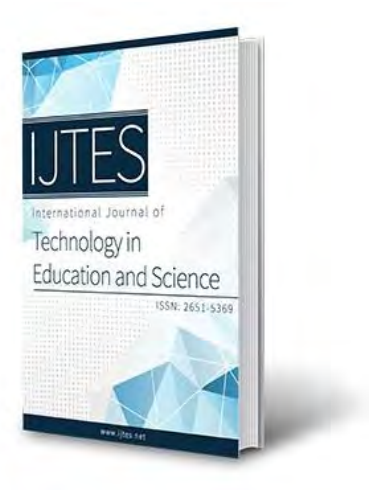

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Sustainability Challenges of Universities' Online Learning Practices

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Sustainability Challenges of Universities' Online Learning Practices

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Abstract

This paper analyses university teachers and students' experiences of online learning during the COVID-19 pandemic in Nepal and presents post-pandemic implications. Potential ramifications of the findings in a normal setting were suggested by the analysis of data gathered through semi-structured interviews with participants both during and after the pandemic, as well as through observation of online classes during the period. Findings demonstrate teachers' ability to create online learning, an alternative mode to a physical classroom, during the pandemic while having an inadequate level of ICT understanding. Despite limited access to digital technology and no administrative assistance, teachers and students created an online learning environment. Findings, however, show an increasing digital gap between rural and urban areas. The discontinuation of effective online learning techniques in the post-pandemic circumstances produced by the teachers during the pandemic pointed out the issues of reforming higher education in developing countries such as Nepal.

Introduction

Many countries, including Nepal, used online learning as a replacement for conventional instruction in physical classrooms after the COVID-19 outbreak (Baral & Rana, 2022). All schools and most universities in Nepal were closed due to the notable increase in COVID-19 cases (Paudyal & Rana, 2021). Just a small number of private, mostly urban colleges with internet access made an effort to continue their educational endeavours using internet-based teaching and learning (Adhikari & Rana, 2022). However, many students, especially those from remote villages lacked internet access (Baral & Rana, 2022). The COVID-19 pandemic impacted about 78% of students worldwide, which resulted in the closure of schools and colleges (UNESCO, 2020). It had formed a global alliance to help countries in their efforts to develop distance learning, especially for vulnerable children and youths at risk. Many teachers and students had to transition to online learning as a result of the COVID-19 outbreak in China and other countries (Zhou et al., 2020). We noticed that both teachers and students in Nepal initially struggled to understand new technologies before progressively becoming more comfortable utilising them for online education.

The COVID-19 effect on education affected students, particularly those from low-income families, and increased student dropouts (Dorn et al., 2020). Although many universities in the developed countries that had internet connectivity during this pandemic crisis replaced their physical classrooms with online learning (Liguori & Winkler, 2020), most universities in developing nations found it difficult to implement it due to inadequate ICT

infrastructures (Baral & Rana, 2022). Amidst the COVID-19 pandemic crisis, teachers and students in developing nations were forced to wait for things to return to normal while adhering to safety measures including social distancing, self-isolation, or quarantine at home (Sahu, 2020). Nonetheless, the pandemic provided a chance for many nations to establish flexible learning options, including online learning, as an alternative to traditional classroom settings (Bao, 2020). Before April 8, 2020, 188 countries including Nepal transitioned from conventional physical classroom instruction to online learning by using a variety of media, including radio and television in locations without internet access, and Zoom, Slack, Teams, and Google Meet in locations with internet access (Basilaia & Kvavadze, 2020). In the context of Nepal, some university campuses started offering an online mode of learning following the pandemic crisis. The new approach was mostly used in urban areas where both teachers and students had access to computers and the internet. This study, thus, analyses how university teachers developed and delivered their courses using an online mode of instruction and how university students learned their courses owing to the new mode of learning. Also, this study examines teachers' ability to transfer their knowledge and skills of online learning to post-pandemic settings.

Online Classes during COVID-19 in Universities

The COVID-19 epidemic compelled higher education institutions to transition from traditional classroom instruction to online learning, resulting in universities either cancelling or postponing all of their scheduled events (Sahu, 2020). Teachers and students were able to continue their academic pursuits during the pandemic because of the virtual learning environment (Bao, 2020). Because of flexibility in terms of time and location, online learning offers an inventive and resolute answer during a crisis and assists students in communicating and working digitally without the necessity for face-to-face interaction (Dhawan, 2020). However, Paudyal and Rana (2021) argue that both university teachers and students need to have a minimal level of digital skills to utilise available internet resources and manage their online learning. Kapasia et al. (2020) contend that students' engagement in virtual learning is impacted by their dread of pandemics like COVID-19, which they claim leads to cognitive dissonance in their minds. One could see the pandemic as a spark that demonstrated the necessity of changing educational processes and paradigms to be more adaptable (Rapanta et al., 2020). The adoption of online learning in Spain, for example, as a response to the pandemic promoted the growth of digital learning and increased students' engagement in virtual classes more than the physical mode of learning (Mulenga & Marbán, 2020). Peters et al. (2020) reported that because of the emergency plan that Chinese universities and colleges established, many Chinese students were able to continue their distance and online learning during the COVID-19 crisis. In Nepal, both university teachers and students utilised freely available videoconferencing applications, such as Zoom, MS Teams, Facebook Messenger, Skype, Google Meet, and Viber to discuss problems and suggestions for online learning (Adhikari & Rana, 2022).

Access to the internet and computer technology has enabled students to manage their education in ways that suit them best (Vonderwell & Zachariah, 2005). Online learning, in particular, as an alternative to traditional on-campus learning, has allowed higher education institutions to rebuild the entire institutional education system (Mainali & Heck, 2017). Many higher education institutions saw the COVID-19 pandemic as an opportunity to transition from traditional face-to-face to modern learning (Acharya et al., 2022). However, studies conducted in

Nepal (Rana, 2022; Giri & Rana, 2022; Paudyal & Rana, 2022) discovered that, while the majority of students lacked access to computers and the internet, online learning was only available to a small number of students in urban areas. Although online education may provide university students with an equitable option to pursue higher education from the comfort of their own homes (Khalili, 2020), access to it for a small number of urban students deepens the digital gap (Acharya & Rana, 2023). Furthermore, a lack of technological and pedagogical competence among teachers is likely to impede the deployment of online learning (Rana & Poudel, 2024). Even the successful practices of online learning in one place may not replicated (Alon et al., 2023) in contexts where most students cannot afford expensive technologies.

The Success of Online Learning

Although many students struggle to manage their learning at home due to a lack of access to computers and the internet (Adedoyin & Soykan, 2023), students who have access to digital technologies may be able to improve their autonomous learning skills through online learning (Wilson et al., 2007). Sintema (2020), for example, discovered that the COVID-19 pandemic in Zambia lowered students' contact hours and pass percentages due to their limited access to ICT. Paudyal and Rana (2021) discovered that, although online courses were more flexible than traditional courses, students with less web technology skills had fewer opportunities to engage with their lecturers and peers. However, Rajhans et al. (2020) argue that the COVID-19 crisis offered a foundation for many higher education institutions to transition from traditional pedagogies to online modes of instruction. Especially, online learning during the pandemic offered new opportunities for students to expand their learning environment (Paudyal & Rana, 2021). Scholars (Allen & Seaman, 2011; Gautam & Gautam, 2021) argue that online education is possible in contexts where web technology has become a part of students' lives. Alon and his colleagues (2023) argue that the effectiveness of online learning during the COVID-19 pandemic would be dependent on the longevity of those beneficial practices in post-pandemic normal contexts.

For the traditional classroom to change and educational opportunities to increase, an online learning environment is crucial (Kumar et al., 2017). For instance, Rana et al. (2018) reported that the use of digital resources transformed instructional activities from a traditional setting to a learner-friendly environment. However, they argued that university teacher education programmes without ICT training do not produce graduates who are proficient in using technologies in their instructional activities. Thapa and Sein (2018) recommend that teachers be trained in both the usage of digital technology and the adoption of cutting-edge pedagogical strategies. They append that it may improve ICT's capabilities for efficient teaching and learning processes to raise the bar for digital education in impoverished nations like Nepal. Despite the fact that ICT is highly valued in rural Nepal, Dawadi and Shakya (2016) argued that there are still significant obstacles to the digitalisation of education there. These include Nepal's challenging and diverse topography, low literacy rate, lack of electricity, lack of broadband internet, and a skilled workforce shortage. However, Rana and Poudel (2024) underscore that ICT in education is the focal point through which students, teachers, policymakers, and institutions construct modern and progressive identities. Furthermore, they emphasize the creation of effective ICT educational initiatives, including online learning, to provide students with flexible learning options.The literature reviewed in the sections above has given researchers a distinct lens through which to view university teachers and students' experiences with online learning

throughout the pandemic.

Methods

This study reports an examination of online learning practices during the COVID-19 pandemic and university teachers' capability to transfer their skills to post-pandemic circumstances. We employed semi-structured interviews with the participants and observation of their online classes to gather data as suggested by Cohen et al. (2013). We obtained ethics approval from the Faculty Research Committee in the Faculty of Social Sciences and Education, Nepal Open University before starting the fieldwork. Before starting to collect data, participants were followed on their phones and Facebook Messenger which helped build rapport with them. Informed consent was obtained from each participant before the interviews with them. After obtaining informed consent from the participants, they were followed by internet-based semi-structured interviews on multiple occasions depending on the data requirement. We emailed a Zoom link to the participants who used email and sent the link to the ones who used Facebook Messenger for the interviews. Most of the participants were interviewed twice seeking detailed information about specific issues raised in the first interview. The first round of interviews was conducted in 2020. The second set of interviews with teachers, in particular, took place in 2023, one year after the official declaration of the pandemic's end. On average, we spent about 40 minutes with each participant for interviews. An interview schedule (See Table 1) that we prepared to conduct interviews was used to interview the participants. Interviews were recorded on a laptop and Zoom app.

Table 1. Interview Schedule

For teachers
a. What do you understand about online learning?
b. How did you manage online learning, especially devices and the internet?
c. What kind of digital tools have you used to create and conduct online learning?
d. Have you thought about online learning before the COVID-19 pandemic? Did you have online teaching experience before you started online learning following the pandemic situation? If so, how did your previous experience help you in managing online learning in this crisis?
e. Have you ever experienced challenges in creating and managing online learning? If so, what sort of and how did you tackle them?
f. What strategies did you develop to start online learning and to help students create online learning?
g. How did you deal with students' learning problems and support them in the prolonged lockdown?
h. What kind of learning resources did you mostly use to assist students' learning when they were lonely at home at a distance?
i. How was your students' response to your online teaching and how did you learn to teach through online mode?
j. Did you get any training to manage online learning? If so, who provided what and how?
k. If you received ICT training or online teaching training, was it helpful in your teaching?
For students
a. What is your understanding of online learning?

b. How did you manage your online learning during the pandemic situation?
c. How did your university or teachers help you learn and manage your learning from home?
d. Did you have a computer or smartphone that you needed to manage online learning? If not, how did you manage it in an emergency? Do you have any idea about your friends and how they managed online learning or why they did not?
e. What were the difficulties you experienced in the process of online learning?
f. Was your teacher's online teaching strategy helpful for your learning? If not, why?
g. What kind of teaching techniques did your teachers apply in their teaching? What kind of materials did they use in delivery?
h. What do you think about the quality of teaching and learning online?

For the observation of university teachers' online classes, we used the Zoom and Microsoft Teams links that they provided. Online observation, as suggested by Cohen et al. (2013), allowed us to explore participants' experiences and perceptions of online teaching and learning activities at universities. At least three online classes of each teacher were observed over four weeks. Each online class was 40 minutes long. A class observation diary was developed for the systematic analysis of data. We did not use any rating scale as in the systematic observation, but we followed research questions and interview schedules in the process of online class observation. The records of online classes were saved on personal computers.

Participants

We identified the two campuses involved in this study through friends who reported about online classes the campuses conducted. We contacted the heads of these campuses and explained our research plan. Then, they enabled us to contact their teachers. We emailed information sheets and consent forms to many teachers for their expression of interest targeting the participants in different departments, such as humanities, science and technology, education, and business studies. Based on the first-come-first-serve approach, two teachers from each campus were involved in this research. With the help of these teachers, we approached their students and involved four students from each campus. Following the same process, as we did while selecting teachers, we involved altogether eight students (see Table 2) in this study.

Table 2. Participant Teachers and Students

Campus	Teacher	Age	Sex	Qualification	Student	Sex	Level of Study	Programme of study
Marigold Campus	Mohan	50	Male	Masters	Milan	Male	Masters	Humanities
					Madhav	Male	Masters	Science and Technology
	Mitra	53	Male	PhD	Mina	Female	Masters	Science and Technology
					Madhu	Male	Masters	Humanities
Sunflower Campus	Shravan	45	Male	Masters	Sumi	Female	Bachelors	Education
					Subina	Female	Bachelors	Education
	Shruti	40	Female	Masters	Shristi	Female	Bachelors	Business Studies
					Sakuntala	Female	Bachelors	Business Studies

All the participants were contacted beforehand on their mobile phones and through email to build up a rapport. Although we tried to balance gender in the number of participants involved in this study, this did not happen because of the participants' choice of participation. Participants and their campuses' names are replaced with pseudonyms to maintain anonymity.

Data Analysis

We followed a thematic approach to data analysis as suggested by Braun et al. (2006). An inductive coding scheme helped us identify themes, organise data and present the analysis of data. First, we transcribed audio records of interviews. Second, we read the data gathered through interviews and observations and developed preliminary codes. Third, we organised these codes into broader themes. Fourth, we read the data into the themes and refined the themes to interpret the data. Fifth, we defined the themes based on the data and conceptualised ideas into the themes. Finally, we interpreted the data into the themes in a story form.

Results

A cluster of findings from the overall study is reported here. These findings include online teaching at Nepali universities, difficulties with online learning during the COVID-19 pandemic, accessibility issues with online learning, and transfer of learned skills to post-pandemic circumstances.

Accessibility of Online Education

In their interviews, most participants admitted that they first struggled to get online education because of the COVID-19 pandemic. Following the safety procedures of the health issue that the government announced with the declaration of lockdown in March 2020, university lecturers gradually started online communication with a small number of students around the nation from the second month of the lockdown. Participants focused on the need for online learning to continue educational activities during the pandemic situation when all traditional physical sessions were halted out of concern for COVID-19. For example, Mohan, a lecturer at Marigold Campus, said:

> Our campus started online classes by using Google Meet at first. Later, we started to use Microsoft Teams when the university provided access to all the students and teachers. We can have lots of functions for online classes.

His expression reflected how both lecturers and students managed their online learning. Particularly lecturers appreciated the initiation of an orientation programme for lecturers and students with the help of IT specialists. Milan, a student at the same campus, shared his similar online learning experiences:

> At the beginning stage of online classes, we all the students were confused about the use of ICT tools like Google Meet and Microsoft Teams but gradually, we learned it. Then, we felt comfortable using it

> and got benefited from online classes. Some friends are unable to join online classes.

It was evident that the study's participants were learning and teaching for the first time online. Participants' experiences suggested that this type of online teaching would be beneficial for many students who were involved in various jobs and unable to attend university. Providing access to internet facilities would encourage online learning and progressively ensure that everyone has an equal opportunity to receive a high-quality education, even in rural areas. However, students worried that although they were able to take advantage of internet access in urban areas, most students from rural areas would not be able to benefit from such amenities owing to a lack of the internet, digital devices, and electricity. For example:

> There was no provision of online classes before the COVID-19 lockdown. When the university was shut down, our campus started online classes on Zoom at first and then Google Meet. Technology is meaningful in teaching and learning in such crises. In online classes, there is good participation of students but some of our friends from remote areas are unable to connect to online classes. (Sumi, student at Sunflower Campus)

Her comment provided a clearer picture of how they learned to use new technologies and internet resources for their online learning. Her expression reflected that the COVID-19 pandemic provided them with an opportunity to switch from the traditional style of learning to an online mode. However, Mitra, a lecturer at Marigold Campus, acknowledged that he could not enrol all of his students in his online courses. He said:

> I am teaching online classes during this COVID-19 pandemic. I have a smaller number of students as compared to face-to-face classes on campus. Students from remote villages are unable to access online classes because of poor bandwidth of the internet, lack of computers, and expensive mobile data. Their economic status also plays an important role in online learning. Students from city areas have good participation.

He implied that there might be many students in remote locations without access to computers and the Internet. His expression reflected how the divide between rural and urban areas would widen in the absence of ICT. The small number of students in online classes was discovered through observation of lecturers' online classes. They were primarily from urban areas with access to ICT for learning. Further discussions with lecturers revealed that students in remote locations were unable to access online education due to a lack of digital devices and internet connectivity.

Online Teaching as a Complementary Mode

Participants reported that online learning was the only mode of teaching and learning during the pandemic. They claimed that the online learning environment became a way for students, lecturers, and researchers to collaborate, interact, and encourage one another in their academic endeavours. For example, Madhav, a student at Marigold Campus, said:

> Online education is supporting us to continue our teaching and learning activities in this COVID-19 lockdown. It could not be an alternative to on-campus education without proper plan, policy, and development of ICT infrastructures in Nepal. It complements the traditional mode of teaching in this crisis.

His expression reflected that the online learning environment had evolved into a substitute way to continue academic activities. Urban locations with access to ICT infrastructure were the focus of the new practice of internet-based teaching and learning. Madhav added that the brand-new method of online education would enhance traditional classroom teaching and learning. Most participants echoed that universities started offering online education to fill the gap in education that the nationwide lockdown created. Shravan, a lecturer at Sunflower Campus, said:

> In a situation of complete lockdown, I felt a gap in the learning system and so did my students. And the initiation of online classes has filled the unproductive gap. Now, the online mode of learning has become alternative learning. There is no other option than online education during the COVID-19 pandemic.

Although most participants from urban areas were satisfied with the new learning system, those from rural areas found it difficult owing to their lack of understanding and access to ICT. The universities, on the other hand, went from holding physical classes to online learning with the expectation of continuing entire education activities virtually and enhancing their existing curricula. Shruti, a lecturer from Sunflower Campus, said:

> In the context of Nepal, ICT infrastructures are not properly developed and there is a lack of skilled manpower. Online learning is supportive of a traditional system of learning. For its proper use, the government needs to formulate a better policy for appropriate implementation of online education.

She seemed hopeful about the new learning system. However, the observation of her online classes identified that many students from rural areas were unable to attend online classes. Her emphasis on the necessity of developing adequate government policies for the effective practice of online education revealed that Nepal lacks proper planning and implementation of strategies for the online teaching and learning system. Students perceived that if they had access to digital devices and the internet, everyone could benefit from online learning. For example, Milan, a student at Marigold Campus, said:

> Online education is an option for the face-to-face mode of education. The online mode of learning allows students to identify online learning communities, share ideas, and get help to solve learning problems. It is flexible and suitable for all including special needs students.

His comments revealed that educational activities continued, to some extent, throughout the COVID-19 lockdown due to the new learning system. Other students also appreciated the value of how online learning enhanced their interactive learning abilities. Students were able to discuss their problems, share experiences through online mode.

Challenges of Online Teaching

Participants in the new system of teaching and learning encountered technological issues. Particularly in online programmes, students from rural areas frequently faced voice and internet connection outages. The main issues with online learning have been identified as having poor connectivity to the internet, unstable electricity, and limited ICT skills in both lecturers and students. However, the online learning environment allowed lecturers and students to continue their classes despite the weak educational infrastructure during the COVID-19 pandemic. For instance, Subina, a student at Sunflower Campus, said:

> There is no proper facility of internet for online classes in remote villages. When we talk about the city area, there is less problem. Those who live in rural areas are struggling with online classes because of poor ICT infrastructures.

Her comment provides a picture of how students in remote areas have struggled to access online education. It also suggests that millions of students might not be aware of such events since they live in remote villages without access to smartphones, computers, and the internet. The digital divide between rural and urban areas would have gotten worse as a result. Subina added that many students were also unable to manage necessary computer devices and the internet for their online learning since they were more concerned with getting food than with their education. For example, rural students described how difficult it was to handle mobile data, which was the only option available in their villages for their unreliable online learning. Similarly, Mina, a student at the same campus, shared:

> Our campus provided an orientation and started online classes through Microsoft Teams from the second month of lockdown. Unfortunately, I did not get the notice about it and had difficulty joining Teams. Online teaching is not so effective for those who are unable to manage the technology needed for online education.

She explained that although many universities started offering online courses, students had trouble managing them because they lacked the necessary web-based learning expertise and skills. However, they were able to manage their online learning by gradually developing skills for new learning systems through their consistent practices. The effectiveness of university's online learning has been questioned due to low technological abilities, lack of digital devices, and weak internet. However, Madhu, a student at Marigold Campus, highly emphasised the development of online learning as he said:

> Online education is much more suitable and effective in the context of Nepal because we need to spend many hours to reach campuses, or we have to leave our family for higher education. Online education can be an alternative to the existing education system and support students, teachers, and universities to extend teaching and learning activities.

He appreciated online learning, which in this crisis has given rise to a new teaching and learning strategy that may

be made viable in the long run as a replacement for the existing on-campus learning model. It was much clearer from his idea that many students, who cannot afford on-campus education, can continue their higher education from their home without being physically present. Further discussion with him revealed that the innovative learning system had introduced fresh ideas for enhancing students' capacity for learning with the help of various ICT tools. Although participants reported difficulties, such as the lack of university policy in online education, limited or no ICT infrastructure in rural areas, and people's lack of affordability, some students from urban areas appreciated online teaching and learning that was started with the rise of COVID-19. However, most students reported online learning was less effective than physical classroom learning. For example, Sakuntala, a student at Sunflower Campus, said:

> I am a university student and teacher at a school. We cannot develop social intimacy through online classes. We need a social environment like working together or meeting each other to develop social skills.

Her expression reflected that online learning can be feasible and affordable in Nepal where millions of students cannot move to cities or towns for higher education after school. However, in the absence of the physical presence of both students and lecturers, they might not be able to develop their social skills through internet communication. She also voiced her frustration at not being able to communicate with her lecturers face-to-face and meet them. Our observations identified that students who had to work individually had less time to talk to their lecturers and peers about academic concerns and were unable to share problems.

Transfer of Learned Skills to Post-Pandemic Circumstances

Teachers' perspectives during the pandemic interviews covered a wide range of topics, including the potential for educational transformation, the sustainability of online learning, and the ability of teachers to apply their technological, pedagogical, and content knowledge to post-pandemic environments. They expressed their capacity to translate technical and pedagogical skills into post-pandemic regular classrooms in our follow-up interviews with them after two years of the pandemic in 2023. They valued the practice of online learning throughout the pandemic for a variety of reasons, including the development of digital skills and innovative pedagogical techniques. For example:

> I was completely unaware of the use of Messenger and Zoom for distance learning before COVID-19. I used them for personal communications though. When all schools and colleges were shut down, these technologies became the means to communicate as well as teach students. I would probably not understand web technologies should I not use these technologies. Now, I use online resources to explore materials to teach lessons. (Mohan)

> I joined several webinars about online learning and learned to use Zoom to support my students in their learning. Gradually, I learned how to create online learning environments. Unfortunately, we could not continue online. However, I commonly use internet resources to teach lessons and ask students to search

> for learning materials on websites. (Mitra)

These comments indicated that the pandemic became an opportunity for teachers to learn about using digital technologies in educational activities outside of the crisis in normal settings. The responses also revealed that teachers had a good attitude about the use of current technologies and that they were gradually changing the ways they taught and learned. However, the retention of just traditional terminal hall exams while abandoning the work-based assessment used throughout online learning demonstrated a form of educational reverse travel. For example:

> We did not meet our students during the pandemic, but they were very active in doing their homework and demonstrating their work. We graded their assignments and provided feedback on them. Students developed autonomous learning skills. When we opened schools and colleges normally, did not continue these practices. Instead, we carried out terminal exams. (Shruti)

When we asked these teachers why they failed to sustain effective practices in typical contexts, they explained that government assessment systems obstructed them from continuing online learning. We assumed they were telling the truth about the long-established tests and knowledge-based schooling that they would not dodge. However, the expressions of these teachers revealed their failure to translate their creative technology-based pedagogies into their regular classroom teaching, which they were capable of doing. With the abilities they gained during the pandemic, we believe that teachers could create a collaborative learning environment in and out of the classroom. They might, for example, use digital technologies to supplement students' outside-of-class learning. It implies that not all effective methods can be reiterated and sustained.

Discussion

When COVID-19 broke out, traditional face-to-face learning was put on hold. To continue their educational operations, certain university campuses, particularly those in urban areas, have embraced online learning. Findings indicated that a significant number of students from remote areas were unable to access online education during the pandemic because Nepali universities started online learning in an emergency. Due to a lack of ICT infrastructure and students' inadequate ICT knowledge and skills (Rana & Rana, 2020; Rana et al., 2020), many students from remote villages were unable to access online education, which their university campuses managed for them during the pandemic. Although the pandemic has become an opportunity for many international universities to switch from normal physical classrooms to online interactive teaching and learning environments (Dhawan, 2020; Huang et al., 2020; Rajhans et al., 2020; Rana, 2023), the limited practices of online education at the university campuses provide a picture of how they have struggled to start it with limited resources, lack of online learning experience, and inadequate administrative preparation. While the campuses were closed as a result of the pandemic, online learning was abruptly introduced to continue educational activities. For those students who could access online education, the quick shift offered students who had access to online education the opportunity to learn cutting-edge technologies and novel methods for taking classes at home. Despite the small number of students enrolled in online classes, the online learning environment filled the void left by COVID-19 and provided an opportunity to digitalise education. The new method of online instruction, however, was

inaccessible to many rural students.

We observed issues, for instance, weak internet, unreliable electricity, expensive internet, inadequate ICT resources, and lecturers and students with little ICT proficiency. During the pandemic, limited ICT skills of lecturers, expensive computer and mobile data, and a lack of government financing for ICT resources (Rana et al., 2018) all became impediments to connecting students in online learning in remote regions (Paudyal & Rana, 2021; Giri & Rana, 2022). These challenges appear to widen the digital divide between the students who have access to online education and those who do not. Researchers (Palvia et al., 2018; Peters et al., 2020; Acharya & Rana, 2023) have also produced contradictory findings on the operation and efficacy of online education, such as the low participation of rural students and the high engagement of urban students in online education.

Online learning has provided university lecturers with opportunities for learning new technologies and pedagogies. Students who had access to online learning were able to gain independent learning skills through their ongoing involvement in online classes. Online learning has, to some extent, made it possible for lecturers and students to accomplish curriculum objectives using a variety of pedagogical approaches, including interactivities, project-based learning, and the presentation of works. In the words of Rapanta et al. (2020), university lecturers and students can make use of ICT resources to find alternative ways to deal with problems like the pandemic and keep up with educational systems. However, the practice of online learning, which was only available to a few students from urban areas, would widen the gap between students from rural and urban areas, which would then lead to an increase in inequality between the communities.

Urban lecturers and students appreciated the introduction of online learning for its flexibility. However, many students from rural areas highlighted how difficult it was for them to enrol in online classes since they lacked appropriate ICT skills and had little access to internet resources. Moreover, university lecturers found it difficult to succeed in online classes due to their poor ICT knowledge and expertise, and lack of prior experience with the online learning environment. This is consistent with the findings of Bao (2020) in China, who claimed that university lecturers at Chinese universities found it difficult to carry out online teaching and learning activities because they lacked adequate knowledge of the subject. Additionally, it appeared that inadequate administrative support and a lack of ICT resources were obstacles to effectively managing online learning for university students. In this situation, researchers (Adhikari & Rana, 2022; Baral & Rana, 2022) have suggested that ICT training, ongoing IT support, and appreciation for lecturers from the administration would help them explore online resources and ideas to use them in instructional activities. However, the initiatives of the university campuses in Nepal suggest that even with the limited ICT resources inside and outside the university premises, particularly in rural areas, their attempts to implement online learning during the COVID-19 crisis provide an idea of how they can survive with little assistance from the government and sustain even in the most difficult circumstances.

The findings of this study highlight the problems of sustaining effective online learning practices in underdeveloped countries such as Nepal, where both institutions and teachers are underprepared. Despite international studies (Leal Filho et al., 2024; Zhu et al., 2023) reporting the continued development of online education in post-pandemic normal situations, the institutions involved in this study chose to continue their

traditional teaching and learning, including the examination system, despite finding online learning to be an effective mode of learning. It suggests that instructors, and particularly institutions, have not formed a mindset toward changing old educational structures into technology-integrated learning systems. A lack of ICT infrastructure, as well as a willingness to change themselves, appear to be important impediments to the adoption of digital technology in higher education. Apart from teachers' limited use of internet resources in the post-pandemic environment, the ongoing practice of knowledge-based teaching and exams in the post-pandemic situation suggests a lack of transfer of effective pedagogical and digital abilities to the regular situation.

Conclusion

The COVID-19 pandemic has provided a possibility for academic institutions, lecturers, and students to incorporate contemporary technology into their teaching methods. The high level of enthusiasm among university lecturers for utilising the ICT resources available for online teaching during the pandemic increased their ICT abilities and teaching strategies. Many students were able to strengthen their self-learning skills through online learning. On university campuses during the pandemic, the online learning environment replaced traditional classroom settings and aided both lecturers and students in continuing their studies. Lecturers were able to conduct teaching from home with various tools, such as Zoom and Microsoft Teams. To finish their courses, students could manage their learning from home and collaborate. Amid the crisis, online learning complemented traditional face-to-face instruction at the institutions involved in this study. University students, however, expressed their concern regarding the accessibility of online learning due to the difficulty they had in managing ICT resources for their studies. Although many students from rural areas struggled to manage the fundamental ICT infrastructure for online education, urban students and lecturers, to some extent, benefited from online teaching and appreciated the initiation of online learning. Many students who lack computer and internet access might participate in online learning. Findings point to the necessity for Nepal’s higher education institutions to create a minimal level of ICT infrastructure, train lecturers to use the available resources, and give every student access to online education.

Major barriers to the successful implementation of online learning at universities include a lack of ICT infrastructures, inadequate ICT training for lecturers, unreliable electricity, students’ low socioeconomic status, and both students and lecturers’ limited ICT skills and knowledge. This study has indicated the potential of online learning in the context of Nepal that can be expanded to future educational development, even though there was only a short amount of practice during the pandemic crisis. Unfortunately, effective online learning activities such as project-based learning and online collaboration among students, were discontinued in the post-pandemic context. Apart from teachers' capacity to transfer fundamental ICT skills developed during the pandemic, such as using the internet to search for online resources, to post-pandemic teaching activities, teachers reverted to their previous teaching and evaluation techniques in normal settings. This highlights the issue of the sustainability of great educational techniques. This study, thus, recommends that universities and the government provide ICT infrastructure, knowledge, and skills to lecturers and students, implement educational policies on ICT for the development of online learning, and transform traditional pedagogies into e-based learning to provide equal opportunities for all students to receive high-quality education.

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