Original Article

Challenges of an Online Pedagogy as a Method for TVET Practical Skills Training Delivery and Assessment

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ABSTRACT

Natural catastrophes and pandemics have disrupted teaching and learning in unexpected ways, forcing educators to carefully contemplate a future in which the majority of training delivery and assessment may have to be online. However, before committing to this pedagogical shift, there is a need to establish, rank in terms of prevalence and thus address related challenges. This paper aims to establish and rank the challenges of online pedagogy as a method for TVET practical skills training delivery and assessment in the context of trainees, instructors, and assessors. A survey method was used to gather participants' responses using an open-ended post-test questionnaire from a total of sixty-nine (69) trainees, twenty (20) instructors and eight (8) assessors after they had undergone an online training delivery and assessment of practical skills. The collected responses were first processed into operational data that was then clustered into twelve categories of closely related meanings. The clustered data was then statistically (descriptive) illustrated and then graphically presented in terms of the ranked average percentage of participants mentioning the category of challenges. The findings of the survey showed that lack of ICT equipment; poor or no internet connectivity; lack of feedback and realtime interaction; poor course/training design; and electricity outages ranked as the top challenges of an online pedagogy as a method for TVET practical skills training delivery and assessment. The paper recommends that governments, donor agencies and TVET providers should invest in the infrastructure and enablers of online training and assessment.

INTRODUCTION

The disruptions in the teaching and learning process caused by natural disasters and pandemics have created a new normal in which educationists have to seriously consider a future where most teaching and learning may have to be done online. Despite the numerous challenges that have resulted from these closures, the opportunity of using digital tools to develop learning solutions that are more flexible has been presented. Comyn (2020) advises that while online or remote learning in TVET and skills development during the pandemic can be and has been used to find short-term solutions, we must take this chance to have long-term beneficial impacts and increase resilience. This new reality calls for immediate attention towards refining and standardising those learning experiences where learners and their teachers are separated in time and space.

Gillett-Swan (2017) points out that problems with the online environment and software restrictions can hinder communication and functionality, contributing to the time constraints and annoyances felt by both facilitators/staff and students. Thus, before committing to this pedagogical shift from sitting in the lecture room to studying from anywhere at the learner's convenience and pace, there is a need to establish, rank in terms of prevalence and thus address related challenges. The purpose of this paper, therefore, is to establish and then rank the challenges of online pedagogy as a method for TVET practical skills training and assessment in the context of trainees, instructors, and assessors.

LITERATURE REVIEW

Technical Vocational Education and Training (TVET) is a learning pathway that aims to equip people with knowledge, know-how, skills and/or competencies required in particular occupations or more broadly in the labour market for the jobs of today and tomorrow (European Commission, 2014), has '*practical skills* as an integral and indispensable component for the eventual employment of the resulting graduates. Whereas the term practical work is not clearly defined within available TVET literature, closely related terms in use and practice in TVET are *Technical skills* which are the knowledge or abilities needed to perform specific tasks such as working with a piece of technology or equipment or to use a certain technique (Borsellino, 2021)and *practical work* which refers to any teaching and learning activity that, at some point throughout the activity, requires the students to either observe or manipulate the items and materials that they are studying (Millar, 2004).

A UNESCO report titled "*Transforming TVET from idea to action*" emphasised the need for learning and teaching strategies to change, moving away from rigid, theory-based frameworks and toward more generic, adaptable approaches that embrace the use of digital media: rather than learning how to use ICTs, TVET providers must use ICT to enhance learning (UNESCO, 2012). Because online learning is a developing phenomenon and because businesses and academics at universities are attempting to make sense of this trend, Liang and Chen (2012) noted that the medium of delivery is frequently the factor that drives efforts to define online learning. The concept of online learning, they add, needs to be defined in a way that considers important questions like what learning actually is, how it takes place through electronic means, and the implications that online learning has for adaptability, accessibility, interaction, and cooperation (Liang & Chen, 2012).

The findings of research conducted by Haddad and Draxler (2002) in the UK and Africa (Ghana, Rwanda, South Africa, Tanzania) showed that the effectiveness of information and communication technologies (ICTs) improved whenever there was a shift in the classroom pedagogy toward one that was more learner-centred. *Pedagogy,* as "a strategy and execution of the instructional process

(Tes Editorial, 2018)", is a discipline that continually develops new methods for teaching and supporting students as they expand their knowledge (Daniela, 2019).

Whereas the rapidly changing learning environment requires TVET trainers to respond with an expanded toolset, especially in the delivery of practical skills, a number of challenges and bottlenecks still affect online learning as an alternative to practical skills training. According to Hoftijzer et al. (2020), obstacles to providing TVET skills online include a lack of access to internet connectivity, electricity, equipment, or media, learning platforms, and poor teacher and student preparation for remote learning (Hoftijzer et al., 2020). Thus, the main problem of online education is to create a system that improves rather than hinders learning by utilising the many course resources (Duncan & Young, 2009).

Sambu and Simiyu (2013) opined that first, it is important to ensure that everyone has access to high-quality education by removing all obstacles, whether they are financial, physical, institutional, or systemic; second, it is equally important to ensure that everyone can benefit from that education by eradicating all forms of discrimination and by implementing flexible modes of instruction, especially for the most disadvantaged and marginalised students who might not otherwise be reached by conventional modes; and third, it is also important to emphasise that simply having access to education is not enough (Sambu & Simiyu, 2013). Whereas the online learning pathway increases accessibility, flexibility, and convenience by allowing students to manage their obligations while pursuing their education, on the other hand, this increased flexibility can also lead to more problems because of distractions and a student's inability to fully participate in any live, scheduled contact hours per week (Gillett-Swan, 2017).

Simamora (2020) divided online learning challenges into five categories: learning styles and culture, pedagogical e-learning, technology, technical training, and time management challenge. Referring to students' responses on the topic, Simamora (2020) points to internet quota, signal, equipment (smartphones, laptops etc.), online learning applications, insufficient memory, and workload (and its impact on student's health) as the key challenges of online learning. Results of a study by Yusuf and Ahmad (2020) showed six (6) major challenges faced by educators in online learning, including; students paying less attention to what they were studying online, students in residential institutions left behind a variety of educational resources, including books and computers; learning environment or medium did not live up to expectations; connection to the internet was less than sufficient, to the point that the allotted time for the lectures had to be extended; connection to the internet that was unreliable for instructors, which hampered the flow of instruction; and online classes were not attended by the pupils (Yusuf & Ahmad, 2020).

According to a study by Basar et al. (2021) in which, all students in the study had access to some kind of digital device (a computer, a smartphone, etc.) and internet in their homes; the findings showed that their capability and comfortability to use computers was high (more than 93% of the population), only 41.5% of them were motivated to participate in online learning, and their capacity to collaborate with others was only at a moderate level (66.7%). The facilitator also faces the challenge of finding a platform that can encourage and foster an online sense of community among the students and the facilitator while also extending their skills, confidence, and capabilities using the online form to lessen the worries associated with participating in this kind of learning (Gillett-Swan, 2017). Palloff and Pratt (2007) opined that "when we migrate to online learning, it is not the curriculum we are converting; rather, it is our teaching approach; as our pedagogy changes, so must the course". They continue that developing an effective online course necessitates a paradigm change in terms of how the course materials are delivered (Palloff & Pratt, 2007).

On the drawbacks of online learning, it has been noted that students express worries about health problems associated with computer use,

information overload, communication anxiety due to the delayed replies in an asynchronous setting, more work and responsibility, difficulties navigating online and following discussion threads, and lack of visual clues (Palloff & Pratt, 2007). The challenge of lack of tools or supplies that are not often found within the home can be overcome, opines Hoftijzer et al. (2020), through simulated training, virtual or augmented reality experiences, and work-based learning such as virtual internships or apprenticeships (Hoftijzer et al., 2020).

METHODOLOGY

A survey method was used to gather information from a predetermined sample of respondents in order to learn more and acquire insights into the challenges of online delivery and assessment of practical skills (Questionpro, 2021). The survey was conducted on trainees and instructors of St Joseph's Technical Institute – Kisubi (Institution X) and Nakawa Vocational Training College (Institution Y) located in Wakiso and Kampala Districts of Uganda, respectively; and assessors from the Uganda Business and Technical Examinations Board (UBTEB). The trainees were first years pursuing the National Certificate in Building Construction and the National Certificate in Woodwork Technology programmes. A total number of sixty-nine (69) trainees, twenty (20) instructors and eight (8) assessors participated in the survey.

To promote homogeneity between the different categories of participants in the survey, a pre-test survey questionnaire was administered to guide the sampling process. Stratified sampling was then used to select trainees who participated in the survey, and purposive sampling was to select only instructors from institutions X and Y on the basis of their typicality and specific purpose in the study. Considering that the population of assessors was large and involved subjects residing in a large (countrywide) geographic area, cluster sampling was used to randomly select (from a list provided by UBTEB) assessors from the clusters that were geographically in close proximity to the institutions where the survey was conducted. A

standardised open-ended questionnaire instrument was then administered to trainees, instructors, and assessors after they had undergone various sessions of online delivery and assessment of TVET practical skills (post-test phase).

Descriptive statistics were used to analyse the collected data. The collected responses were first clustered into twelve categories of closely related meanings and then processed into operational data that shows the frequency and percentage of participant categories mentioning the challenge. The categories were then ranked based on the overall percentage of participants that mentioned the challenge and finally graphically represented in a bar chart.

FINDINGS

Demographically, the sample population of trainees (t! = 69) varied in institution of study, programme of study, gender, academic background, competency in the use of ICT and experience in online learning. 56.5% of trainees in the study were from programme A and 43.5% on programme B; 26.1% were female and 73.9% male; 24.6% had Uganda Advanced Certificate of Education, 71% had Uganda Certificate of Education, and 4.3% were from Community Polytechnic/Technical School; 79.7% were competent in use of ICT and 20.3% were not competent in use of ICTs; and 26.1% had prior experience of online training and 73.9% had no prior experience of online training.

The sample population of instructors (t! = 20) also varied in programme taught or assessed, gender, academic background, competency in the use of ICT and experience in online learning. An equal number (50%) were drawn from each of the programmes (A and B); 30% were female, and 70% male; 10% had postgraduate qualifications, 40% were degree holders, and 50% were diploma holders; all were competent in the use of ICTs; and 10% had prior experience of online training whereas 90% had no prior experience of online training.

The sample population of assessors (t! = 08) also varied in programme taught or assessed, gender, academic background, competency in the use of ICT and experience in online learning. An equal number (50%) were drawn from each of the programmes (A and B); 12.5% were female and 87.5% male; 12.5% had postgraduate qualifications, 25% were degree holders, and 62.5% were diploma holders; all were competent in the use of ICTs; and all had prior experience of online training.

Findings of the frequency and percentage of participants (trainees, instructors, and assessors) responses on challenges with online delivery and assessment of TVET practical skills are tabulated in *Table 1*. Findings on the percentages of each category of participants' (trainees', instructors', and assessors') responses on the challenges of online delivery and assessment of TVET practical skills are graphically represented in a bar chart shown in *Figure 1*.
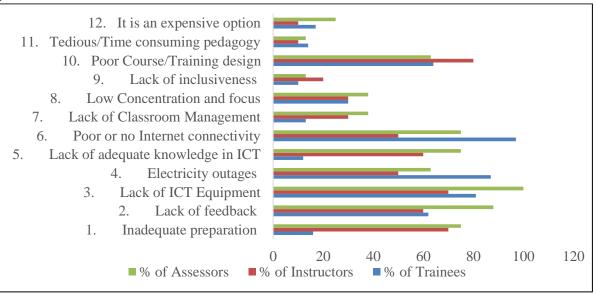
Table 1: Participants' frequency and percentage of responses on challenges with online delivery and assessment of TVET practical skills

Category of challenge	Participant category	Number of participants	Frequency Mentioning challenge	Percentage Mentioning challenge
1. Inadequate preparation of trainers and assessors	Trainees	69	11	16
	Instructors	20	14	70
	Assessors	8	6	75
2. Lack of feedback and realtime interaction	Trainees	69	43	62
	Instructors	20	12	60
	Assessors	8	7	88
3. Lack of ict equipment	Trainees	69	56	81
	Instructors	20	14	70
	Assessors	8	8	100
4. Electricity outages	Trainees	69	60	87
	Instructors	20	10	50
	Assessors	8	5	63
5. Lack of adequate knowledge of ict	Trainees	69	8	12
	Instructors	20	12	60
	Assessors	8	6	75
6. Poor or no internet connectivity	Trainees	69	67	97
	Instructors	20	10	50
	Assessors	8	6	75
7. Lack of classroom management	Trainees	69	9	13
	Instructors	20	6	30
	Assessors	8	3	38
8. Low concentration and focus	Trainees	69	21	30
	Instructors	20	6	30
	Assessors	8	3	38
9. Lack of inclusiveness to learning abilities	Trainees	69	7	10
	Instructors	20	4	20
	Assessors	8	1	13
10. Poor course/training design	Trainees	69	44	64
	Instructors	20	16	80
	Assessors	8	5	63
11. Tedious/time-consuming pedagogy	Trainees	69	10	14
	Instructors	20	2	10
	Assessors	8	1	13
12. It is an expensive option	Trainees	69	12	17
	Instructors	20	2	10
	Assessors	8	2	25

Figure 1: Participants' responses on the challenges of online delivery and assessment of TVET practical skills
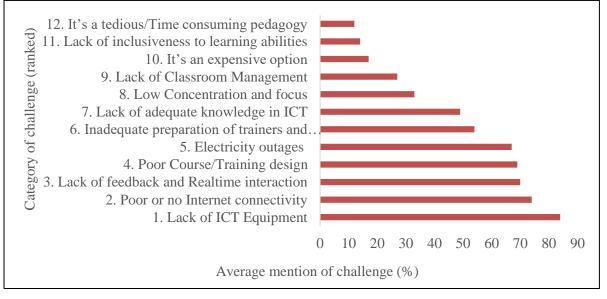

The average percentage of participants mentioning a particular category of challenge with online delivery and assessment of TVET practical skills was computed and used to determine the overall ranking of the mentioned category of challenges. The results are tabulated in *Table 2*.

Table 2: Participants' average percentage mention and overall ranking of challenges with online delivery and assessment of TVET practical skills

Category of Challenge	% of trainees mentioning the challenge	% of instructors mentioning the challenge	% of assessors mentioning the challenge	Average % mention of the challenge	Overall ranking of the challenge
1. Inadequate preparation of trainers and assessors	16	70	75	54	6
2. Lack of feedback and Realtime interaction	62	60	88	70	3
3. Lack of ICT Equipment	81	70	100	84	1
4. Electricity outages	87	50	63	67	5
5. Lack of adequate knowledge of ICT	12	60	75	49	7
6. Poor or no Internet connectivity	97	50	75	74	2
7. Lack of Classroom Management	13	30	38	27	9
8. Low concentration and focus	30	30	38	33	8
9. Lack of inclusiveness to learning abilities	10	20	13	14	11
10. Poor Course/Training design	64	80	63	69	4
11. Tedious/Time-consuming pedagogy	14	10	13	12	12
12. It is an expensive option	17	10	25	17	10

The overall ranking of the participants' average mention of the challenges (category) of online delivery and assessment of TVET practical skills is graphically represented in the bar chart shown in *Figure 2* in order of prevalence.

Figure 2: Ranking of participants' average percentage mention of challenges of online delivery and assessment of TVET practical skills

DISCUSSION OF FINDINGS

The results of the study showed that the challenges facing online training and assessment of practical skills could be categorised under twelve categories that include: inadequate preparation of trainers and trainees, lack of feedback and realtime interaction; lack of ICT equipment, electricity outages, lack of adequate knowledge in ICT, poor or no internet connectivity, lack of classroom management, low concentration and focus, lack of inclusiveness to learning abilities, poor course/training design, it's a tedious/time-consuming pedagogy; and being an expensive option.

The results showed that trainees ranked poor or no internet connectivity, electricity outages and the lack of ICT Equipment as the top challenges of online pedagogy, whereas lack of classroom management, lack of adequate knowledge in ICT and lack of inclusiveness of learning abilities were ranked as the least of their challenges to online pedagogy. Instructors ranked poor course/training design, lack of ICT equipment and inadequate preparation of trainers and assessors as the top challenges of online pedagogy; whereas lack of

inclusiveness to learning abilities, it being a tedious/time-consuming pedagogy, and being an expensive option, were ranked as the least of the challenges to online pedagogy. Then the assessors ranked lack of ICT equipment, lack of feedback and realtime interaction, and inadequate preparation of trainers and assessors as the top challenges of online pedagogy; whereas it is an expensive option, lack of inclusiveness to learning abilities, and it is a tedious/time-consuming pedagogy were ranked as the least of the challenges to online pedagogy. These findings are consistent with the findings of Hoftijzer et al. (2020), which concluded that obstacles to providing TVET skills online include a lack of access to internet connectivity, electricity, equipment, or media, learning platforms, and poor teacher and student preparation for remote learning.

The combined category of participants (Trainees, instructors and assessor) responses on the challenges of online delivery and assessment of TVET practical skills showed the top seven ranked challenges to be: lack of ICT equipment (mentioned by 84% of respondents), poor or no internet connectivity (mentioned by 74% of

respondents), lack of feedback and real-time interaction (mentioned by 70% of respondents), poor course/training design (mentioned by 69% of respondents), electricity outages (mentioned by 67% of respondents), inadequate preparation of trainers and assessors (mentioned by 54% of respondents), and lack of adequate knowledge in ICT (mentioned by 49% of respondents). These results resonate with the findings which have shown that: internet quota, signal, and equipment (smartphones, laptops etc.) are key challenges of online learning (Simamora, 2020); Connection to the internet being less than sufficient and unreliable for instructors hampers the flow of instruction(Yusuf & Ahmad, 2020); and the facilitator also faces the challenge of finding a platform that can encourage and foster an online sense of community among the students and with the facilitator (Gillett-Swan, 2017).

With 69% of the combined (Trainees, instructors, and assessor) responses pointing to poor course/training design as a challenge that is ranked fourth overall, the results agree with Palloff and Pratt's (2007) insistence on an effective online course necessitating a paradigm change in terms of how the course materials are delivered, and Duncan and Young (2009) conclusions that utilising the many course resources improves online learning. However, the findings did not support, in any of the categories of participants' responses, the conclusions in Palloff & Pratt (2007) regarding health problems associated with computer use and information overload and those of Hoftijzer et al. (2020) regarding lack of tools or supplies as challenges of online learning. This may have been due to the short duration of participants' involvement and experience of online delivery and assessment of practical skills.

CONCLUSION

This paper has established and then ranked the challenges of online pedagogy as a method for TVET practical skills training and assessment in the context of trainees, instructors, and assessors. The paper has established that the ranking of challenges of an online pedagogy as a method for TVET practical skills training and assessment in order of prevalence is: 1. lack of ICT equipment; 2. poor or no internet connectivity; 3. lack of feedback and real-time interaction; 4. poor course/training design; 5. electricity outages; 6. inadequate preparation of trainers and assessors; 7. lack of adequate knowledge in ICT; 8. low concentration and focus; 9. lack of classroom management; 10. it's an expensive option; 11. lack of inclusiveness to learning abilities; and 12. it's a tedious/time-consuming pedagogy.

The paper also concludes that although trainees, instructors and assessors all face similar categories of challenges in terms of online delivery and assessment of TVET practical skills, every category of challenges is ranked differently for each group. Whereas trainees ranked poor or no internet connectivity, electricity outages and the lack of ICT Equipment as the top challenges of online pedagogy, instructors ranked poor course/training design, lack of ICT equipment and inadequate preparation of trainers and assessors as the top challenges of online pedagogy; and assessors ranked lack of ICT equipment, lack of feedback and realtime interaction, and inadequate preparation of trainers and assessors as the top challenges of online pedagogy.

Practical Implications

The practical implication of this paper is that for online training and assessment of practical skills to be effective, there is a need to mitigate the prevailing challenges by having in place the relevant ICTs and trained personnel, ensuring stable and secure services such as internet connectivity and electricity, integrating technologies that can facilitate immediate feedback between the trainer and trainees so as to permit realtime communication between the instructor and those who are "attending the training online", and putting in place a structure that supports trainers and assessors to acquire adequate skills in online course design, delivery and assessment.

Recommendations

Governments, donor agencies and TVET providers should invest in the infrastructure and enablers of online training and assessment. This may include ICT equipment (Digital video cameras, video editing equipment, sound equipment, projectors, computers, and Wi-Fi routers, among others), internet connectivity with good speeds, and stable electricity sources that also have a backup system in case of an outage. Education planners, managers and quality assurance agencies should develop and implement a mechanism that continuously supports and prepares trainers and assessors in online course design, training delivery, class management, and assessment. Considering that feedback and real-time interaction are the '*Achilles heel*' of online training and assessment of practical skills, online course developers should explore the various software and hardware options possible to integrate some level of feedback within online training and assessment mechanisms.

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