies.
3) Case study analysis: The data will be analyzed within the context of the case study, using the boundaries defined above.

The population of this study included students, technical experts and assessors. The population size was 27 – nine students, nine technical experts and nine assessors. The participants are females and males and range from 21 to 67 years old, with diverse educational backgrounds.

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The sampling technique that was utilised in this study was purposive sampling. Purposive sampling is more aligned to qualitative studies that are seeking in-depth description of a subject being studied. According to Hassan (2024), purposeful sampling method allows participants to be selected based on predefined criteria that align with the purpose of the study. Therefore, there is an intentional selection of participants who the researcher believes have specific characteristics relevant to the development of an online practicum assessment framework. The sample size included 10 participants (i.e. three students, three assessors and 4 technical experts).

Results

Research Question 1: What challenges are faced in evaluating practical competencies in online TVET practicums?

A key challenge identified is the inability to conduct real-time observation during assessments. This limitation is summarized in the assertion: Real-time assessment limitations hinder accurate evaluation of hands-on skills. Participants emphasised this through comments such as, “Instructors find it difficult to assess hands-on skills online because they can't observe the students in real time.” This supports the overarching theme, 'Challenges in evaluating practical competencies online,' which emerges from the category 'Assessment limitations.'

Another challenge is the issue of video-based evidence, where the validity and clarity of submissions are questionable. This aligns with the assertion: Video-based assessments may lack authenticity and clarity in demonstrating practical competencies. As one participant noted, “Videos submitted by students sometimes do not clearly show their skills or are edited.” This concern reflects the theme 'Concerns about validity of student-submitted assessments' within the category of 'Evidence integrity.'

Technology disruptions during live assessments were also highlighted. This supports the assertion: Technical disruptions compromise the effectiveness of real-time practical assessments. One participant explained, “We try to use live video sessions, but they are often disrupted by technical issues.” This reinforces the theme 'Technology as a barrier to synchronous assessment' under the category 'Delivery constraints.'

Research Question 2: How does student access to resources affect online practicum assessment in TVET?

Inequitable access to digital and physical tools presents a major barrier to fair assessment. The assertion here is: Digital and material resource disparities undermine fair assessment. This is exemplified by the statement, “Some students do not have the necessary tools or stable internet to perform their practical assignments from home.” This insight supports the theme 'Inequity in access to practical learning,' grouped under the category 'Resource constraints.'

Research Question 3: What are effective strategies for improving online practicum assessment in TVET?

One effective strategy is incorporating external assessment by workplace supervisors, as students reportedly perform better in authentic environments. This leads to the assertion: Authentic environments and assessors enhance the credibility of competency evaluations. A participant observed, “Some students perform better when they are assessed by external workplace supervisors.” This theme, 'Value of workplace-based assessment,' stems from the category 'Assessment authenticity.'

Additionally, hybrid models combining digital and in-person elements were recommended. This supports the assertion: Combining online and in-person methods may improve validity and flexibility of assessments. As noted by one respondent, “We need a system that combines digital tools with on-site verification when possible.” This reflects the theme 'Hybrid approaches to competency assessment' from the category 'Blended assessment strategies.'

Discussion

The findings of this study highlight several challenges and limitations associated with evaluating practical competencies in online TVET practicums. One of the primary concerns is the inability to conduct real-time observation during assessments, which hinders accurate evaluation of hands-on skills (Boud & Falchikov, 2007). This limitation is consistent with previous research, which suggests that real-time assessment is crucial for evaluating practical skills (Eraut, 2004). The use of video-based evidence has been proposed as a potential solution; however, concerns about validity and clarity of submissions were raised, echoing findings from other studies (Kearns & McBain, 2015).

Technical disruptions during live assessments also pose a significant challenge, compromising the effectiveness of real-time practical assessments. This is consistent with research highlighting the importance of reliable technology infrastructure in online learning environments (Beldarrain, 2006). Furthermore, inequitable access to digital and physical tools presents a major barrier to fair assessment, underscoring the need for TVET institutions to address resource disparities (Selwyn, 2004).

In terms of effective strategies for improving online practicum assessment, incorporating external assessment by workplace supervisors and hybrid models combining digital and in-person elements were recommended. These findings are supported by research emphasizing the importance of authentic environments and assessors in enhancing the credibility of competency evaluations (Billett, 2001). Hybrid approaches to competency assessment have also been shown to improve validity and flexibility (Garrison & Kanuka, 2004).

Conclusion

This study provides insights into the challenges and limitations of evaluating practical competencies in online TVET practicums. The findings highlight the need for TVET institutions to address issues related to real-time assessment limitations, video-based evidence, technical disruptions, and resource disparities. Effective strategies for improving online practicum assessment include incorporating external assessment by workplace supervisors and hybrid models combining digital and in-person elements. These findings have implications for the design and implementation of online TVET practicums, emphasising the importance of authentic environments, reliable technology infrastructure, and flexible assessment approaches.

Recommendations

Based on the findings of this study, there are several recommendations to enhance online practicum assessment to ensure validity, reliability and equity:

1. Participants felt that online practicum assessment is enhanced when a technical expert is on location as the assessment is being done by the students. In addition, a checklist must be completed and signed by the student and the technical expert, agreeing that the practicum assessment was in alignment with the industry standard. This signed document must be submitted to the assessor prior to viewing recordings. This will address the issue of validity and reliability. The TVET institution providing the training should provide the checklist of criteria that are in alignment with the critical aspects of evidence and performance criteria outlined in the industry standards.

2. If it is a situation where the practicum is being done in real-time, an agreed site must be used. This site must be requested by the TVET institute. Therefore, the proper partnership documents must be in place prior to the assessment. This will facilitate a technical expert being present to complete, sign and date the checklist. This will address validity and reliability.

3. To address the challenge of equity, the training provider must ensure that the students who are at risk are provided with the digital tools and other necessary resources.

4. The TVET institution is to provide virtual and augmented reality, artificial intelligence or simulation-based assessment, to enhance online practicum assessment.

5. The TVET institution is to incorporate in its training programmes, training to use the technologies necessary to record practicum assessments.

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