THE IMPACT OF COVID-19 PANDEMIC ON TVET STUDENTS' LEARNING PROCESS: A CASE OF ONE POLYTECHNIC COLLEGE IN HARARE

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ABSTRACT

A series of transformations have taken place in the education system due to COVID-19 pandemic. This research is aimed at determining the impact of COVID-19 on the learning process with special reference to Technical Vocational Education and Training (TVET) students in Zimbabwe. A qualitative research approach was used involving a multiple case study research design. The study sample included two Clothing and Textile Technology (CTT), two Building Technology (BT), and two Food Technology (FT) students; and three lecturers at one selected Polytechnic College in Harare. Participants were purposively sampled. Data was collected through interviews with lecturers, focus group discussions with students and a review of uploaded materials. Thematic data analysis approach was used followed by a cross-case analysis of the three subject areas. The study established that the most affected subjects were CTT and BT. However, little effect was experienced in FT. The researchers therefore recommend a methodological shift from the traditional instructional designs to modern methods that address the prevailing conditions brought about by the pandemic. This requires all educational stakeholders' ingenuity to institute feasible methods that would cater for all technical subjects in the transfer of the conventional educational systems to blended learning.
Keywords: COVID-19, TVET, remote learning, technical subjects, blended learning

INTRODUCTION AND BACKGROUND

In response to the Corona Virus Disease 2019 (COVID-19), the Director General of the World Health Organization (WHO) declared the pandemic as a Public Health Emergency of International concern on January 30, 2020 (WHO 2020). Zimbabwe reported its first case on March 20, 2020. COVID-19 affected many people and thousands succumbed to the disease. Worldwide, governments and organisations such as WHO reacted to the pandemic (Cucinotta and Vanelli 2020). The reaction measures included complete or partial lockdowns, curfews,

and the enforcement of basic hygiene practices such as regular hand washing, sanitisation, social distancing and masking.

To mitigate the spread of the corona virus, Zimbabwe began the 21-day national lockdown on 21 March, 2020. Zimbabwe had to shut down all services and activities except for the essential ones such as health care, law enforcement and food services (SI 2020-083 2020). Subsequently, Zimbabwe announced the indefinite closure of all learning institutions on 24 March, 2020. This resulted in adverse impact on the teaching and learning services particularly TVET that benefits more with face-to-face modes of teaching and learning. As a result, educational institutions resorted to alternative instructional methods. It is said that challenges bring opportunities, COVID-19 may also have done the same.

STATEMENT OF THE PROBLEM

COVID-19 has created a lot of stress and anxiety among teachers and learners as it potentially placed barriers on many of the aspects of teaching and learning. TVET programmes require conventional face-to-face teaching and learning modes that were constrained by raft measures such as social distancing and travel restrictions to contain the spread of the virus. It is therefore necessary to explore the impact of COVID-19 pandemic on TVET students' learning process.

RESEARCH QUESTIONS

This article sought to answer the following research questions:

1) What strategies have been adopted by different TVET learning areas that support the acquisition of sustainable skills and experiences?
2) How do students and lecturers view the delivery of TVET programmes in their areas of specialisation during COVID-19 pandemic?
3) How can education providers ensure continued provision of quality education in TVET programmes during such a crisis?

LITERATURE REVIEW

Technical and Vocational Education and Training and its implications

Skills development and Technical and Vocational Education and Training (TVET) courses are becoming increasingly important on the international and national policy agenda (Baraki and Kemenade 2013, 492. TVET refers to the educational process involving the study of technologies and related sciences, and the acquisition of practical skills, attitudes,

understanding and knowledge relating to occupants in various sectors of economic and social life in addition to general education (UNESCO 2001). It is the form of training that comprehends knowledge, skills, competencies and all other experiences acquired to enhance opportunities for securing jobs (Magaji 2015; Kehinde and Adewuyi 2015; Agrawal 2013). Practical skills are often acquired through learning-by-doing, which occurs in college-based workshops, laboratories and studios or through gaining hands-on experience in work environments (David et al. 2021). This means that teaching technical subjects is best done with a hands-on realistic approach. As a result, adequate training systems are necessary tools needed by all educators or trainers to effectively train the next generation technical force.

Delivery of TVET programmes during COVID-19 pandemic

Most educational institutions, including Polytechnic Colleges, have closed due to COVID-19 measures and this has served as a test for education technology interventions for teaching and learning activities (Figueiredo et al. 2021). On a positive note, TVET has provided the education sector with new and unique opportunities for the development of more flexible learning solutions that would enable better use of distance learning and digital technologies (ILO, UNESCO, and World Bank 2021). Teaching and learning has moved from classrooms to remote mode, facilitated by the internet, television, radio, or print materials (Hoftijzer et al. 2020). Many educational institutions have adapted to the prevalence of COVID-19 pandemic by adopting e-learning as a mechanism to reach their students and to meet work demands plus the changing trends in education (ILO, UNESCO, and World Bank 2021).

The demand for virtual teaching is increasingly being embraced by educational systems around the globe due to the COVID-19 pandemic. The various restrictions made traditional classroom instruction an unlikely means for the continuous delivery of education (Vital-López et al. 2022). However, TVET systems moved slowly towards implementing virtual classroom in the teaching and learning process. New technologies can facilitate the delivery of practical learning in classroom-based TVET setting. Technologies such as simulations, augmented reality (AR) and virtual reality (VR) can support the provision of practical training outside the classroom (OECD 2021). New technologies can be integrated into on-line learning platforms and face-to-face settings to develop key competencies for students (OECD 2021).

In response to this situation, lecturers now are working and attending training through webinars to learn and explore e-learning technologies capacitating them to manage virtual classes (Khine 2020). Anekwe (2017) reported that in Nigeria, virtual classrooms have positive impacts on the students of federal and state universities. The majority of students pointed out that this sort of teaching saves time, and their cognitive load did not increase much due to this

type of learning. In Greece, Engineering and the Built Environment students who enrolled in a CAD module carried out their practical tasks using Autodesk Revit software (Kanetaki et al. 2021). Students also resorted to watch real-time instructions via screen sharing, YouTube channel videos followed by an interactive dialogue with their instructor, and debating about different ways to achieve the task. Real-world tasks such as creating the architectural model of a building to assess their understanding were carried out through online platforms. It was found out that, after assessment of tasks, students were able to represent the visible edges of an object from the isometric given view, and their challenges were detected on conceiving the bottom views, back views, and sectional views determining the inner form of an object (Kanetaki et al. 2021).

To enrich theory, Clothing and Textile Technology traditionally involves a significant amount of practical training both in the laboratory and studio (Pastore et al. 2021). While the pandemic kept students at home, it meant that practical training in the laboratories and studios had to be readdressed. Pastore et al. (2021) observed that Textile Technology students continued their practical lessons in the United States of America during the COVID-19 pandemic. They improvised the resources they had at home, and one student created a circular knitting device from a hair curler and flat metal bobby pins to achieve the required tubular knit structure. Findings from a study in Botswana revealed that TVET colleges were not ready to provide online teaching as most colleges lacked the necessary infrastructure and resources (Hondonga, Chinengundu, and Maphosa 2021). Most TVET students expressed challenges in engaging in online learning owing to lack of internet connectivity, lack of a computer or laptop, and/or lack of training in the use of their college's LMS (Hondonga et al. 2021).

In most cases, the increased adoption of distance learning solutions by TVET programmes has not facilitated the acquisition of practical skills and organization of work-based learning, which are essential components for the success of technical and vocational education (Egielewa et al. 2022). According to Ogunode (2020), digital learning approaches seem to be weak substitutes for practical exercises as these require the use of equipment or materials that are usually not found inside the home. Simon and Hans (2020) contend that programmes that struggle most when using web-based teaching methods are those that depend heavily on learning-by-doing, and where this "doing" is not usually done via the computer. This implies that programmes that can easily adapt to remote learning are those with a stronger focus on theory or that do not require manual activities.

Using their experience from one programme, Shem and William (2020) concluded that online learning is not the same as in-class learning. A lack of operational distance-learning platforms and educational resources, disruptions to assessment and certification, and a general

decline in the quality of training caused demotivation among learners and teachers (Shem and William 2020). To combat this, course facilitators arranged regular tutorial sessions and had to spend time coaching students on how to use digital learning platforms before they could start the main course programme. The programme created groups using popular mobile communications applications such as WhatsApp and Telegram to support participants and encourage collaboration (Munir, Erlinda, and Afrinursalim 2021). In light of the above, Kanetaki et al. (2021) have argued that remote learning increases students' awareness of real-world tasks motivating them to learn the concepts they need in order to maximize their performance.

Effective adoption and use of innovative technologies in TVET can be supported by providing financial support to colleges and by ensuring lecturers have access to relevant training to develop digital environments (OECD 2021). Public and private stakeholders in TVET have formed partnerships to increase the availability of accessible distance learning solutions, develop new training programmes and allocate additional resources (ILO, UNESCO and World Bank 2020). Governments are mandated to provide lasting solutions to improve the quality of emergency remote teaching, building on any available optimal online learning in practical subjects and minimizing disparities (ILO, UNESCO and World Bank 2021). Policy makers must also ensure that lecturers have access and opportunities to develop the technical and pedagogical competencies necessary for remote teaching.

METHODOLOGY

The purpose of the study was to assess the impact of COVID-19 pandemic on TVET students' learning process and hence this qualitative research approach to gather in-depth insights into the teaching and learning experiences in higher education (Creswell and Creswell 2017). Qualitative methods are germane to the research problem that involves assessing complex multi-component systems and addressing questions beyond "what works", towards "what works for whom, when, how and why", and focusing on intervention or improvement (Busetto, Wick, and Gumbinger 2020). Views and experiences presented in the results section were elicited from three cases.

PARTICIPANTS

Interview data were collected from three lecturers at one polytechnic college in Harare. Of the three, one was from the CTT, one from BT and the third one from FT departments. Focus Group Discussions (FGDs) were conducted with six students, two from each subject area under study. The criterion for selection was purposive which was defined by, first, the participant being either a lecturer or a student from any of the three subject areas. Secondly, to ensure the

relevance of the data collected, participants were supposed to having been at this polytechnic college in 2020 when COVID-19 lockdowns started. Both lecturers and students were named after their subject areas as codes for data presentation purposes.

INSTRUMENTATION

The designed interview and a FGD schedules initially comprised seven semi-structured questions. These were given to two lecturers and two students in the respective subjects for face validity and clarification of items. As a result of this exercise, three questions from the interview protocol were modified and one question fell off from both the interview and FGD protocols. The final versions of the protocols, therefore, had six items.

DATA COLLECTION AND ANALYSIS

Interviews were conducted via telephone calls for lecturers and Google Meet for FGD. Responses from both protocols were recorded using cell phones. Each researcher was a specialist in one of the three subjects and therefore conducted interviews with lecturers in their specialist areas. Telephone interviews lasted twenty minutes each on average. All researchers joined the Google Meet for FGDs and the meeting took sixty-five minutes. Students in this research were asked to present folders with their uploaded material such as assignments, presentations and student reflective journals. Data recorded on cell phones were converted into digital transcripts for the purposes of analysis. Researchers read each transcript to independently gain familiarity with the data (Ruona 2005). All forms of discrepancies and inconsistencies were discussed and harmonised. Initially, each of the three cases was analysed individually, coded, and categorised. Next, all codes were viewed on a report. Finally, a cross-case analysis was performed looking into commonalities and differences, and outliers and exceptionalities (Khan and VanWynsberghe 2008; McWhorter et al. 2013). The cross-case analysis conducted revealed four emerging themes from the entire data.

CROSS-CASE FINDINGS AND DISCUSSION

The results show data from the telephone interviews conducted with the lecturers, FGD with students and review of uploaded materials. Categories were established during the coding and data analysis processes. Selected participant responses were captured followed by cross-case analysis and discussion of findings. Four major themes that emerged and the following is the discussion.

RQ1: What strategies have been adopted by different TVET learning areas that support the acquisition of sustainable skills and experiences?

Table 1 presents the different strategies employed by the selected polytechnic college in the three practical subjects, namely Clothing and Textiles (CTT), Building Technology (BT) and Food Technology (FT).

Table 1: Implementation of remote learning strategies adopted by different TVET learning areas

	Category	Selected Participant Excerpts
a)	Use of home space	Most of the practical work is conducted outdoors, so, students just need to identify a small section, even in the backyard, that they can use for different practical activities **LBT.** Since I dismantle all the models that I construct when the activity is over, I continue using the same small area that I identified **S1BT.** I have space enough for designing, pattern making, fabric dyeing and printing, garment construction and laundry activities **S1CTT.**
b)	Equipment and resources	Students had some basic tools at home, mainly for bricklaying purposes **LBT.** Basic equipment was available at home and I borrowed some of the tools from my neighbours **S1BT.** Basic essential equipment was available at home **S1FT.**
c)	Assessment criteria	Competencies to be assessed are limited to jointing, neatness and finishing as these can be shown easily and clearly on videos or pictures **LBT.** There are some projects that I simply captured with my cell phone or take a video and send for assessment **S2BT.** Aspects such as cleanliness, choice of fabric, choice of seams, design details and the appropriateness of the design can be assessed through videos taken by students using their cell phones **LCTT.** I recorded using my cell phone and sometimes the front camera of my laptop. **S1CTT.** I ask my sister to take a video while I conduct some of the processes.
d)	Students' uploaded materials	Most of the completed dishes, servings, and table setting, I send them as pictures for assessment **S2FT.** Various designs were drawn using CAD software **S1CTT & S1BT.** E-portfolios and e-journals were available in students' folders **S1BT & S1CTT.** Folders contained pictures of various models **S2CTT, S1FT, S1BT.**

Findings revealed that both students and lecturers exerted a lot of effort trying to ensure continuity in skills training during COVID-19 pandemic related lockdowns. Students from the three subject areas under study (CTT, BT and FT) were reported to have used the space in and around their homes for practical work. CTT and BT students used some basic tools while most FT students were lucky as most of the tools and equipment for practical work are found and used daily in homes.

Some CTT students used old clothes to practice and, where possible, the reverse sides of the paper patterns. Some innovative CTT students designed and produced protective clothing such as re-usable face masks. The products became part of their assignments. Dyeing and printing was done on old plain sheets; and designing was not much of a problem as it could be done even on used bond paper.

For students doing BT, cement for brick laying was a challenge for it does not have a substitute. River sand and pit sand were also a challenge depending on the area of residence. To those in rural and some residential areas with open spaces nearby, these resources could be easily found and used successfully.

Findings revealed that FT students also had a chance to try out different beverages that

could be used to prevent the virus and to heal those suffering from COVID-19. Ingredients for basic dishes in FT were available though some students used the COVID-19 lockdown as an opportunity to improvise a lot.

Although the pandemic exposed weaknesses in TVET institutions and systems, the scale of innovation and experimentation showed that change is possible (Hoftijzer, Levin, and Weber 2021). Some students were able to download videos on YouTube and some pre-recorded demonstrations by their lecturers for instructions and guidance in their practical activities. Sehleicher (2020) posit that the period of learning from home has made visible the many benefits that students gain from learning in close contact with their lecturers and peers with full access to the wide variety of educational materials. They could also use different search engines to access some materials to help tackle both theory and practical assignments. Some said they could call their lecturers and colleagues for clarification when faced with some challenging areas. Students received assignments from their lecturers through emails, WhatsApp and e-learning platforms such as LMS. Videos and pictures were sent by students through the same platforms for assessment including practical assignments. Online methods used for assessment included e-portfolios and e-journals for practical work. The reviewed uploaded materials from some participants in this research provided evidence of both theory and practical work done by students. This reflected some form of skills and competencies gained by students during remote learning. In most countries, respondents noted a shift towards remote training measures to ensure continuity of training (ILO, UNESCO, and World Bank 2021, 7).

RQ2: How do students and lecturers view the delivery of TVET programmes during COVID-19 pandemic?

Table 2 presents results showing students and lecturers' views of the delivery of TVET programmes during COVID-19 pandemic.

Table 2: Diverse views on the delivery of TVET subjects during COVID-19

Category	Selected Participant Excerpts
a) Use of home space b) Equipment and resources	Working from home is good but there is not enough space with all my design portfolios, khaki covers and patterns **S1CTT.** I only use two rooms with my family therefore the environment is not conducive to any meaningful practice **S2FT.** Space for conducting practicals was available in most kitchens at home **LFT.** For the sewing part, space can be found but for designing and pattern making that requires bigger space, and this can be a big challenge. Also, if there are kids at home, they may disturb a lot for designing makes use of coloured pencils and paints which attract the small beings. Patterns need proper storage which most students may not have in their homes or areas they are renting **LCTT.** For the small utensils, it may not be a problem. Some of these we can even improvise but for some large equipment, such stoves and microwaves, most of us do not have. Most of us do not have electric gadgets due to unavailability of electricity in my area

Category	Selected Participant Excerpts
c) Online learning resources	**S1FT.** Some labour-saving devices could not be found in every home **S1FT.** Students have some basic tools at home but these basic tools are too many and it is difficult for them to get all of them **S1BT.** Students do not have the various industrial sewing machines for different techniques such as the safety stitch, button holer, elasticator, flossing and twin needle **LCTT.**
d) Assessment criteria	I did my work using CAD software **S1BT.** I did not have data to access learning material online **S2CTT.** I have a small phone with very poor picture quality; I also didn't have a laptop **S2BT.** We don't have electricity in our area therefore network is always a problem **S2CTT.** I did a lot of researching on the internet, I even downloaded videos from YouTube with very clear instructions on how to perform certain processes **S1FT**
e) Students' uploaded materials	I used my own data to send assignments to students, download their work and for feedback. Using this technology was a challenge to many of us **LCTT.** General competencies such as jointing and neatness can be assessed using pictures and videos but major skills such as plumbing are very difficult to assess because the correctness of the skill is measured using the exact tool that the student would have used **LBT.** There are some projects that I simply capture with my cell phone or take a video and send for assessment but some are very difficult and accuracy of results is questionable **S2BT.** Accuracy in measurements and workmanship are difficulty to measure but cleanliness, choice of fabric, choice of seams, design details and the appropriateness of the design can be assessed through videos taken by students using their cell phones **LCTT.** Portfolios are difficult to send for assessment but for displays and oral presentations I record using my cell phone and sometime the front camera of my laptop **S1CTT.** I ask my sister to take a video while I conduct some of the processes. Most of the completed dishes, servings, and table settings, I send them as pictures for assessment **S2FT**
	Various designs were drawn using CAD software **S1CTT & S1BT.** Some work was too good to have been done by students in a polytechnic college **S1BT & S1CTT.** Some pieces of work were not in the folders submitted by the students as most of them did not have laptops to use **S2CTT, S1FT.**

Research findings showed that, although students could use their home space for practical exercises, the area was usually small for most practicals. Students lived with big families and hence space was so limited while those renting accommodation cited restrictive rules by the landlords that made it difficult for them to conduct practicals, especially in CTT and BT. Respondents felt that the learning environment for hands-on practical activities was a hindrance for meaningful practice. In FT, students could use their normal working space for everyday cooking. Several dishes required as assignments could be prepared one at a time and food displays could be done even outside. Food service could be conducted with family members, house mates or neighbours in small numbers in line with COVID-19 social distancing regulations. Both lecturers and students lamented unavailability of special tools and equipment for use by students in their homes since face-to-face interactions were restricted for a considerable period of time. Hoftijzer et al. (2020) assert that remote learning approaches are a weak substitute for practical exercises that require the use of equipment or materials not usually found inside the home. It was reported that resources used were not of the right standard and some were not even available thereby compromising the nature of skills gained.

Students indicated that, with basic tools, they could only gain basic skills. These skills were said to be repetitive across all subject areas due to lack of appropriate and specialised

equipment as well as lack of raw materials to use for various activities. This was said to be a major draw-back given the period colleges and other institutions of learning were closed due to COVID-19 pandemic. All respondents concurred that, no matter how initiative and innovative they became, remote learning could not replace traditional modes of learning where students interact with real machinery in real learning/work environments with appropriate learning materials for the acquisition of necessary skills and competences. In support of this view, ILO, UNESCO, and World Bank (2021) expressed that hands-on skills-based training cannot be effectively delivered through online learning. They also concur that students incubated during this COVID-19 period may not fit in the industry and are not employable.

Some students said they could not download assignments and other learning materials or upload their work as they did not have data or access to internet or even airtime to communicate with their lecturers and colleagues. They saw this as a major obstacle in the delivery of TVET subjects as they cited little or discontinued practice due to inaccessible e-learning resources. Both students and lecturers also complained about unavailable internet or poor connectivity and the expensive data. Results from the study by ILO, UNESCO, and World Bank (2021) concur that the cost of data was often at the personal expense of teachers. Although the study emphasised and applauded online learning, the need for face-to face interaction was seen as inevitable for the training of a wholesome, astute, industry-oriented graduate. Besides learning in situ, face-to-face lecturers were seen as providing quick responses to both students and lecturers as interaction is synchronous. The current mode is seen as being one way and demotivating hence the need for blended education.

Assessment of both practical and theory components was said to be an uphill task for lecturers. It was reported by both students and lecturers that some uploaded pictures and videos were hazy due to the nature of devices used for capturing. This was supported by the poor quality of materials in students' folders reviewed in this research. Some processes in CTT could not be marked as they were blurry in the submitted pictures and videos. Lecturers expressed that different processes worked but their standard was difficult to determine. Furthermore, some fabrics and quality of paper used for designing and pattern making were restrictive thereby affecting the marks students got.

BT lecturers said that skills assessed were limited to jointing, neatness and finishing as these could be shown clearly on videos or pictures. However, major skills such as plumbing were very difficult to assess because the correctness of the skill is measured using the exact tool that the student would have used. Some element of bias was said to be inevitable where marks were awarded for real models by merely watching videos or looking at pictures, worse still given the subjectivity in marking practical work. ILO and World Bank (2021, 13) assert that

the inherent difficulty of assessing practical skills, the conduct that require physical presence in the workshops, presented a challenge in itself given the closure of colleges and stringent physical distancing requirements imposed in most countries.

It was also reported that it was very difficult to assess aspects such as texture and taste in FT, but videos and photographs illustrated clearly aspects such as table setting, serving, cleanliness, colour and washing up making assessment easier. ILO and the World Bank (2021) reported that lack of distance operational platforms and educational resources caused disruptions to assessment and certification. Generally, respondents viewed assessment as a necessary tool just for encouraging students to continue learning but with little impact on their performance.

The reviewed folders with uploaded materials from students showed very few pieces of work done using CAD software in CTT and BT regardless of the instructions making use of software mandatory. Results showed that both lecturers and students were not conversant with such software, especially those in CTT. This was attributed to the institution not training staff on the use of such technologies. However, some pieces of work in BT were too good to have been done by a student illustrating some element of cheating or outsourced skills. This concurs with the views of several respondents that some students asked experts from the industry to do the tasks for them for a fee. This is regarded as a gross act of misconduct that compromise the world of work if flooded with graduates who claim to be knowledgeable yet they are untrained. Students in FT did not use any software and the lecturer said they were not aware of such software so students could design using some general purpose packages as publisher. Some students viewed this as creating technology gaps among subjects under the same TVET programme. The TVET programme therefore faces a particular challenge in ensuring the continuity of practical skills training during COVID-19 crisis (ILO and World Bank 20121)

RQ3: How can education providers ensure continued provision of quality education in TVET programmes during crisis?

Table 3 presents insights on government interventions necessary to ensure continued provision of quality education in TVET programmes during crisis.

Table 3: Insights on Government interventions for continued provision of quality TVET programmes during crisis

Category	Selected Participant Excerpts
a) Sustainable online teaching modes	When deciding on modes of remote learning, our ministry must ensure that the solutions cater for both practical and theory components of the TVET programmes **SICTT**. The government should account for access and utilisation of technology among both teachers and students including digital skills **LCTT**. The government should provide a permanent solution to this problem and must allow lecturers and students opportunities to develop the technical and pedagogical competences needed for teaching remotely **LBT**. The existing

Category	Selected Participant Excerpts
b) Rapid response to online programmes	system within our institution should be made available more broadly as well as enabling access for learners, thus learning management system can be used for online training for TVET students **LFT**. The ministry of higher education should negotiate with internet providers for students and lecturers to have access to educational programmes on subsidised rates **S2FT**.
c) Financial support	I feel there is dire need to offer online courses to build staff capacity in blended TVET **LCTT**. The government to come up with policies that recognise learning of practical subjects during events beyond students' control **SIFT**. There is need to create online communities of practise for staff to share ideas and experiences **LFT**. The responsible authorities must device new ways of teaching and assessing practical skills **S2BT**. We urge the government to look seriously into students' welfare and provide financial assistance so that they buy the necessary gadgets as well as software and data for the online programmes to be viable **LBT**.

The results above show that education providers are central in ensuring continued provision of quality education in TVET programmes during COVID-19 pandemic. It was established that both theory and practical subjects are equally important hence disparities should be minimised. It was suggested that the government should ensure both students and lecturers have adequate digital skills and to allow them opportunities to develop the technical and pedagogical competences needed for teaching and learning remotely. In addition, the learning management system can be used for online training for TVET students to widen the horizon of accessibility by learners. ILO and World Bank (2021) recommended establishment of national cloud-based learning management systems or make existing systems within institutions available more broadly and accessible for online training of TVET students and teachers. Furthermore, the results suggested that the ministry of higher education should negotiate with internet providers for students and lecturers to have subsidised rates for educational programmes for sustainable online teaching modes.

The ministry ought to respond rapidly to online and offline TVET programmes for the success of blended learning that is said to work better for practical subjects. This calls for professional associations to come together and develop national digital content platforms to facilitate easier access to relevant and quality resources (ILO and World Bank 2021). This should include assessment of practical skills as well. Participants expressed that it is imperative for that the government to provide financial support for students and lecturers to secure gadgets as well as software and data for online programmes to be viable. Furthermore, they remarked that the government ought to come up with policies that recognised and emphasised learning of practical subjects during crises such as COVID-19.

Table 4: Emerging themes

Theme	Substantiating evidence
Adaptive learning environment	- Home space could be used for continued learning but was inadequate and not conducive to skills development. - Students had basic tools for basic operations and activities but the major ones were only found in the college or at workplaces. The major tools are very expensive and are

Theme	Substantiating evidence
Effectiveness of assessment criteria	beyond the reach of students. - It was a struggle using online resources in most scenarios and some respondents did not have the digital gadgets and software. - Very few assignments, presentation write-ups, e-portfolios and e-journals were uploaded by students. - Assessment was limited to online methods which did not cater for physical items produced by students.
Training needs	- Both lecturers and students needed some training on the use of digital technologies and online resources. - Government ought to provide lasting solutions to improve the quality of remote teaching in TVET programmes.
Government interventions	- There is a need to establish rapid online teaching and learning strategies for TVET programmes. - The government ought to offer financial support to students to be able to acquire devices, software and data for online learning.

This study was guided by three research questions (RQs), and presented three cases from three separate disciplines (CTT, BT and FT) from one polytechnic college in Harare, Zimbabwe.

RQ1: What strategies have been adopted by different TVET learning areas that support the acquisition of sustainable skills and experiences? Although delivery strategies were implemented in different contexts, taken as a whole, these three cases illuminated the potential for remote learning to provide continued training even during a crisis such as COVID-19. Learning from home could be an important strategy as students can work at their own pace and can explore new technologies. According to Adam and Metljak (2022), remote learning improved the ability to use technology and, as a result, students became more innovative.

RQ2: How do students and lecturers view the delivery of TVET programmes during COVID-19 pandemic? It was so glaring that COVID-19 has had adverse effects on the TVET programmes in Zimbabwe largely due to loss of contact hours for students in CTT, BT and FT and lack of e-learning facilities that students could use to interact with their lecturers. It was a general view that lack of adequate space, tools raw materials, digital gadgets and connectivity hampered progress in the TVET area. According to ILO and World Bank (2021), practical subjects require adequate physical and technological infrastructure, digital skills and pedagogical resources to ensure an optimum learning environment. This study also clearly revealed that assessment was negatively affected in terms of quality of work and the number of pieces of work assessed. The other reasons cited were lack of preparedness for remote learning by the institution and lack of training and support by education providers. Thus, inadequate and inappropriate training strategies would possibly affect the performance of students and the quality of skills and competencies they acquire.

Concerning RQ3: How can education providers ensure continued provision of quality education in TVET programmes during crisis? The results suggest that education providers ought to step up efforts in containing the negative effects of this epidemic by bringing in

pedagogical strategies aimed at ensuring that students acquire the requisite skills and competencies expected in the world of work. It is also expected that training and financial support augmented by policies would significantly improve the implementation strategies and ensure continued provision of quality education in TVET programmes during crisis. According to ILO (2021), training providers, policy makers and other stakeholders should implement measures to improve resilience of skills training systems and preparedness so they can continue delivering quality training during crisis.

CONCLUSIONS

It has been shown in this study that COVID-19 has impacted negatively on delivery of TVET programmes. Both lecturers and students concurred that concerted efforts to maintain learning continuity during COVID-19 period have been made but students have to rely more on their resources to continue learning remotely. Lecturers also had to adapt to new pedagogical concepts and modes of delivery of teaching for which they were not trained. While all the three subject areas faced a host of challenges, the most affected were CTT and BT where proper workshops and the equipment ideal for the acquisition of requisite competencies were absent. FT was the least affected as the learning environment could be modelled successfully at home. Higher education institutions need to develop a new value proposition that re-assess the quality of learning and delivery mechanisms of TVET programmes. The new mode of learning ought to address the needs of the industry for national and economic development.

RECOMMENDATIONS

The researchers recommend a methodological shift from the traditional instructional designs to modern methods that seek to address the prevailing conditions brought about by the pandemic. This requires all educational stakeholders' ingenuity to institute feasible methods that would cater for all technical subjects in the transfer of the conventional educational systems to blended learning.

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