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### IMPACTS OF REMOTE LEARNING TO STUDENTS IN HIGHER EDUCATION DURING THE COVID-19 PANDEMIC IN NEPAL

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## IMPACTS OF REMOTE LEARNING TO STUDENTS IN HIGHER EDUCATION DURING THE COVID-19 PANDEMIC IN NEPAL

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### Abstract:

The COVID-19 pandemic has immensely disrupted many aspects of human life. Education is not immune to it, rather affected drastically by urging to shift online immediately, wherever possible. Resource-constrained countries were more challenged by this crisis, as higher education institutions are predominantly operated in the traditional classroom settings. With such an abrupt transition to remote teaching and learning with limited resources, both teachers and students have accelerated in gaining new knowledge and adopted the technology gracefully. This study extends our previous work in exploring the facilitating and the inhibiting factors by teachers during remote learning processes to see how students at the receiving end, experienced the journey. By using a mixed method, students' experience during the remote learning is explored. While returning to the normal mode of teaching post-pandemic, this study suggested that students would prefer to continue some aspects of online tools and embrace blended learning.

**Keywords:** COVID-19; remote learning, students, Nepal, learning tools

## I. INTRODUCTION

Speedy transitioning to remote teaching and learning during the COVID-19 pandemic posed many challenges to both teachers and students [Dindar et al., 2021]. However, as countries are getting ready to open and putting effort to reactivate universities and campuses, and that there is growing suggestion that certain portion of teaching and learning could be kept blended [Shrestha et al., 2021; Jena, 2021] as it could help improve the quality of face-to-face teaching [Bowen, 2012], it is important to review, reflect and unravel the learning from the remote teaching and learning [Krull & De Klerk, 2021]. First, we started investigating how the teachers in higher education were affected in resource limited countries like Nepal when they had to quickly switch their classes to remote environments. One of the popular frameworks, Tornatzky and Fleischer's [1990] Technology-organisation-environment (TOE) is used to examine teachers' external factors, in addition to personal factors as their internal capabilities, in adopting remote teaching and learning [Laudari et al., 2021].

It is also important to explore those learnings from student perspectives for two reasons: the first is a large number of students were impacted by the closure of educational institutions or suspensions of educational activities for social distancing, and participated in the remote learning. So, it is important to understand their experience of remote learning amidst the challenges. Secondly, remote teaching and learning has shown us new ways to engage students, which could be continued post-pandemic to enhance teaching and learning and improve the quality of face-to-face delivery. Therefore, this study focuses on the experiences higher education students had during

that time and follows the similar pattern to be in line with our previous study investigating the factors that facilitated or inhibited remote teaching and learning in Nepal. We have formulated the following research questions:

- How did the higher education students in Nepal experience remote learning during the pandemic?
- What supported or discouraged higher education students in remote learning during the pandemic?

The higher education courses considered in this study are both undergraduate and postgraduate in either a university or one of their affiliated or constituent campuses/colleges. Of the 12 functional universities in Nepal, Tribhuvan University (TU) is the largest and the oldest and the largest number of constituent and affiliated campuses around the nation. Whilst the constituent campuses (n=60) are winged campuses and run under the direct administrative, academic and financial control, affiliated campuses (n=1084) are operated under the academic supervision of TU. Other universities also have affiliated campuses which are run under their academic supervision, but they are far less as compared to TU.

## II. LEARNING DURING COVID-19 FOR UNIVERSITY STUDENTS

Generally, the institutions have been slow in adopting and integrating technology in education but in light of the crisis as result of the COVID-19 pandemic, the universities and colleges were required to either suspend all teaching and learning activities or rapidly pivot to remote teaching and learning by adopting the available technologies [Shahu, 2020]. There has been a proliferation of research studies since then to explore the issues of such a rapid shift to online teaching. For example, studies have focussed in different areas of higher education, including organisational and teachers' readiness to teach online [Marinoni et al., 2020; Shrestha et al., 2021], impact of the pandemic on teachers' [Rumbley, 2020] and students' wellbeing [Grubic et al., 2021; Tuck et al., 2021].

An area of research that has drawn significant interest is the factors supporting or obstructing student remote teaching and learning. For example, a study of higher education students in Saudi Arabia by Alshaikh et al., [2021] found factors such as flexibility in class schedule, correspondence with the teachers, not having to commute, availability of the recorded lecture were some of the factors that supported remote teaching and learning. The authors [Alshaikh et al., 2021] also noted that factors such as not being able to communicate with the group members, application of practical training, administrative, lack of comprehension in online classes and procedural issues with examinations were some of the obstructions in remote learning.

A study of Romanian higher education students by Mican & Cocorada [2021] reported that students' familiarity and ease of technology use, ability to interact with teachers and colleagues using audio, video and chat features, use of e-learning resources were some of the factors that supported students' remote learning. As for the factors that obstructed students' engagement in remote learning, they reported that some students experienced failure of technological devices, and some students were hesitant to participate in learning activities during the synchronous sessions.

In a study of university students in Poland, Baczek et al [2021] found that students liked remote learning because they did not have to commute to go to university, and they had access to online resources that they could study at their own pace. As for the negative aspects of online learning, the students mentioned that there was no meaningful interaction, lack of participation in learning activities, which were exacerbated by the technical issues.

Laili and Nashir [2021] surveyed Indonesian students who reported that flexibility was the outstanding factor that supported remote learning. As for the factors that discouraged students, they found that unstable signals, lack of motivation in students to attend online classes, no meaningful engagement in remote learning activities and high cost of the internet were some of the factors that discouraged students during remote learning. Mishra, Gupta and Shree [2020] surveyed 130 students in India and reported that there were challenges in conducting practical (for

example lab-based activities). They also argued that issues of equity in access to technology was an issue that discouraged remote teaching and learning. In a comparative study of Nepal and Bangladesh, Shrestha et al. [2021] also presented concurring findings. They mentioned that unstable and slow internet connection, power cuts, lack of access to IT devices and students' inability to focus in online classes were some notable factors that obstructed remote learning. Having reviewed the studies from other developing countries, for example, in Pakistan infrastructural issues and access to technologies due to a low socio-economic background posed a challenge in remote learning for students [Mahmood, 2020]. In discussing the factor that supported remote learning and teaching, Shrestha et al., [2021] argued that students' ability to repurpose existing tools helped them continue remote learning. For example, students and teachers in Nepal repurposed messaging programmes and applications for communication and sharing resources in the absence of learning management systems in the educational institutions. Sobaih et al., [2020] are in agreement with this argument in that in their study of students and teachers in higher education in Egypt found that the use of social media sites helped to continue remote teaching and learning.

In another study of higher education students in the mid-western part of Nepal, Paudel [2021] found that factors such as flexibility, easy access to resources supported remote learning. However students struggled to manage their time and faced social isolation which obstructed their participation in remote learning. Concurring findings were also reported by Gautam and Gautam [2020]. They found that while students liked the flexibility offered by online learning, they suffered from anxiety, which obstructed remote learning.

As can be seen from the brief review above, issues related to technology, connection and slow internet were overarching factors which were reported to have obstructed technology use across different countries. Also, issues such as social isolation and anxiety were reported to have impacted remote learning experiences negatively. On the positive side, the review shows that flexibility, easy access to resources and multiple means to connect to teachers were some of the factors that supported remote learning for students.

### **III. THE TOE FRAMEWORK**

The study draws on the TOE framework to explore different factors that supported or obstructed student participation in remote learning in the context of higher education in Nepal. Proposed in 1990 by Tornatzky and Fleisher, the TOE Framework is used in describing factors that influence the adoption and use of technology. TOE proposes three kinds of contexts: technological context, organisation content and environmental context that influence technology adoption.

While the TOE framework was originally proposed to study technology adoption within an organisation, because it is an "adaptable in nature" [Baker, 2012, p. 237] over time it has been used to explore and understand adoption of technology by teachers and students [Alshaikh et al., 2021, Ergado et al., 2021]. As the shift to remote teaching and learning was abrupt, we believe that different contexts at national, institutional and personal level influenced the effectiveness of remote learning. So, the use of the TOE framework can help in exploring these contexts, their interplay and the influence that they had in student engagement in remote learning.

#### **Technological Context**

Technological context includes all of the technologies that are relevant and that are available in the market [Baker, 2012]. In the context of remote teaching and learning, technological context refers to the online tools (such as Zoom, MS Teams, learning management systems (LMS)) and the devices used to operate them. The availability of these tools, ease of use, and the services they deliver and what these afforded influenced the remote teaching and learning experiences. For example, in the study by Alshaikh et al., [2021] it can be seen more than half the participants were satisfied with the use of the Blackboard LMS as they believed it met their remote learning needs.

## Organisational Context

The organisational context refers to the characteristics and the resources within an organisation and how those factors come to influence innovation [Baker, 2012]. In the context of remote teaching and learning, organisational context includes the factors related to the colleges/universities such as the policies on remote teaching and learning, attendance, examination, assessments, online class schedules, choice of the tools for the delivery of teaching and learning, the kind of resources made available to students and teachers, support provided to teachers and students and their overall facilitation to ensure effectiveness in teaching and learning. For example, in the study by Alshaiikh et al., [2021], a majority of their students had challenges and were concerned when submitting their online exam in the Blackboard, which was the tool that the universities used to conduct online examinations. This finding suggests that the organisational choices can negatively (or positively) influence the remote learning experiences of students.

## Environmental Context

The environmental context constitutes the structure of the broader institute, regulatory environment, technology service providers and stakeholders [Baker, 2012]. In the context of remote teaching and learning, environmental context refers to the policies and directives at the national level by the ministry of education or department of education, the technological infrastructures (such as broadband strength of the country), technology network by the internet providers, and electricity supply. For example, the ministries of education from different countries published directives and instructions, provided supporting resources and facilities to facilitate remote teaching and learning, and such factors were deemed to have facilitated remote teaching and learning [World Bank, 2020].

## IV. RESEARCH DESIGN

After exploring major factors that have contributed to support or inhibit remote teaching for teachers during the COVID-19 pandemic, this study is set out to investigate the impact on student learning. For the country where the majority of teaching and learning takes place in physical space and limited resources available for both teachers and students, the pandemic posed an unprecedented challenge. However, the previous study and other similar studies [Shrestha et al., 2021; Gautam and Gautam, 2021] showed that the most teachers in the country positively responded to the challenge by learning the new technology despite several hindrances such as lack of training, policies, and inadequate infrastructure. In order to understand the impact of remote teaching and learning on students, a mixed method (combination of both qualitative and quantitative data) is used to collect data from higher education students who took part in remote learning during the recent COVID-19 pandemic. Following Creswell's [1999] guidelines of mixed method, data collected from a qualitative method (focus group discussions (FGDs)) is combined with surveys to triangulate and blend the results.

The recruitment of participants for FGDs started from our own network. We contacted some of the students who were studying in higher education during the pandemic, they were briefed about the study and were requested to take part in focus group discussions. We also requested them to extend our invitations to other students who would be interested to take part in this discussion. Three different focus groups with 4 to 8 participants in each were conducted. Two of FGDs had students from different disciplines (faculties), both levels of degrees (undergraduate and postgraduate) from different universities and campuses, discussing in the focus group but the other one was organised with a homogenous group of students undertaking MPhil (Master's of Philosophy). The list of participants in three separate focus group discussions are presented in Table 1. The participants have been assigned pseudonyms (Student #) to anonymise and protect their identity.

Table 1. List of Focus Group Participants

S No	Participants	Level of Degree	Discipline/Faculty
<b>Focus Group 1</b>			
1	Student S1	undergraduate	Journalism
2	Student S2	undergraduate	Engineering
3	Student S3	undergraduate	Medicine
4	Student S4	postgraduate	Business (MBA)
5	Student S5	postgraduate	Psychology (Counseling)
6	Student S6	postgraduate	Business (MBA)
7	Student S7	undergraduate	Information Technology
8	Student S8	undergraduate	Engineering
<b>Focus Group 2</b>			
1	Student S9	postgraduate	International Development
2	Student S10	undergraduate	Business (Management)
3	Student S11	undergraduate	Engineering
4	Student S12	undergraduate	Engineering
<b>Focus Group 3</b>			
1	Student S13	postgraduate	MPhil
2	Student S14	postgraduate	MPhil
3	Student S15	postgraduate	MPhil
4	Student S16	postgraduate	MPhil
5	Student S17	postgraduate	MPhil

All three authors analysed the FGD data and discussed the outcome. The qualitative data generated from three different discussions reached the saturation point. Themes generated from FGDs are clustered together in the technological, organisational and environmental contexts. It was realised that the students discussed several factors related to the personal context as well, which were beyond the remit of the three contexts. Therefore, we decided to introduce a new theme called "personal context" and extended the TOE framework into TOEP.

Based on the data analysis from the FGDs, we developed a survey instrument in MS Word Forms to collect quantitative data from students. Using five Likert scales ranging from 'strongly agree' to 'strongly disagree', the survey included items on the TOEP framework. The survey was distributed

to students who were studying either Bachelor or Master's degree during the pandemic. The collection of survey data is still progressing. At the moment, there are 65 responses and the results are discussed below to triangulate the data from FGDs. Thus, this study presents the blended results from both qualitative and quantitative methods to understand the impacts from remote learning on students in higher education in Nepal.

## V. RESULTS

From FGDs with students from different universities and colleges in Nepal, several themes about remote learning were generated. Broadly, those themes were categorised into four contexts, following the TOEP framework. The three contexts are drawn from the popular theoretical framework of the study, viz. TOE framework (technological, organisational, environmental contexts). The fourth is labelled as the personal contexts. The analysis of the qualitative data suggested that there were factors such as students' socio-economic status, their access to personal devices, home environment, and their technological literacy which were beyond the scope of the three other contexts. Quantitative data from survey participants is used to support and validate the information generated from FGDs.

### Technological Context

There were not many positive aspects of remote learning from technological aspects for students. The findings make it evident that while students found the tools used in their remote learning easy to operate (agreed by 77%) as shown in Table 2 below, some factors related to the technological context constrained their remote learning.

One of the most prevalent technological issues discussed by the students is related to unstable Internet connection during the remote class. This caused intermittent connectivity issues during the class and was reported by many students during the focus group discussions. A few students who went to their villages in the remote areas due to lockdown, had even worse experiences as neither WiFi nor cellular (mobile) data plan was available. A student, S7 said "*There is no connection at all from [my village]*". Likewise S17 stated "*...while I purchased a good internet plan, my internet connection failed miserably every time I tried to attend classes on MS Teams or Zoom.*" Several other students concurred with their counterpart when arguing that the unstable internet connection impacted their participation in remote learning. This is also experienced by the majority of the survey participants (74%) who faced some level of technical difficulties during their remote learning, caused by network disconnections and access to tools.

On the contrary to the focus group where students discussed the poor connectivity widely, the survey result showed internet connection was not a major issue as less than 50% faced the problem and about 28% reported that stable connection was available for them. This could have been due to the fact that many students mentioned in the survey that they used cellular data for remote learning. Cellular data provided fast and stable connectivity to students in colleges and the universities [Paudel, 2020]. However, some students were unable to afford the data easily due to their socio-economic status, which we discuss in the personal context.

The focus group discussion data mostly corroborate with the quantitative survey data, as shown in Table 2 below.

Table 2. Survey results for Technological context

Questions	Agreed	Neutral	Disagreed
Tools used for remote learning [e.g. Zoom, MS Teams, Google Meet etc.] were easy to use.	77%	18%	5%
During the remote learning, stable internet connection was available.	28%	26%	46%

During the remote learning, I have mostly used a mobile data plan to attend my classes and to participate in learning activities.	54%	23%	23%
During the remote learning, I have had many technical problems [e.g. network disconnection, access to IT tools, misconfigurations, etc.)	74%	23%	3%

### Organisational Context

Student participants discussed several positive and negative experiences that were related to organisational context during the remote learning. Students reported that they had access to more learning resources during remote learning, made available by relevant teachers in their institutions. Some also emphasised that the remote learning enabled their teacher to organise guest lecturers from overseas, whereas it was limited to only local guest lecturers in the past. Students felt that they could interact with the experts in the field from different countries which they believed helped them to build their knowledge. Student S4 said, "...we are also able to find other [educational] resources online easily. Now, we are able to connect with people abroad so easily too." Before the pandemic, these skills were not necessary and students were not aware of their own such capabilities. This view was shared by several participants, S1, S8, S9 and S15.

Also, teachers recorded their lessons and made it available to them online. This was a new practice for most students as face-to-face classes were never recorded and made available to students. This finding corroborates with the survey results as 63% participants agreed that they could revise contents online and 68% mentioned that they had additional resources available.

Some students also reported during the focus group discussion that their college/university helped them in buying mobile data packages so they could attend classes and access resources, in particular, student S3 said, "...[college] provided data packages up to 18 GB..." The colleges and universities facilitated students in buying data packages because they were made available through the colleges by the vendor [Paudel, 2020].

During the remote learning, students felt that the due dates and other information about their subject was clearly communicated. A student S2 said "*Due dates for assignments are much clearer now...*". Likewise Student S8 mentioned "*in the past, we did not know who the TA (teaching assistant) was, or we only contacted TA for assignment questions, but now, we know who the person is and we interact every week about the course material online.*"

However, not all students concurred with the positive factors discussed by their counterparts as some of them were discouraged because their college did not provide information on time. One student S1 shared her experience, "*...older teachers are not technologically competent, one of them actually delivered their lecture for about half an hour on mute. We tried to notify him by sending a message but he did not know how to check the message while presenting...*" Therefore, the students believed that the colleges should have provided necessary training and support to those teachers to improve the quality of remote teaching and learning. In some cases, according to the students only minimal technological support and training were provided from their colleges. However, the survey results contradicts this view although the majority of students believed that their teachers had the skills to deliver remote learning. Only a small percentage, i.e. 17% expressed the similar view as the participants of focus groups.

Table 3. Survey results for Organisational context

Questions	Agreed	Neutral	Disagreed
During the remote learning, the recorded videos of lessons or video tutorials by teachers helped	63%	34%	3%



me to revise the content			
During the remote learning, there was more exposure for learning from different resources (guest speakers, video watching, etc.).	68%	26%	6%
During the remote learning, most of my teachers had the required technical skills for online teaching.	52%	31%	17%
Remote learning has brought changes to the assessment processes and practices (e.g. open book exam, online test, take home exams, etc.) in my college/university.	58%	34%	8%
Remote teaching and learning helped me to access more learning resources with ease (e.g. video, documents, course materials).	77%	18%	5%
During the remote learning, I have had difficulties in understanding practical subjects (e.g. numerical subjects, laboratory, networking, clinical).	68%	29%	3%

Students in both focus group and survey indicated that the remote delivery of practical and numerical subjects was not effective. As can be seen in Table 3 above more than 68% of students agreed / strongly agreed to the statement that they had challenges in understanding practical subjects. For some disciplines such as health, the lack of human interaction with patients made it difficult to implement and practice the content. Student S3 stated, *"it is difficult to get motivated as there is no human (patient) interaction, we don't know a patient's condition without interacting with them..."*

Moreover, institutions had to make sudden moves and make changes to their assessment processes and practices. While some universities had difficulty in making a commitment about exam policies, and took longer time to make a decision initially, as evident in the survey data, assessment processes and practices have changed positively.

### Environmental Context

As discussed earlier, environmental contexts include factors associated with the national infrastructure of electricity and the internet. In Nepal, one of the most impactful environmental factors which negatively impacted remote learning for students was power cut (load-shedding) due to insufficient or sub-standard electrical infrastructure. Several students were affected by the intermittent power supply, which affected their attendance and participation in lectures, workshops and tutorials. A significant number of survey participants (34%) also expressed that their remote learning sessions were interrupted by load shedding.

Table 4. Survey results for Environmental context

Questions	Agreed	Neutral	Disagreed
During the remote learning, uninterrupted electricity was available	43%	23%	34%
During the pandemic, government initiatives on	35%	22%	43%

free or subsidised mobile data packages for online learning helped me to attend my classes.			
During the pandemic, government regulations (online education policies, operation information and directives) around remote learning and teaching were helpful.	54%	28%	18%

On the positive side, students felt that the government regulations and directives on remote teaching and learning were helpful. Some students also recognised and appreciated the fact that the government initiated the discussion and provided directives for subsidised cellular data plans which supported students' engagement in remote learning. However, as can be seen from the table above. There is a mixed feeling by the survey participants about the government providing subsidised mobile data packages for students during the pandemic lock-down.

### Personal Context

During the focus group discussions, students expressed their mixed feelings (both positive and negative) about remote learning during the pandemic, while the majority of them believed that remote learning helped them to continue their study. In discussing the factors that they believed helped them in remote learning, they argued that they were able to save time as they did not need to commute to the university to attend the class, which was the standard practice before the pandemic. Some students S1, S8 and S12 shared the similar view and one of them expressed that “...[we] were happy not to be in the traffic jam”.

Students also enjoyed the flexibility afforded by the online teaching and learning. For example, working students enjoyed the flexibility of being able to login to their classes from anywhere. This could have been the reason why 42% of the participants of the survey agreed that their experience of remote learning is better than face-to-face classes prior to the pandemic. Consequently, 52% of the participants responded in the survey that they were able to attend more remote classes in comparison to the physical classes.

Some of them noted that remote learning taught them a lot of technical skills from using new tools in learning and research. This claim is also corroborated with the survey data which shows 75% were confident that they learnt new skills due to the remote learning, as shown in Table 5. The remote learning revealed these self-efficacies and provided more opportunities to them. Aligning with this statement, one student S2 pointed out, “...during the online learning, it was very easy to make notes as I learnt to take screenshots of lecture slides, which was not possible in face-to-face classes...”.

Concurrently, students also mentioned that they have lost some vital experiences they were having in the physical classes. For example, some students said that remote lessons were not that effective. Facial expressions and body language were absent from teachers during the remote classes and they had minimal interactions, which they believed impacted learning negatively. This sentiment was shared by several FGD participants, S5, S8, S10, S12 and S16.

There are other factors which are of personal nature that are associated with remote learning are captured in survey data. For example, a significant number of students (78%) had access to their devices to attend the class regularly. In contrast, students with low socio-economic backgrounds had financial burden as they were required to purchase personal devices (mobile and laptops) and data plan to be able to attend remote classes. For instance Student S7 mentioned, “Roughly around 45 GB of data plan per month is not sufficient during the remote learning period”. As the pandemic had already caused the loss of income (and there was no government financial support to those who lost income) purchasing a 45 GB data plan to attend remote learning was not financially feasible for students.

Table 5. Survey results for Personal context

Questions	Agreed	Neutral	Disagreed
During the pandemic, remote learning helped me to continue my study	80%	17%	3%
My remote learning experience during the pandemic was better than face-to-face mode.	42%	28%	31%
During the remote learning, I have had the opportunity to learn new skills (e.g. research skills, video making skills, information search etc.).	75%	18%	6%
During the remote learning, I was able to attend my classes more often than the time when classes were face-to-face.	52%	26%	22%
During the remote learning, I have had access to IT devices (e.g. laptop, mobile devices) to attend my classes regularly.	78%	15%	6%
During the remote learning, I felt there were many distractions (e.g. noises at home, family structure, study environment) during the online lessons.	74%	20%	6%

Students' individual circumstances at home was found to have impacted students' remote learning during the pandemic. Not all students had the luxury of a separate room or proper desk set up to attend class with cameras on or be able to concentrate in the activities. A few students (S6, S8 and S15) mentioned during the focus group that they had to share the WiFi with the rest of their siblings or other people in the house who also studied remotely which slowed the internet speed. Most students mentioned that they shared their room with others, they had noise in the background. 74% of the survey participants concurred with this experience, suggesting that students' home environment can impact remote learning experience.

## VI. DISCUSSION

Widely discussed findings in the paper is the lack of technological infrastructure in developing countries, including Nepal. Previous papers/research have suggested lack of devices and ICT infrastructures obstructed the adoption of technology in higher education [Laudari & Maher, 2019]. On the contrary, the findings of this paper suggests that there were no issues of access in general as all students who participated in the survey or the focus group and their peers had personal devices to attend classes. This could have been due to the fact that many students, as they indicated in the open ended question in the survey, used their mobile phones and personal laptops to attend online class. This suggests that going forward in the future, if online teaching and learning activities were to be continued, bring your own (BYO) policies could be introduced. To address the issue of equity and access in online learning [Mishra, Gupta and Shree, 2020], universities/colleges could loan devices to those who are not able to afford a personal device.

A finding that concurs with those of previous studies from Nepal [Shrestha et al., 2021; Paudel, 2021] and other studies in the developing countries [Bączek et al., 2021; Rashid & Yadav, 2021; Mahmood, 2020] is that students experienced connection issues. However, unlike in the past, after the pandemic, government and organisational initiatives were made to provide stable connection through packaged cellular data packages at an affordable rate. While some students mentioned that the data plan was expensive for them due to their socio-economic status, the subsidised data

package provided a stable and fast connection to attend the class. As Subedi [2020] mentioned, some of the packages were customised for attending Zoom/MS Teams classes, which suggests that such initiatives from the government and technology service providers (environmental context) supported remote learning. Authorities in developing countries can introduce such initiatives to support online learning in the future.

As students mentioned that intermittent power supply was one of the environmental contexts that impacted their engagement in remote learning, institutions should consider how they can support to ensure maximum participation and engagement in online learning and assessment activities. One way they can support students is by providing space and facilities at the university or the college so they can attend and participate in the remote learning activities from those venues if required. This would also help students address the issues caused by their personal circumstances.

Also important is the fact that teachers and students need to be supported to enhance their technological competencies and online learning pedagogies. While the institutions did not have time and resources when the abrupt shift was made [Sahu, 2020], institutions and the authorities take the onus of upskilling teachers and providing necessary training to students when new technologies are introduced and they are expected to use it [Laudari & Maher, 2019]. This is important because as Sahu [2020] argued, students in this study shared that not all of their teachers were equipped to teach in online mode.

As students and teachers have both experienced online teaching and learning, and it is evident that teachers can engage students in new ways and students' learning can happen outside the classroom [Bowen, 2012], going forward in the future, teaching and learning in higher education could be blended. This is important because as mentioned by students in this project and other studies [Alshaikh et al., 2021; Mican & Cocorada 2021], online offering would help them save time spent on traffic jam, save money from not having to commute and provide flexibility in how and when to access the content. Also, it is important to continue the good practices that supported student learning during remote teaching. For instance, students enjoyed access to recorded lectures from their teachers, guest lectures from abroad who shared current industry update, other kinds of online resources, change in the assessment practices (which was predominantly proctored test before the pandemic), and repurposing the social media sites for teaching and learning activities [Shrestha et al., 2021; Sobaih et al., 2020].

## VII. CONCLUSION

This study explored what worked and did not work during remote learning for higher education students in Nepal. The study contributes to the remote teaching and learning discourse by exploring and extending factors in the technological, organisational, environmental and personal context that impact students' participation in remote learning.

From the theoretical perspective, this study has made it evident that TOE is an adaptable framework [Baker, 2012], and its key construct (viz. the three contexts) can be used to explore and understand the use and adoption of remote learning via technology. However, as this study has unraveled, it cannot capture personal context when it impacts the activity concerned (e.g. technology use). So, it is important to extend it as TOEP by adding personal context and the factors that influence students' (or teacher) decision to use (or not to use) technology.

The study made some pedagogical suggestions in the discussion section so the new knowledge that students can be engaged in new ways of using the available tools is not lost when teaching and learning returns to its traditional face-to-face mode. Keeping a certain portion of the teaching activities could be kept online to offer students flexibility. Also important is to continue the good practices that have been trialled and implemented.

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