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Perspectives of Bhutanese TVET practitioners on online teaching and learning during the COVID-19 pandemic

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***Original Research Papers** are papers that report on original empirical research with a focus on teaching and learning. Papers may be qualitative or quantitative and include an Abstract, Introduction, Method, Results, Discussion, and Reference section, as well as any tables and/or figures.

Abstract

Due to the shutdown of schools, universities, and Technical and Vocational Education and Training (TVET) programs during the pandemic, practically all students experienced educational challenges for an entire year. The education system was conducted remotely via the internet, TV, and mobile phones; however, TVET education, which is learned outside of the typical classroom, suffered due to internet problems, lack of electricity supply, lack of availability of technology, unprepared teachers, and challenges in balancing studies and household responsibilities for female students. It is tough and challenging to adapt and implement this educational system under such pandemic conditions, particularly for low-income and vulnerable youths. Since TVET strongly emphasizes practical skills and workplace readiness, remote learning is complex. TVET is a practical-based education that can be successfully learned through performing in classrooms, workshops, or laboratories, along with the practical experience of training or attachment at the workplace. In another setting, practical instruction for some professions could be realistically simulated, for example, through augmented reality experiences. Still, again, the cost of purchasing sophisticated and complex software that can run such simulations can be a barrier for most students. The biggest challenge is adjusting to distance learning, which mainly relies on learning by experience.

This study aimed to learn more about how Bhutanese teachers and students in a technical training institute perceived and experienced online classrooms during the pandemic. In response to the present pandemic, the entire educational system changed and modified itself to include the delivery of online classes. This survey describes Technical Training Institute teachers' and students' perceptions and concerns about the emergency pivot online instruction.

The sample consisted of 10 trainers and 119 trainees from Technical Training Institute Samthang in Wangdue Phodrang. An online survey method (Google Forms) was used for data collection. While most participants (69%) thought online education saved time, the study also uncovered significant challenges

related to the validity of the assessment system. The findings show that only 27% believed online teaching is effective. It is also reported that this negative impression of online education can be attributed to the low level of knowledge transfer, lack of structure in lessons, challenges to clarify doubts during the class, and poorly designed learning materials. Significantly, most participants believed that technical issues majorly disrupt the flow and pace of online teaching.

Introduction

Contrary to the general education system, TVET is more comprehensive, more diversified, and more complicated; as a result, it is essential to comprehend it to guide TVET reform initiatives. According to the TVET system typology, Bhutan's TVET system may be divided into three primary sub-systems: formal, informal, and non-formal. There are three ways to give training: through institutions, at the workplace, and by combining several TVET delivery methods.

Through 112 institutions, the official TVET is delivered, with more than 80% being privately owned and concentrated in the major towns of Thimphu, Phuentsholing, and Paro (urban bias). Six Technical Training Institutes (TTIs), two Institutes of Zorig Chusum (IZCs), and four other public training providers comprise the public TVET sector. While commercial training providers mainly provide courses in driving, ICT, media, business, and management, public TVET institutions offer instruction in technical fields that need significant investment. The commercial sector is more prevalent in quantity, while the public sector assumes more responsibility regarding basic technical capabilities. From 2008 to 2019, institutions under the MoLHR enrolled around 12000 trainees, with 71.73% men and 28.27% women. Technical Training Institute, Samthang in Wangdue Phodrang Dzongkhag, is one of the six TTIs that provide automobile courses and the focus of the study. Until the outbreak of the pandemic, traditional apprenticeship learning was the primary mode for informal TVET in carpentry, masonry, arts and crafts, and traditional culinary. Though the number of conventional apprentices and artisans is still being determined, they cater in prominence to the needs of rural communities. Learning usually takes place together with daily activities. However, the outbreak of COVID-19 has brought a tremendous paradigm shift in the teaching and learning process.

The Ministry of Education has been carefully monitoring the situation and taking precautions to stop the potential spread of COVID-19 in school settings. The disease was declared a Public Health Emergency of International Concern and classified as a pandemic by the WHO on March 11, 2020. On March 5, 2020, the nation experienced its first COVID-19 case. Schools, colleges and universities near Paro, Thimphu, and Punakha were shut down starting March 6, 2020. On March 7, 2020, schools in Wangdue Dzongkhag, Phuntsholing Thromde, and one school (Chumithang MSS) under Chukha Dzongkhag also closed. This was done to stop the spread of COVID-19 and its imminent danger to children's lives.

The Royal Government of Bhutan then announced the closure of all schools and educational institutions nationwide on March 18, 2020, by an executive decree. Bhutan had reported seven positive cases as of April 28, 2020, all of which were imported. Five have fully recovered, and the remaining patients are doing the same. Bhutan has remained in the pandemic's Orange Zone since March 5, 2020, as there have been no cases of community transmission in the nation. This left both teachers and trainees anxious about the coverage of the syllabus. Teaching through WeChat, Google Classroom, Radio and TV in general education was suddenly adopted to roll out Education in Emergency (EIE). However, Technical Training institutions took a while to embrace online learning since, unlike general education institutions, TVET institutions do not offer Education in Emergency (EIE). Thus, with the directives from the Department of Technical Education, the planning of online teaching started to engage trainers and trainees meaningfully during the lockdown. That was the era of a new beginning in the TVET system. The launch of a digital learning management system (LMS) for the construction sector on December 15, 2021, was a massive milestone in the history of the TVET sector in Bhutan. It was expected to create flexibility in the learning system (Kuensel, December 16, 2021). To access the LMS, trainers and trainees have to register to log in to access teaching and learning materials. The LMS server was installed in one of the TVET institutes in central Bhutan, TTI Chumey. LMS provided trainers and trainees access to video tutorials in all the trades, assessment memos and their performance results. This system was a great boon to TVET faculties and students, especially during the lockdown that engaged everybody in academic areas without breaking COVID-19 protocols. LMS was one part of online teaching. We also

used other online forums like Zoom, Google Meet and WhatsApp.

Although the COVID-19 pandemic has provided us with an opportunity to pave the way for introducing digital learning, there were certain deficiencies, such as the weakness of online teaching infrastructure, the limited exposure of teachers to online teaching, the information gap, the non-conducive environment for learning, weak internet and software access and so on. This article evaluates the impact of the COVID-19 pandemic on the teaching and learning process in one of the TVET institutions in Bhutan. The challenges and opportunities of online and continuing education during the COVID-19 pandemic are summarized, and the way forward is suggested.

Research Questions

This research study is set within a Bhutanese TVET context during the COVID-19 pandemic. The researchers set out to investigate the impact of the pivot to online learning to understand how online instruction might supplement face-to-face instruction. As part of this research, we sought answers to the following research questions:

1. How does online teaching impact TVET practitioners' teaching identities?
2. What barriers do trainers and trainees encounter when taking online courses?
3. How do trainers and trainees perceive the effectiveness of online teaching and learning?
4. What could be the pros and cons of online teaching and learning?

Literature Review

The Impact of COVID-19 on the Education System

The way educators deliver high-quality education is changing drastically due to many Internet platforms (Tadesse & Muluve, 2020). Due to the limitations placed on actual meetings owing to the unprecedented COVID-19 outbreak, the usage of these platforms has been essential during the last few years. Because of lockdown and social segregation measures implemented in response to the COVID-19 pandemic, most nations have had to close schools, training institutions, and higher education institutions (Preeti, 2020). Tadesse and Muluve (2020) claim that "Education in Emergency" has been adopted by instructional machines and instructors through unique online platforms. However, the difficulties that teachers and newcomers face, such as online learning, distance training, and continuing with exercise, have evolved into a remedy for this massive global pandemic (Adams et al., 2018). For trainees and instructors, transferring from traditional face-to-face to online training is exceptional, given the lack of options. They are under pressure to transform into a machine they are unprepared for. Thus, two (2) sub-sections—the influence on the educational and training environment and the impact on teachers and students—will illuminate this part.

The Impact on the Education Environment

Schools, institutions and universities have been closed because of the COVID-19 pandemic, which has had an unintended ripple effect on students, parents, and educators worldwide. In these trying times, educational institutions seek to preserve a high level of education for everyone as governments, frontline staff, and health authorities battle to prevent the spread (Krishnan et al., 2020). They continued by saying that many pupils had gone through psychological and emotional turmoil and could not communicate effectively at home or in a communal setting. Many families and concerned authorities chose various approaches to provide their children with a better experience during this challenging period. Due to school closings and rigorous confinement measures, more families have turned to technology and digital solutions to keep kids interested in learning, entertained, and connected to the outside world. However, not all children can access the information, abilities, and tools needed to be secure online (Siti Nurshahidah et al., 2020).

However, using technology for education became the new standard, which prompted various changes in how education was delivered. Several systemic changes have been brought about by the shutdown of educational institutions, most notably in teaching and learning. According to Preeti (2020), it impacted teaching and evaluation methods and learning and education frameworks. She also mentioned how institution closures have impacted learners' learning. To sustain continuity in institutions and universities, one urgent step was required. One such measure was adopting several educational institutions' digital learning tools and platforms. Colleges, especially TVET training institutions, started embracing open-source as a digital learning solution to run online classes while continuing to deliver instruction

through learning management systems (LMS). The pandemic significantly influenced the sector, and higher education is crucial in defining the nation's economic future (Mohamed et al., 2022).

The Impact on Educators and Learners

Movement constraints affected both how students learned and how their learning was measured. The method of delivering lessons, as well as assessment and evaluation, changed due to the lockdown. Due to educational institution closures, several tests and assessments have been postponed or cancelled (Mohammad Izzamil et al., 2021). By adopting online assessment technologies, many colleges and institutions have shifted from traditional classrooms to online classes and from offline to online examinations (Chung et al., 2020). Online assessment tools may have downsides. Online assessment technologies include several things that could be improved compared to traditional measurements (Bibi et al., 2020). However, evaluation and assessment are crucial since they are critical components of education that gauge the success of learning. Additionally, it provides reliable data that employees can use to compare prospects when hiring graduates. Burgess and Sievert-sen (2020) demonstrated how employers evaluate candidates using educational credentials like grade point averages and degree categories. Thus, the lockdown had an impact on how recent graduates were hired.

As candidate outcome disturbances rise, the effectiveness of new graduates' matching (matching recent graduates with the target market of job specifications) is deteriorating, leading to higher employment separation rates and slower wage development. Preeti (2020) says this is costly for the individual and the community. Furthermore, it is challenging to monitor students' online course behaviour and ensure that they are not engaging in academic dishonesty (Basilaia & Kvavadze, 2020). Online performance testing, practical tests, and laboratory exams are impractical to emphasize the issue further. Tests and evaluations may be challenging for students without internet access (Sahu, 2020).

E-Learning

Shahzad et al. (2021) claim that artificial intelligence and other technological advancements have turned traditional education into current learning. Therefore, "e-learning" refers to a broader range of technology-based learning methods, including websites, learning portals, video conferencing, YouTube, mobile applications, and numerous other free blended learning websites. However, any information system's users determine its effectiveness (Almaiah et al., 2020). E-learning improves students' knowledge, academic staff's understanding, and professional and industry people's abilities via the Internet (Adams et al., 2018). As a result, in an e-learning system, student acceptance of e-learning is considered a critical success component. Through two (2) sub-sections—e-learning in higher education and the benefits and drawbacks of e-learning for teachers and students—this part will be broadened to encompass a broader perspective.

E-Learning in Higher Education

Students on and off campus can take online courses at most higher education institutions. The government of Malaysia, which makes significant investments in higher education, is an excellent example of this. Massive Open Online Courses (MOOCs) are reportedly being used by Malaysian universities, colleges, and polytechnics to support online teaching and learning. According to Radha et al. (2020), the online education market is expected to grow at an annual rate of 16.4 per cent between 2016 and 2023. They predicted that in the next ten to fifteen years, university teaching and learning paradigms would change as a result of the internet's exponential growth. Although virtual education is frequently discussed, every educational institution—established or yet in the early stages of development—in every nation faces difficulties getting users to use and embrace it. Since the necessary progressive stages have already been reached, as Almaiah et al. (2020) stated, developed nations are likely to be less concerned about their learners' motivation to adopt and employ e-learning systems. Due to the digital gap in developing countries, the challenges associated with establishing e-learning systems continue to exist (Almaiah et al., 2020).

The Benefits and Challenges of E-Learning to Educators and Learners

With the aid of e-learning, educators can reach a wider audience and effectively communicate their message to their intended audience (Ab et al., 2022). This ensures that all students receive the same instruction when employing this kind of instruction. However, due to difficulties in its practical application, e-learning has yet to attain parity in stature across geographical boundaries. Despite the prevalence of online learning, specific demographic segments purposefully shun it, mainly due to a false

perception (Doucet et al., 2020). Despite the rising popularity of online courses, most students still opt for traditional classroom education, claim Krishnan et al. (2020). Physical classroom instruction is more natural than online learning, and students can debate, reflect, and discuss with their professors and classmates. As a result of their findings, they concluded that in-person education is essential for practical learning because e-learning may, at any time, run into unforeseen technology issues. Additionally, a reliable internet connection with a high bandwidth connection is required for all forms of online learning. Due to a significant lack of connections and energy, it is only sometimes successful. Due to a lack of the necessary infrastructure for online courses, e-learning is less developed in rural areas than urban ones. As a result, students cannot attend virtual classrooms (Mohammad Izzamil et al., 2021). Due to the pandemic, however, e-learning is more prevalent today, and many nations are attempting to adopt it to guarantee learning continuity.

When universities and schools were shut down due to the pandemic, e-learning systems allowed schools and colleges to continue to provide instruction to students (Subedi et al., 2020). It is essential to evaluate and support staff and student readiness as they adjust to new developments. Learners with a fixed perspective find it challenging to adapt and adjust, whereas those with a growth mindset are more open to changing their learning environment. Due to the diversity of academic fields and their demands on learners, there is no one-size-fits-all model for online learning. Different approaches to online education are required for many disciplines and age groups (Doucet et al., 2020). Additionally, online learning allows students with physical disabilities to study more independently in a virtual environment requiring less mobility (Basilaia & Kvavadze, 2020).

Challenges in E-Learning

Lack of ICT Infrastructure and Support

The current literature review identified several obstacles to implementing an e-learning system. The challenges can be divided into four groups, according to Almaiah et al. (2020): a) technology challenges, b) individual challenges, c) culture challenges, and d) course challenges. It is found that these issues differ significantly among nations due to various cultures, settings, and levels of preparedness. For instance, inadequate network infrastructure, lack of ICT expertise, and lack of content production were the main obstacles to adopting e-learning systems in developing countries (Aung & Khaing, 2015). According to another study, the main barriers to the effective adoption of e-learning systems in Pakistan include system characteristics, internet experience, and computer self-efficacy (Kanwal & Rehman, 2017). Similar research was conducted in Kenya, where it was found that there were three significant obstacles to e-learning: lack of ICT infrastructure, lack of technical expertise, and financial constraints (Tadesse & Muluye, 2020). According to a study by Rahim and Chandran (2021), inadequate interface design, lack of IT skills, and insufficient technical support are the main obstacles preventing the effective implementation of existing e-learning programs.

According to a study by Aboagye et al. (2020) cited by Heng and Sol (2021), the main obstacles to implementing e-learning are technological infrastructure, digital competence, socioeconomic factors, assessment and supervision, heavy workloads, and compatibility. As a result, technical proficiency, technological infrastructure, lack of content production, and individual and cultural variations are the most frequent issues encountered when using e-learning. Heng and Sol (2021) also noted that Southeast Asian learners faced a significant barrier due to a lack of internet access. However, the region's problems are more comprehensive than those involving the Internet. The learning environment at home was shown to be the biggest obstacle in a study done in the Philippines (Barrot et al., 2021). Similar to this, Malaysian research by Bibi Noraini and Jihan (2020) revealed six major obstacles that universities, teachers, and students must overcome when implementing e-learning methodologies: ICT infrastructure, necessary online skills, platform security, lecturers' and students' motivation when using the online method, and context-specificity.

Lack of Budget and Funding in Some Higher Institutions

The challenges frequently addressed in e-learning are accessibility, cost, flexibility, pedagogy, lifelong learning, and educational policy (Alkhezzi & Ahmed, 2020). The availability of digital devices and internet access are significant problems in many countries. Online education exposes the learner to increased screen time, even if economically disadvantaged pupils in many poor countries cannot afford it (Hove & Dube, 2021). Offline activities and self-exploratory learning have consequently become

crucial for students. They continued by saying that parental guidance is another problem, especially for young students and when both parents work. Physical workplaces conducive to different learning modalities raise practical issues since they could find it challenging to include online learning resources (Bibi et al., 2020). Compared to more traditional modalities of instruction, institutions will need to budget for both per-learner and overall costs related to online learning. Prices may become more tolerable if courses can be spread out over a broader learner population (Ab et al., 2022). By pressuring students and parents to buy any necessary multimedia equipment for online education, such as PCs, laptops, printers, or scanners, a school may shift some costs to them (Bozkurt et al., 2020). However, specific locations have restrictions on internet access, adding to the difficulties.

Challenges among Educators

Due to a dearth of computers, internet access, mobile network access, and ICT-trained teachers in developing nations, educators and students may face some difficulties, including familiarity with online tools, the ability to maximize the benefits of the medium, teachers' availability during times of need, and the ability to provide feedback and prompt responses from students (Morgan, 2022). As teachers, they encounter many difficulties with e-learning, such as limited experience with platform setup (for example, Zoom Meetings, Google Hangout Meet, Telegram, and Google Classroom), worries about student participation, lack of assessment techniques for determining course learning outcomes, and lack of experience creating e-content (Zhu et al., 2018; Bozkurt et al., 2020). Teachers are also worried about students' devices and internet access when they take online classes. The technical issues that students face while taking part in activities—such as the need for an email to register for a new account, the inability to explore the platform's tools, and the inability to search for uploaded assessments—send educators into a panic (Bozkurt et al., 2020).

Additionally, Abdul Rahman et al. (2021) observed in their study during the Malaysian Movement Control Orders that teachers' failure to increase and maintain student participation is a challenge specific to online learning. They also emphasized that the most challenging part of online learning was engaging and recruiting pupils. This was also noted earlier by Ab Wahab and Mohamad (2022), who talked about the lack of participation from the teacher's perspective. They argued that when teachers cannot see their students' faces, they cannot recognize signs of attentiveness or inattention and cannot act quickly to assist.

Researchers Bibi Noraini and Jihan (2020) found that instructors confront six (6) significant obstacles to online learning, including the following: In residential colleges, students abandoned learning tools like books and laptops because they were less focused on online learning, the platform or medium of instruction was unsatisfactory, and students' internet access was so poor that lectures had to be prolonged past their scheduled times. There were four (4) methods for getting beyond these challenges. 1) Institutions should offer more thorough e-learning platforms for students who wish to learn online; 2) students and teachers should have appropriate internet access to guarantee a seamless and continuous online learning experience; 3) teachers should attend workshops or training sessions on managing online courses and 4) the number of students per group in practical classes should be low enough to accommodate ten.

Challenges among Learners

Numerous earlier studies have looked at various challenges learners and instructors face. Students faced administrative issues, social interaction, academic and technical aptitudes, motivation, time restraints, limited resource access, and technology challenges (Barrot et al., 2021). The lack of online student discipline, faculty reluctance, and the high costs associated with online production and distribution were among the challenges students faced when pursuing online education (Shahzad et al., 2021). These challenges are similar to those found in earlier studies, such as unclear roles and responsibilities, delay in obtaining feedback from teachers, lack of technical support, reliance on technology that is too great, and low student performance and satisfaction (Chung et al., 2020). As students regard themselves as an online component, challenges may arise from a lack of motivation, alienation, and isolation (Sahu, 2020). Through social media platforms, including Facebook, WhatsApp, WeChat, and email, learners believed it less engaging than other kinds of instruction, unwelcoming to learners, and insufficiently interactive to develop a sense of connection with teachers and peers (Haleem et al., 2020). Students' attitudes, human resources, time constraints, lecturer self-efficacy, and technology challenges have all been noted as problems (Zhu et al., 2018).

The coronavirus lockdown may cause people to feel tense, dreadful, and anxious, including fear of passing away or the passing of their loved ones (Sahu, 2020). This stress could harm the students' emotional and physical health. The pandemic may have negatively impacted learners' careers or prevented undergraduate students in higher education from graduating this year (Niranjan, 2020). According to Haleem et al. (2020), not all learners will interact favourably with online learning platforms and apps because some users may be more active than others and take longer to become used to the technology. Some challenges they now encounter include losing their sense of social connection and finding it challenging to form the study groups they once loved. While distance education can be helpful during a pandemic, some forms of it lack interaction between students and educators, which has been a significant issue, claims Tümen (2020), who conducted a study titled "College Students' Views on Pandemic Distance Education: A Focus Group Discussion". According to the statistics, most points of view indicated worry about the adverse impacts of virtual education on students' learning, including a loss of connection, issues with communicating with teachers, tests, assignments, time management, and traditional educational traditions. Most study participants lamented not having enough opportunities to question teachers. Parallel to this finding, the researchers found that students had to wait until they had another interaction with the lecturers to ask questions as they came to mind (Ab Wahab & Mohamad, 2022).

Methodology

Research Design and Instrument

Because no previous comparative study on this topic had been undertaken in TTIs in Bhutan, this study aimed to determine the contributing factors that affect the outcome of online classes and get fresh insights. Because the information available was limited, an explanatory investigation research design was chosen. The study was conducted using a descriptive survey questionnaire, as this method provides a breadth of coverage.

For this study, the authors formed two short surveys: one for the trainers and the other for the trainees. The five-point Likert scale questionnaires were developed from the literature review, and their reliability was tested with Cronbach's alpha. The trainees' questionnaire had a Cronbach alpha score of 0.744. The first part of the questionnaire required respondents to fill in demographic data—and the second part intended to collect data on online class perspectives. The trainees' survey questionnaire contained 29 closed-ended Likert scale questions on various aspects of online teaching and two open-ended questions. Similarly, the trainers' survey questionnaire contained 64 closed-ended Likert scale questions on numerous elements like course, personal, trainees, and perceived satisfaction and barriers.

Population and sample

Survey respondents were limited to trainees and trainers who had the experience of attending and taking online classes introduced recently as per the institute's contingency plan during the COVID-19 lockdown. Therefore, 119 trainees and ten trainers were the targeted populations selected through a non-random sampling strategy to acquire the lived experience of online classes introduced at Technical Training Institute Samthang from 2019 to 2020.

Data Collection and Analysis

The researchers collected the data using Google Forms amidst ongoing online classes and the nationwide lockdown in Bhutan. The data collection was administered through the use of Google Forms. Researchers designed survey questionnaires using Google Forms and shared them with trainers and trainees through Google Classroom, WhatsApp, Telegram groups, and email.

Collected data were analysed using the STATA-13 software package with descriptive statistics like frequency and percentage. The study was then displayed and interpreted according to trainers' and trainees' perceptions of recent online classes.

Results

The survey was done to understand the experience and perception of trainers and trainees about the recently introduced online teaching mode due to the pandemic. The survey results were divided into the trainers' and trainees' perceptions of online classes. The results for both were discussed separately.

Participants' demographic

A total of 20 teachers and 119 students participated in the survey. For the teachers' survey, 13 teachers completed the entire survey, i.e. 65% of the total sample, whereas, for the students, 80 completed the whole survey, i.e., 67.22% of

the total sample. Hence, only 13 teachers and 80 students' data were considered for the analysis. Of the 13 teachers considered for the study, 69% were male, and 31% were female. Regarding trainees, 74.07% were male, 24.69% female and 1.23% of the population preferred not to disclose their gender.

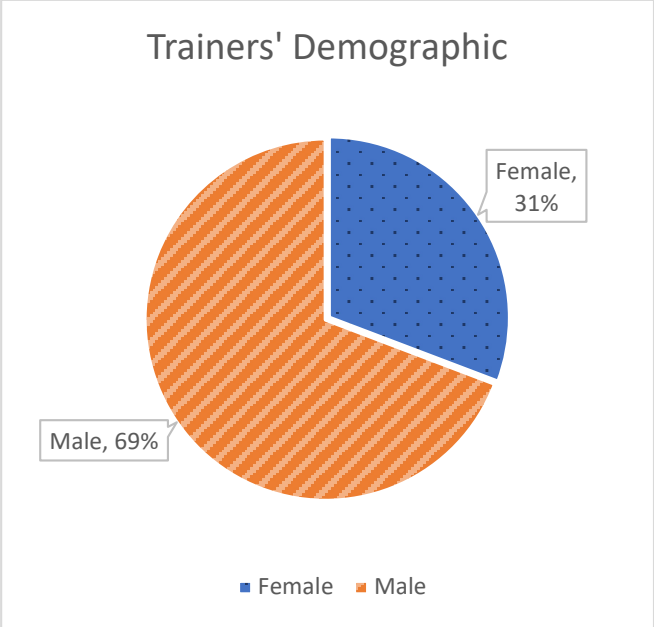

Figure1.a: Total Participants:20, Males 69% and females 31%.

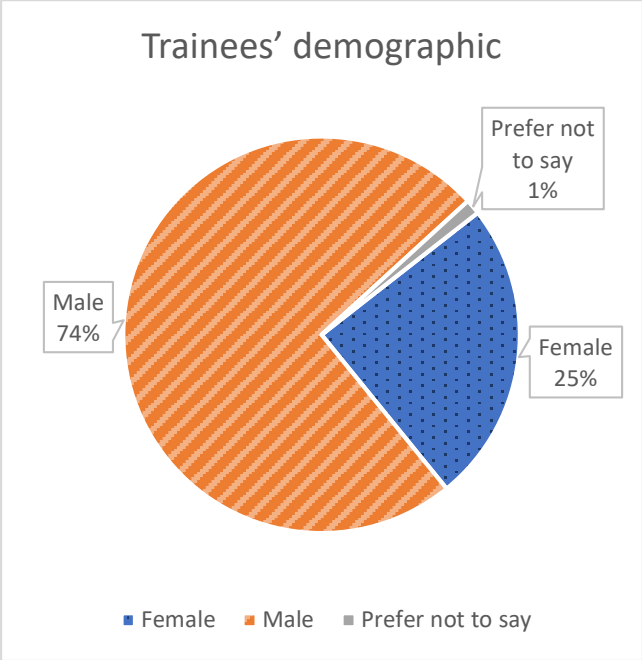

Figure1.b: Total Participants:119, Male 74% and Female, 25% and 1% Preferred not to say their sex.

The most preferred online platforms

The most common online platform the trainers found convenient is Google Meet (23.91%), followed by those listed in Figure 2. Figure 2 indicates that Google Classroom and Zoom were the most commonly used for online classes after Google Meet. WhatsApp and Telegram were primarily used to send assignments and carry out class tasks, as they can be referred to after the course.

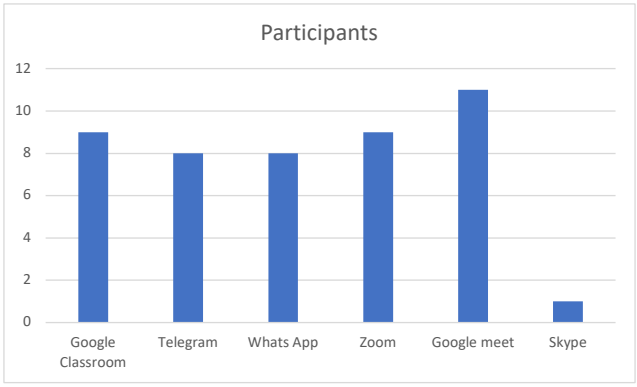

Figure 2: Trainers were asked to select the online platform they are most comfortable with and it was found that Google Meet is the most favorable for online teaching (~24%). On the other hand, skype (~2%) is less popular amongst the trainers.

Trainees' perception of the quality of online teaching

The student survey had items assessing three dimensions: the quality aspects of online teaching, perceived satisfaction, and personal factors that affect online teaching. In the quality aspect of online teaching, 33% of the trainees involved in the study remarked that online classes are more effective than traditional classroom teaching, and 27% believed that online classes are ineffective. Around 68% of the respondents felt online courses needed more interaction. Similarly, 29% of the sample disagreed that online classes were more convenient than the classroom teaching method, while 25% agreed it was more convenient. Regarding the quality of discussion, 58% said that the quality of debate in online teaching was low, whereas 20% agreed that the quality of discussion in online teaching was higher. Significantly, 76% of the participants believed that the technical issue majorly disrupts online teaching flow and pace. The other factors attributed to the low quality of online teaching were the low level of knowledge transfer (38%), less structured than classroom teaching (53%), challenging to clarify doubts (53%), and teacher designing teaching learning materials

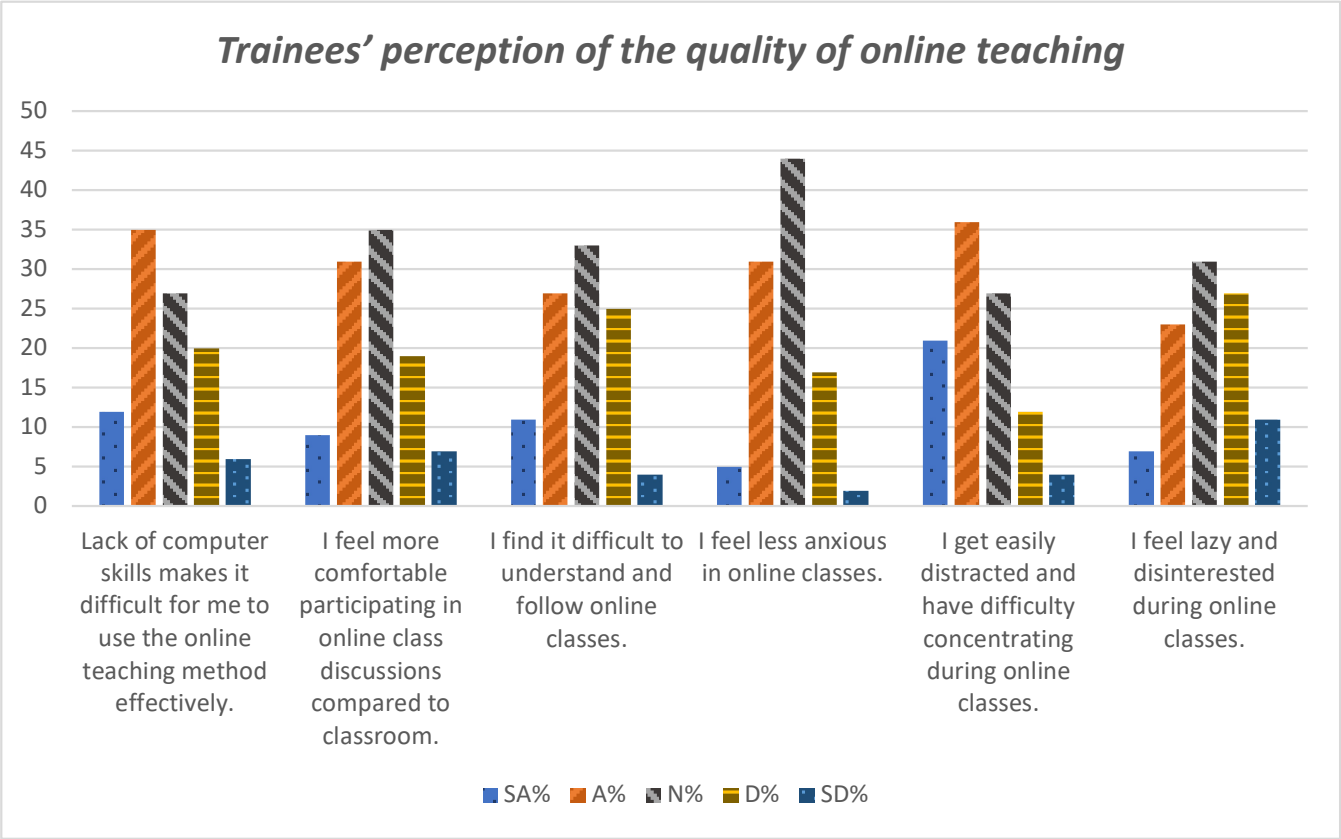

Figure 3: The figure above shows the perception of trainees on the quality of online teaching initiated in TTI Samthang during the COVID-19 lockdown. SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

were not interesting (78%). The other factor that made online teaching successful was that the data package provided by the management benefited them more (87%). 63% of the sample agreed that online education saves time.

Trainees' perception of personal factors that affect online teaching

Looking at Figure 4, trainees perceived that personal factors have a more significant impact on the success of online teaching. Things such as lack of computer skills making it difficult, finding it difficult to understand, feeling less anxious in online classes and feeling lazy and disinterested during online classes were some prominent factors impacting the effectiveness of online classes. Even though today's generation is well-versed in technology, the survey showed that most of the sample reported that they lacked computer skills, which made it uncomfortable for them to use online channels.

Perceived satisfaction

37% of the trainee respondents felt satisfied by online teaching, while 29% were not. This indicated that the satisfaction level of trainees on online teaching could not be confirmed. There were many reasons for not being satisfied with online teaching, such as lack of advanced gadgets in online classes (57%), lack of solid internet connection (71%), and distraction at home deterring online participation (55%). The sample also agreed that the absence of personal phones /laptops hindered online teaching (72%). See Figures 5a and 5b.

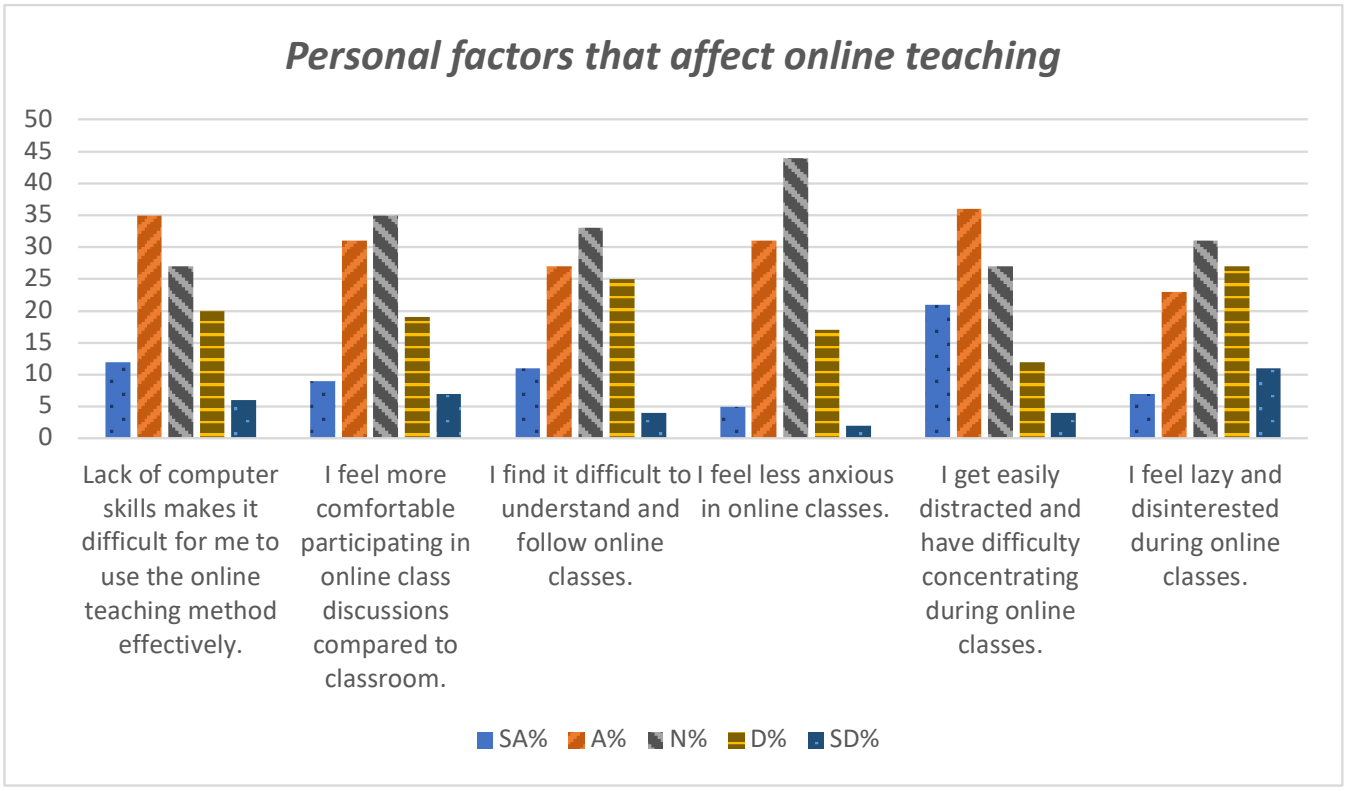

Figure 4: The figure above tells the impact of personal factors on the online teaching SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

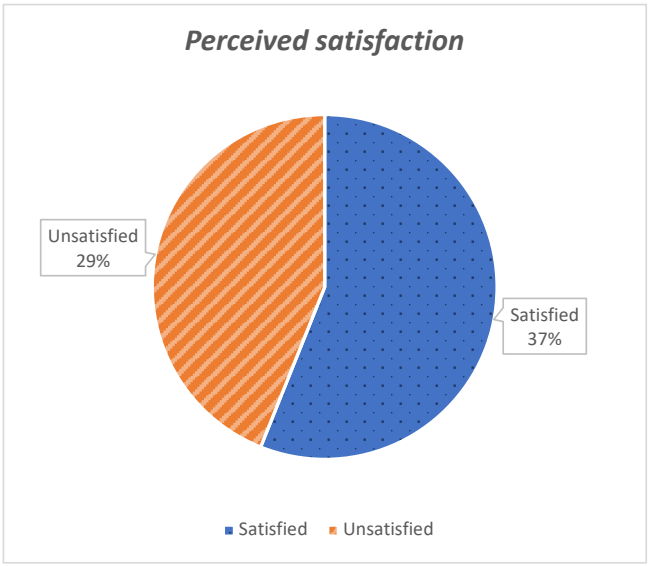

Figure 5a: The figure above indicates the satisfaction and dissatisfaction levels of online teaching.

Personal factor of the trainer

Similar themes were used to collect data from the trainers involved in online teaching to compare their perceptions to the trainees'. Figure 6 expresses mixed perceptions like that of the trainees. An equal weighting of the trainers (38.5%) each believed they needed more computer skills to teach online more effectively. Trainers also felt that online classes make them self-conscious about their teaching. 38.5% felt that online teaching boosted their confidence level as teachers. 53.8% of the trainers felt satisfied with their online teaching experience.

The Trainees' Personal Factor

It was ascertained that the trainees' personal commitment played a vital role in the success of online teaching. 84.6 % of the trainers agreed that trainees do not take online classes seriously. A similar percentage (84.6%) agreed that trainees make many excuses for not attending online classes. More than 61% said trainees lacked interest and involvement during class. Almost 70% of the trainers expressed that the trainees' home environment negatively affected online classes. See Figure 7.

Barriers to online teaching

Concerning Table 1, which shows the twenty perceived barriers that hindered the successful implementation of online teaching in TVET institutions, most trainers (76.9%) perceived that insufficient skills to take advantage of new

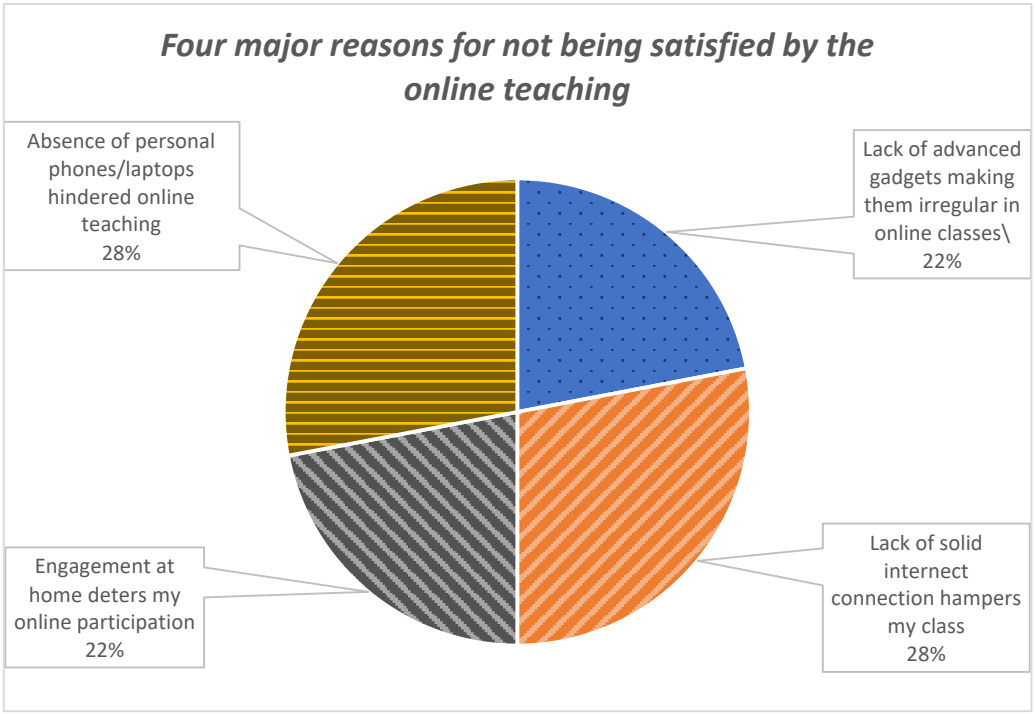

Figure 5b. The figure 5.b portrays the four major reasons for not being satisfied by the online teaching

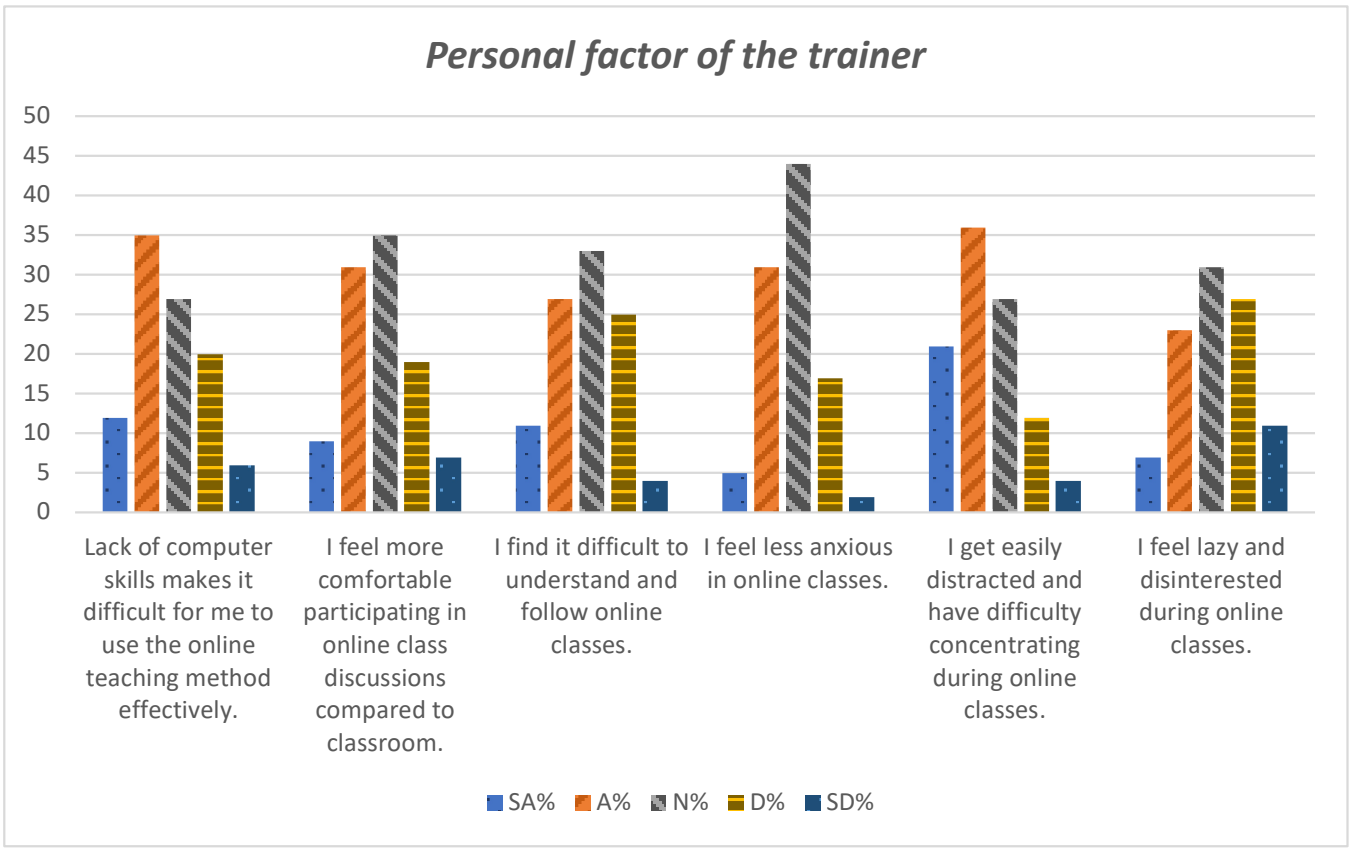

Figure 6: The figure above shows the trainers' personal factors that contribute to the success of the online teaching. SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

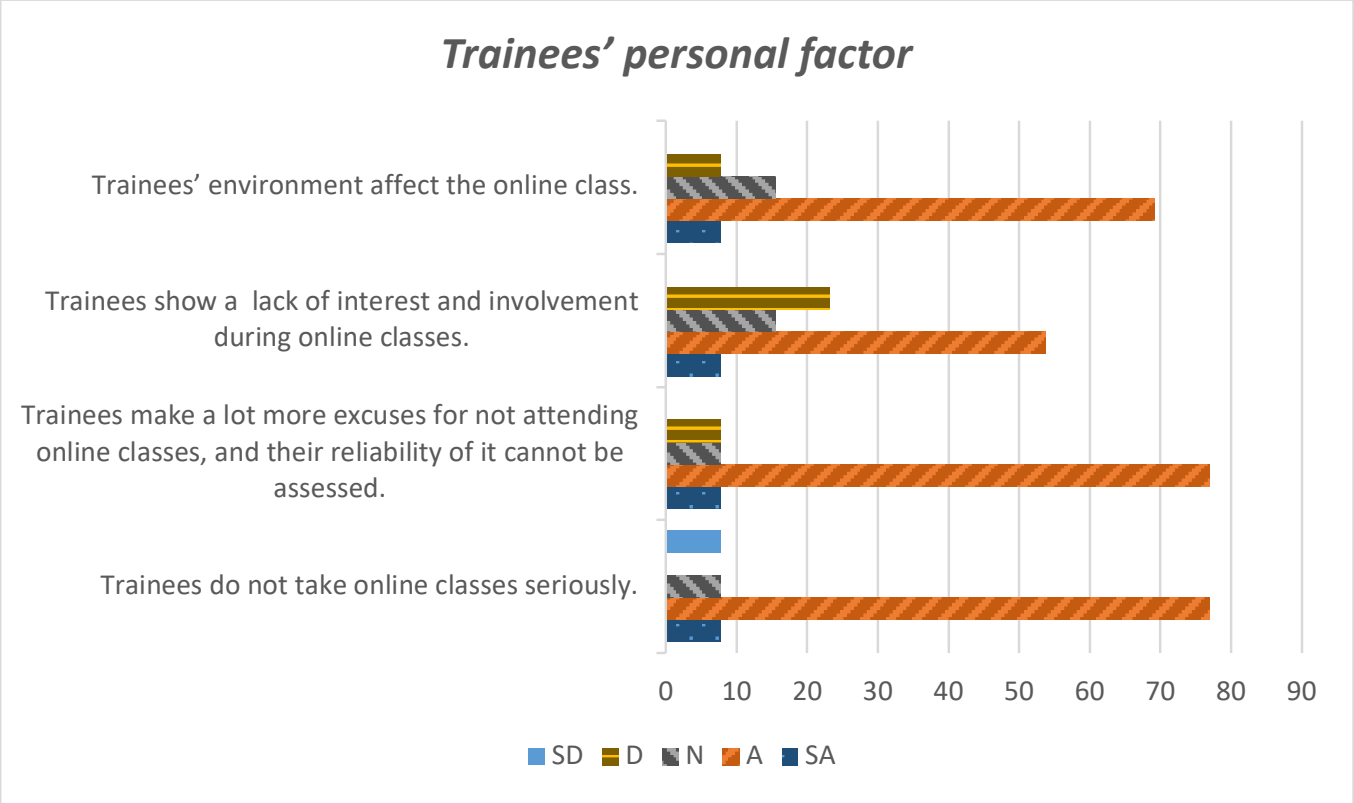

Figure 7: The figure above describes how personal factors play a pivotal role in the success of online teaching. SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree

technologies restricted online teaching. About 77% agreed that the lack of high-speed bandwidth connection is a significant challenge, and 53.3% disagreed that the inability to work with computers is a drawback or hindrance. Further, more than 69% expressed concern about the effectiveness of online learning assessments. The other barrier to the problem was eye strain due to constantly sitting in front of laptops or cell phones.

No.	Statements	SA%	A%	N%	D%	SD%
1	Need for more skills to take advantage of new technologies.	7.7	69.2	23.1	0	0
2	The lack of modern gadgets impedes learning.	23.1	38.5	30.8	7.7	0
3	Lack of high-speed bandwidth /Connectionwithin campus.	38.5	38.5	23.1	0	0
4	Classroom discussions were more challenging to participate in.	15.4	53.8	15.4	15.4	0
5	Learner-to-learner interaction is more difficult.	23.1	46.2	23.1	7.7	0
6	Assessment of learning is difficult.	15.4	53.8	15.4	15.4	0
7	More hard work due to intensive assignments and pressure to maintain deadlines.	7.7	38.5	38.5	15.4	0
8	Learners are not responsible for their learning.	15.4	23.1	30.8	30.8	0
9	Personality development is not possible due to no direct interaction with co-learners.	15.4	46.2	23.1	15.4	0
10	Less creativity and innovation ability due to less interaction with instructors.	15.4	30.8	30.8	23.1	0
11	Sense of loneliness and isolation when not actively involved.	7.7	53.8	7.7	30.8	0
12	Lack of required skills has an impact on learning.	7.7	53.8	30.8	7.7	0

No.	Statements	SA%	A%	N%	D%	SD%
13	Availability of proxy links for assessment can lead to academic dishonesty.	15.4	46.2	30.8	7.7	0
14	Concerns about the effectiveness of online learning and assessment.	15.4	53.8	23.1	7.7	0
15	Lack of supportive culture in the institution.	7.7	15.4	38.5	38.5	0
16	Inability to work with computers.	0	7.7	38.5	46.2	7.7
17	Insufficient computer and Internet skills.	7.7	23.1	23.1	46.2	0
18	Anxiety or stress related to technology.	7.7	15.4	46.2	30.8	0
19	Concerns of privacy or confidentiality online.	7.7	15.4	46.2	30.8	0
20	Physical health barriers such as eye strain.	23.1	30.8	30.8	15.4	0

Table 1: The table above indicates the perceived barriers to online teaching in technical institutions.

Discussion

It was interesting that trainees did not favor online teaching as they felt it could have been more effective than face-to-face teaching. It is reported that little more than 38% believed that online teaching is effective. It is also reported that the negative aspect of online teaching is attributed to the low level of knowledge transfer (38%), less structured than classroom teaching (53%), challenging to clarify doubts (53%), and teacher designing teaching learning materials not being interesting (78%). Similarly, more than half of trainers (53.8%) involved in online teaching were satisfied with online teaching. Sinhal, 2017, cited in Wangdi et al., 2021, argue that technology will find it hard to replace classroom teachers because it does not promote collaborative learning, depriving students of gaining social and organizational skills. The physical presence of a teacher promotes interactive learning that can excite and stimulate students' learning. In addition, a study conducted by Kaur et al. 2020 as cited in Wangdi (2021), reported that online learning is inferior to classroom teaching, so students were not satisfied with online learning. Harmoniously, the study conducted by Sintema, 2020 cited in Pokhrel & Chhetri (2021), found that the level of academic performance of the students is likely to drop for the classes held for both year-end examination and internal examinations due to reduced contact hours for learners and lack of consultation with teachers when facing difficulties in learning/understanding. In contrast, a study by Wangmo et al. (2020) discovered that students identified the interaction with teachers and peers as the most prominent factor that provided learning coupled with e-learning. Most of the students have a positive perception of e-learning and its benefits.

On the contrary, a study conducted in the Bhutanese education system by Wangmo et al. (2020) found that 81% of the sample agreed that e-learning was beneficial and was an interactive strategy. Similarly, 29% of the sample disagreed that online classes were more convenient than the classroom teaching method, while 25% agreed it was more convenient. Regarding the quality of discussion, 58% said that the quality of discussion in online teaching was low, whereas 20% agreed that the quality of discussion in online teaching was higher. Overwhelmingly, 76% of the participants believed that technical issues majorly disrupt the flow and pace of online teaching. The other factors attributed to the low quality of online teaching were the low level of knowledge transfer (38%), less structured than classroom teaching (53%), challenging to clarify doubts (53%), and teacher designing teaching learning materials not being interesting (78%). The other factor that made online teaching successful was that the data package provided by the management benefited them more (87%). Overwhelmingly, 63% of the sample agreed that online teaching saves time. The trainees' personal attributes significantly impact the success of online teaching. Lack of computer skills, getting easily distracted, and feeling laziness during online classes were some of the significant personal factors that the study reported. Thus, the findings of this study are in tandem with the previous study, where online teaching, especially in the Bhutanese context, is more challenging due to the lack of online teaching infrastructure and the non-participatory nature of students (Pokhrel & Chhetri, 2021).

Although COVID-19 allowed trainers to experience various online teaching platforms such as Google Classroom,

WhatsApp, Telegram, Zoom, Google Meet and Skype, almost all the trainers involved in online teaching preferred Google Classroom as the most helpful and convenient online platform. A study conducted by Nambiar (2020) shares a similar finding. He reported that 81.1% of their teachers used Zoom, followed by Google Classroom with 18.5%.

Although the COVID-19 outbreak has given room for the new paradigm shift in teaching pedagogy (online teaching), some issues and challenges have been encountered amid the first-ever online teaching in TVET institutions.

Most trainees and trainers were deprived of modern gadgets, and the internet speed impeded online teaching-learning. Further, online teaching in TVET institutions was aggravated by the lack of technological know-how to use online teaching interfaces and apps. Technical skill was one of the critical factors for the satisfaction of online teaching. In their study, N. Wangdi et al. (2021) reported similar findings. Teachers play an instrumental role in transforming traditional classroom teaching into online digital learning in a desperate time when the education system worldwide has collapsed due to the coronavirus. However, it is revealed that teachers failed to live up to the expectations of the students. Teachers were found incompetent in designing interesting lessons and making them available online for students to learn. This finding corroborates with N. Wangdi et al. (2021) study, which reported that teachers did not have appropriate digital skills to manage online classes.

One prominent issue that online teaching in TVET faced was the credibility of the assessment system. It was reported that online assessment is complex and challenging for trainers and learners. This finding closely concurs with Pokhrel and Chhetri's (2021) findings. The study found that timely feedback and accurate evaluations are crucial for learning. The capacity to provide online learners with timely feedback and effective formative evaluations is a critical component of online distance learning. The educational system and instructors find this to be difficult. Due to bigger class sizes, lack of online teaching infrastructure and professional development, and students' lack of participation, it is more difficult in the Bhutanese environment.

The study also discovered a few disadvantages of online teaching. The result vividly claimed that online learning could not use the pedagogy that is currently available and used for in-person instruction. Digitally illiterate teachers need sufficient professional development and training to focus on their students, even if various pedagogies have been developed for online and distance learning.

The survey also identified some advantages, including requiring teachers and students to learn new skills and adapt to new technology. This has raised their digital literacy and improved their capacity to use technology. It made it possible for students to carry on their education even while schools and institutions were closed. Students have more flexibility to learn at their own pace and at a time that works for them when they participate in online teaching and learning. This has dramatically helped students with other commitments, such as employment or family responsibilities. For students who might not have been able to attend conventional schools or universities owing to distance, a handicap, or financial limitations, it has increased access to education. Both students and educational institutions have found online instruction to be more economical.

Despite many advantages, a few disadvantages need consideration for future study. Online learning can alienate students who are used to interacting with peers and teachers in person. Social isolation and mental health problems can result from a lack of interpersonal engagement. Technology is a crucial component of online education, and technical problems like a poor internet connection, a malfunctioning computer, or a software bug can hurt the learning process. It might be challenging for teachers to give each student individualized attention in an online learning environment. Students who require additional assistance or support may find it difficult. Students not accustomed to self-directed studies may struggle to remain motivated in an online learning environment.

Conclusion

Globally, the COVID-19 pandemic has impacted the education sector, and many institutions now confront difficulties due to this unexpected outbreak that established a new standard of almost complete integration of technology into daily life, notably in educational institutions. On the plus side, this pandemic has given everyone the chance to investigate and push the limits of TVET institutions all over the world to improve their teaching methods and infrastructure. In this study, the researchers focused on how COVID-19 affected the TVET education system from the perspectives of the learning environment

and relationships between teachers and students. Additionally, there are some difficulties that trainers and students encounter when teaching and learning online, such as lack of facilities, lack of technical skills, lack of social interaction between students and teachers, poor internet connection, issues with motivation on both sides and challenges with assessing and evaluating students. Therefore, the government must address these challenges to rehabilitate the impacted education system.

The abrupt virus outbreak had a profound effect on the educational system as well as the environment as a whole. To summarize the paper's conclusions, it was discovered that numerous earlier research studies emphasized the effect of COVID-19 on the educational system, which led to issues and difficulties with online learning. Movement constraints affected both how students learned and how their knowledge was measured. Due to the restrictions, traditional learning has to make way for online learning as the new standard for instructors and students. The use of technology and digital solutions by more families to keep kids entertained, interested in learning, and connected to the outside world was one of the topics highlighted. However, not all kids have the information, abilities, and resources to stay safe online. The winning side is only sometimes popular in e-learning. Even though e-learning helps teachers accomplish their goals for instruction and aids universities and colleges in facilitating students' learning, it has always been dependent on a reliable internet connection with a high-bandwidth link, and the rural lack of infrastructure required for online courses led to students being unable to attend virtual classrooms. As the emphasis shifts to the evaluation, online practical classes, practical exams, and performance testing are not applicable. Tests and assessments may be challenging for students without internet access. Lack of ICT infrastructure, support among educators and students, and limited money among educational institutions are the main problems in e-learning. Educators' and students' difficulties are interrelated, including the need for computers, internet connection, mobile network access, and ICT-trained teachers.

The conclusions of this study must inform critical authorities, including administrators of educational institutions, employees of the Ministry of Higher Education, and decision-makers. To ensure the success of online teaching and learning, they must create a solid plan and implement strategies to deal with difficulties. To encourage students to embrace online learning, universities and educators must develop programs that inform them of the problems they will face and how to overcome them. University administrators could consider providing training opportunities for lecturers to become familiar with the e-learning systems, expanding knowledge on developing content, and delivering it digitally to improve their online platforms. These steps are essential for preparing stakeholders in the education sector for e-learning and plans for education in times of emergency.

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