Research Article

Teachers' Experiences on Virtual Class during COVID-19 Crisis: Challenges and its Coping measures

Gem Prasad Gurung (PhD), Central Department of Education, Tribhuvan University, Kirtipur
Rajan Ghimire, Adikavi Bhanubhakta Campus, Damauli

Abstract

This study explores the experiences of science teachers who faced the COVID-19 crisis which was accidentally spread in Nepal as well as in the world. In response to the coronavirus crisis followed a series of lockdowns to save human lives and the Government decided to close all the educational institutions. After some months, the Government or University introduced a notice to resume (conduct) the class school and university classes. However, the study found without preparation of online learning and quality technology, many teachers and students experienced a series of challenges to conduct the online classes. The research objectives were adopted to find out the challenges that teachers faced in online classes during the COVID-19 crisis, to explore the emergency response in education during the pandemic, and to find out coping measures for future emergencies. As the nature of objectives, qualitative method was followed and interview guidelines were used for in-depth interviews with teachers for necessary data collection. The literature review consists of the preparation of digital literacy and adequate quality of digital connectivity. The study also attempts that the ongoing COVID-19 pandemic has not only created a problem but also revolutionized the educational system and forced fundamental changes in the teaching and learning process. The contributions of this study make awareness to stay in a ready position i.e., management of connectivity, tools, and platforms for online education in any crisis.

Keywords: Virtual class, Science Teachers, COVID-19 pandemic, Experiences, Challenges, Teaching learning, Opportunities

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Introduction

The Novel coronavirus disease 2019 (COVID-19) spread gradually day by day in the globe. The process disrupted every aspect of human life, including education. All human activities such as transportation, industries, and educational institutions were closed in response to control the alarming spread of Coronavirus (Dawadi, Giri & Simkhada, 2020). The educational concern activities like examinations, workshops, conferences, sports, and other activities were either postponed or cancelled (Sahu, 2020).

The infectious coronavirus emerged on the 31st of December 2019 in Wuhan City China and spread rapidly in other parts of China. Within a few weeks, the deadly coronavirus was spread to several other countries. Then very soon it became a global threat. The World Health Organization (WHO) declared the coronavirus epidemic is a pandemic (Chahrour et al., 2020). To prevent the Coronavirus pandemic different countries followed lockdowns and that interrupted everyday aspects of human life globally. Hence people encountered numerous disruptions and challenges in the world. Many people were infected and killed by that pandemic. United Nations (2020) reported that the COVID-19 pandemic has brought the

largest disruption and affected nearly 1.6 billion learners in over 190 countries in case low and lower-middle-income countries closed schools and other learning spaces and have affected up to 99 percent of learners.

Due to this pandemic crisis, Nepal was also affected badly. Hence Government of Nepal decided to enforce a countrywide lockdown since March 24, 2020, to restrict the spread of the coronavirus in the country. Since then, the lockdown has been extended long time (Sharma, et al., 2020). Then deleteriously affected several sectors including education. After long days Government of Nepal as well as educational institutions circulated to conduct online medium. So Tribhuvan University also started the classes in virtual mode. However, became many problems for teachers and students because it was a new pedagogy for them. There was a lack of preparedness in pedagogy and tools of quality connectivity.

Hence got a huge challenge to run the schools as well as in university classes. So, the researchers are interested in studying the teachers' experiences in online classes during the COVID-19 crisis and the challenges and opportunities focusing on the following objectives;

- To find out the challenges that teachers faced in online classes during the COVID-19 crisis
- To explore the emergency response in education during the COVID pandemic
- To find out coping measures for future emergencies.

Delimitations of the Study

The study was based on firsthand information collected through open-ended in-depth interviews. The respondents of the study are the teachers who teach at the B.Ed science department at Tribhuwan University. Among all the science teachers, two science teachers from one constituent campus of Kathmandu Valley and two science teachers from community campus of Tanahu, Damauli were selected as purposive sampling methods. The study does not reflect the experiences of other stakeholders such as campus administration, experts, campus chiefs and students.

Theoretical and Literature Review

Theoretical vision is an advocacy perspective how the research questions are asked, data are collected and analyzed them (Creswell, cited in Taylor & Treacy, 2012). Hence the study was conducted for the education for emergency period of COVID-19 pandemic. The situation was accidently happened in the countries and enforced to lockdown and closed all the human activities as well as educational institutions in the response of corona virus infection. After few months without any preparation, contact classes were run in virtual mode as emergency education.

The concept of emergency education came to the fore in the 1990s. Since the end of Cold War, former Soviet Union countries like Liberia, Seira Leones etc. have been occurred an organized violence in the form of war and increased crisis. Education in crisis situations has become a major concern for the international community, regarding Education for All (EFA) (Kagawa, 2005). The violence of the countries was civil strife, armed conflict and political operation but the crisis in the world during 2019s was covid violence and implication of emergency education including in Nepal.

Second theory was attracted the socio-cultural and constructivism theory of Vigotskey (Akpan, et al., 2020). The theory is related with virtual learning environment that was used in digital cloud approach in emergency period of corona virus pandemic 2019. At the period of lockdown, government and Universities were ordered to provide online education instead of contact mode classroom pedagogy. The online (pedagogy) helps learners, increase socialize with others and develop construction of knowledge. Regarding this view Vigotskey has theorized that learners can learn effectively in a social environment and create meaning using discussion with others (Akpan, et al., 2020). The theorist states more, constructivist believe the knowledge of students that construct by themselves based on the experiences gathered from the environment.

Same as social constructivist views knowledge that the students acquired in collaboration with peers, teachers and their community.

Empirical Review

Impact of the COVID-19 pandemic on human development

COVID-19 occurred as an infectious disease caused by a newly discovered corona virus. This virus was first identified in Wuhan, China in December 2019. Formerly, this disease was referred to as '2019 novel corona virus' or '2019 ncov'. The outbreak of this virus has disrupted human's different developmental processes.

The global spread of Corona virus disease 2019 (COVID-19) was triggering a range of public health responses. Schools and University closures are some of the highest-profile social (physical) distancing measures used to slow the spread of this infectious disease. Many countries in Asia and Europe have instituted a nationwide school closure, while some US school districts and states have also closed schools. These closers prevented contact among students and reduced cases (Subedi, 2020).

According to the Nepal Telecommunication Authority (NTA), a total of 821249 subscribers were using the internet in Nepal in 2019. The country has a population of 29086128 as of 2020, based on Worldometer which depicts that not all students have access to high-speed internet (Subedi, et al., 2020, p. 70). In Nepal, the practice of online classes was new to almost all teachers & students of many colleges. Also, there is no good access to electricity and internet service in most parts of the country. So, this study was carried out to assess the problems faced by students and teachers in Nepal during online classes.

Disruption of Education and Paradigm Shift in Teaching Pedagogy

The pandemic spread of the Novel Coronavirus (COVID-19) has significantly disrupted every aspect of human life such as transportation, construction, including education. The dangerous spread of the virus caused destruction in the educational system forcing educational institutions to shut down. According to a UNESCO report, 1.6 million children across 191 countries have been severely impacted by the temporary closure of educational institutions (Dawadi, Giri & Simkhada, 2020). Regarding this Di Pietro et al. (2020) stated that;

> Most educational institutions around the world canceled in-person instruction and moved to remote learning and teaching in March 2020 in an attempt to contain the spread of COVID-19. Parts of the (or the whole) formal education system will not re-open this academic year in some countries, whereas in others (parts of) the formal education system has re-opened. (p. 4)

The outbreak of COVID-19 has compelled lockdown in every sector including education. The institutions closed with the ceasing of educational activities and created many challenges for the stakeholders. So the various activities like admission, examinations, and entrance tests, competitive examinations conducted by various boards/schools/colleges/universities are postponed (Jena, 2020). The pandemic affected the conventional (traditional) education system in schools and universities seriously. There was a way of lockdown only without alternatives of education for the corona virus response. The government of Nepal had strictly enforced restrictions on public physical movement. Likewise, educational institutions such as campuses, and schools were urged not to conduct any physical classes. As a result, 60 constituent campuses and 1146 affiliated campuses, 292 undergraduate and postgraduate programs were affected badly (Gurung, 2021).

As a response to such an event, countries planned to introduce an element of distance learning to facilitate "coping" once the crisis hits and minimize negative impacts. It was to adjust for the academic calendar prioritizing to meet the academic year. Hence Government and institutions considered for options available and e-pedagogy needs to be considered as an alternative and innovative learning in education (Dawadi, Giri, & Simkhada, 2020). In order to minimize pedagogical problems and follow e-pedagogy

there occurred a dramatic change of teaching-learning activities in the education.

Teaching and Learning Efforts in the COVID-19 Crisis

In order to mitigate the impact, educational institutions have responded to the closure differently in different contexts with a range of options for students, teachers, administrators and parents, depending on the resources, both materials and human, available to them. Most of the options have to incorporate innovative technologies (e.g., digital & mobile technologies combined with traditional technologies (such as radio and TV) in order to provide at least one form of educational continuity (Dawadi, Giri & Simkhada, 2020).

Most countries have opted to ensure educational continuity through online resources as well as the various communication tools available and provided ideal platforms to bring schools and learning processes to students during the COVID-19 lockdown (UNESCO, 2020). Likewise, Bablar and Gupta (2021), stated that universities across the globe adopted various approaches to combat the ripple effects of the corona virus crisis. Most countries All six WHO regions also supported the sudden transition in critical modes of education. The few countries which already had infrastructure for online delivery of platforms, improved and encouraged its uses. Other countries took time to manage and launch platforms for teaching and learning in their institutions. In the South-East Asian region, which mostly comprises developing countries, apart from new lunches, the already existing online learning platforms were also significantly improved. However various modes of education are used by institutions across the world and provided a holistic understanding of different measures taken by governments and universities to endure crippling crises.

Methods and Methodology

According to the objectives, the research design was adopted a qualitative approach. Research tools were constructed as interview protocols and four informants were selected purposively. Those informants can represent the issue of central information of the purpose of the study (Patton, 2002). The reason for selecting the participants they have many/more experiences in B.Ed science teaching and faced challenges in online classes. Some interviews were taken through direct contact and some were taken through virtual Zoom meetings. The study areas were teaching learning for B.Ed. science (chemistry, physics and biology) through ICT tools like photos, videos, animation of subject matters, and simulation of practical session for related subjects in COVID-19 crisis. Also, important issues were access of efficient digital tools (internet), regular electricity, laptop, computer, and smartphone with each participant to conduct effective online classes. Psychological hazards in stakeholders' family during COVID-19 pandemic also included during data collection and analysis. Regarding this, researchers collected information through in-depth interviews.

The follow-up questions were asked during the interview and by telephone. As Creswell (2012) suggested the collected information was transcribed, coded, decoded, analyzed interpreted, and meaning-making in thematic design. Analysis in this study followed the qualitative analytical framework as Creswell (2014) advised to generate an in-depth understanding of the challenge and coping in B.Ed science class in virtual mode during the possible emergencies.

Findings and Discussion

In this section, researchers are presented the findings and discussion in an integrated manner based on the research objectives. The data obtained from interviews are organized thematically, and participants' verbatim responses are used to illustrate key issues. The findings are triangulated with relevant literature and theories to construct contextually grounded and meaningful interpretations.

Challenges of Science Teachers on Virtual Teaching During the COVID-19 Crisis

When the Corona virus suddenly spread in different countries, it affected negatively human activities as well as in the education sector. To respond to COVID-19, security measures enforced lockdown and closure of

educational institutions. The untimely closure of schools/colleges was a good supportive measure to contain the spread of the diseases, but it also had some adverse consequences on millions of students globally who were faced with multiple challenges in their education. To cope the teaching learning, it was necessary to run classes through virtual mode without any preparedness in the educational stakeholders. Without preparedness for online teaching pedagogy, devices, and connectivity the teaching-learning process was not so effective, though government/institutions implemented online classes. An informant also informed of this problem;

> *Online classes couldn't run at once when the campus was closed. When the campus informed us after one month to run online classes, we contacted students to join online classes. However, due to a lack of internet connection in the rural village, only about 50% of students joined the online class. Also, there were not any effective platforms. Some days I taught by creating science students' group calling meeting to resolve emergency classes. I felt it was not so effective when using the Zoom application then.*

Likewise, the common voice of the science teachers found, the teaching-learning activities during the first phase were difficult and in the second phase of lockdown, T.U managed the MS Team and created all teacher's and students' IDs. However, the platform application has many problems. Students used to comment that due to the low power of the internet, they could not join the class. Although they tried to conduct online classes it was not effective. Kagawa (2005) stated on this view, it was the situation to resolve educational problem in emergency period.

With regards to the report, Mishra, Gupta, and Shree (2020) explored that, the smooth running of online classes should be delivered with the exact platform and 4G internet connectivity or broadband services and uninterrupted power supply. That can deliver a two-way interaction between teacher and learner.

Complication in Science Teaching Learning Through Online Mode

Teaching science is a practical-oriented subject. So, its theoretical class and practical class should be performed hand in hand with experience (Shana & Abulibdeh, 2020). Hence science subject is different than other subjects. Therefore, the learning activities would not be completed only through theory class.

On the query of practical activities through online base during the COVID period, science teachers informed us that they have not conducted any practical classes through virtual mode due to a lack of knowledge and skills to conduct it by online mode. Practical work is learning by doing pedagogy. Students should operate the instruments and chemicals in the laboratory themselves. Additionally, teachers said, that to conduct practical classes online it is necessary of particular software and training for teachers and students. For this knowledge and skills institutions/university has not provided necessary training to science teachers. Regarding this view, Laudari, Pradhan and Lama (2021) also argued that many academics in Nepalese universities lacked the skills to use information technology (IT) and found uncomfortable and ineffective virtual mode teaching.

In the study of that issue Bhukuvhani, et al., (2012) stated that the problems can be resolved in different ways such as interactive CDs i.e., video clips on science experiments, virtual laboratories, home experiments, or self-built experimental projects, simulation, etc. To manage that kind of environment, science teacher should be strengthened in their professional development for virtual pedagogy. Now it imposed to remember professional development theory (Sims, et al., 2025) based on combination of developing teachers' insights, motivation, and teaching pedagogy.

Also, it is necessary of good internet, electricity, and reasonable tools such as a smart phone or laptop/computer. Additionally, a science teacher added that their practical work was conducted before the closure of the campus, so did not face any problems of practical classes within lock down. Only

science theory classes have run during the closure of the pandemic.

Nazir and Khan (2021) also claim that teachers and students should have access to equipment, good internet connectivity, and uninterrupted electricity. On the other hand, Subedi, et al., (2020) argued on the issue that, in Southeast Asia like in many other developing regions, a large segment of the population does not have access to the internet and electronic devices. The infrastructural gap can be seen through several circumstances, including the discrepancy of internet speeds in different regions. People in the city centers often enjoy significantly faster internet compared to those living in less developed areas.

Emergency Response in Education During COVID-19 Crisis

The COVID-19 pandemic has also had a severe impact on school/university education as countries shut their premises and countries shut their borders in response to lockdown measures. Although higher education institutions were quick to replace face-to-face classes with online learning, these closures affected learning and examinations as well as the safety and legal status of international students in their host country. To remain relevant, universities need to reinvent their learning environments so that digitalization expands and complements student-teacher and other relationships (Schleicher, 2020). In response to educational problems, an informant opined that;

> *During the lockdown campuses and the T.U central office conducted online training for virtual mode teaching and learning was only a general concept of how to use different platforms as well as MS team but was not special knowledge for science class and laboratory activities. Also, Central Library provided some training to acquire library resources through online mediums.*

Regarding this report, Gurung (2021) mentioned that the training provided to stakeholders by TU was unequal (unsatisfactory). The central office of TU was asked to campuses to organize online class training but most of the teachers and students had reached their villages at sudden lockdown. Likewise, Sapkota (cited in Gurung, 2021) claimed that TU provided training to operating MS Team 365 but many teachers and students still lack appropriate and adequate knowledge and skills to conduct a virtual mode of teaching-learning. For the financial issue in that emergency period of COVID lockdown the common voice of informants was that;

> *In the critical period, institutions did not provide any loans for financial support to purchase mobile, laptop, computer, and smart mobile. Likewise, it was necessary money pay for connective (internet) or an internet package. There were not any effective sources of electric power in the village to run online classes according to the given schedule. Nonetheless, if infrastructure and skills were sufficient, online pedagogy covers constructivist learning in science class.*

As the above report, teachers have an economic crisis during the pandemic period. Other family members' jobs also stopped due to the COVID response lockdown hence it became an economic crisis in the family. The situation affected online teaching activities as well as all the household phenomena. This forces us to remember Marx's theory (Ritzer, 2000) that "money determines everything, all other sectors of society-politics, religion, idea system, and so forth" (271). At this time, they have expected some loan/advance to solve their economic problem. As the teachers reported during the crisis period some stakeholders (teachers) have not essential tools to conduct online classes. Regarding this Hayashi, et al., (2020) reported that it should help providing essential tools like mobile, laptops, etc., and uninterrupted, affordable high-speed internet access for educational stakeholders to conduct virtual class in remote areas. This kind of project promotes equal access to conduct distance learning in schools and universities. Online pedagogy not only resolve the crisis of education but also covers constructivist learning environment in the education (Akpan, et al., 2020). Authors add more learners can learn themselves effectively

as well as in social environment adopting discussion with each other.

Coping Measures for Science Learning at Probable Emergencies

For coping measures in emergency periods informants viewed that, first of all, government/universities must perform well preparation to cope with the educational problems for the probable crisis. The educational stakeholders (teachers and students) must be well equipped with the essential tools i.e., laptops, mobile, tablets, etc. Also, governments should manage the internet with good capacity and electricity power sources even in the villages. It means teachers and learners should not be out of sources. Secondly, it should be well-trained to manipulate essential platforms for both teachers and students to participate in the teaching and learning process under ICT (information communication technology). In addition, science teachers must be provided a particular software and well-trained to teach derivations, numerical, and chemical equations of science. Also, the normal classes should be conducted in blending mode which can make it easy for virtual classes of critical moment.

In this regard, Mackey et al., (2012) reported that a blended mode of learning can provide academic persistence in times of critical conditions like natural disasters, civil emergencies, pandemics, etc. This also helps to rapid course design to mitigate disruptive circumstances.

On the query of minimizing the problem, the informants' common voice was that, the institution should bring a policy for board examination through an online process without delay instead of waiting on a contact exam system and published results regularly. Then teachers teach and learners learn anyway otherwise both teacher and students will not think it is compulsory to take the virtual classes. For the online exam, it should develop authentic software and should train all related stakeholders. The problem was experienced during the COVID-19 pandemic.

As studied on policy for online education, the Nepal Government has adopted ICT for educational transformation in different periods i.e., 2005 and 2007. Later on, the government documents (MoE, 2009, 2016) informed that the policy implication did not succeed due to a lack of funding by the government (Rana, Greenwood, & Turnbull, 2019). So, it seems that if the policy was practiced since the documentation, the system would be in practice in the educational institutions.

The lockdown period was a fearful moment for transmission of corona virus infection to teachers themselves as well as family. So, it was mental depression and the teaching and learning case was considered secondary. Hence psychological counseling was a major part of that period. An informant commented on this issue;

> *The COVID-19 period not only me, it was frightening for the whole family, children, and myself for the infection of Corona virus. Then it was also affecting teaching learning activities. Likewise, news was broadcasting about increasing the infectious and mortality rates of humans in Nepal as well as in the world. Some teachers and our relatives also were victimized by corona +ve strain. Hence psychological hazards were at an increasing rate. At that moment counseling for anxiety by the institution was not provided.*

According to the above report, institutions did not provide any counseling to stakeholders. Different studies suggest that it is essential to provide psychological, medical, and security counseling is important. Anxiety is a part of the existence of the human being: since all human beings feel anxiety in different degrees in times of crisis, such as the spread of the COVID-19 pandemic. In this situation is effective to link Wolpe and Rachman's fear theory which highlights that fear is any natural stimulus that impacts human life and their phenomena (Rachman, 1977, p. 376). The author adds more, fear (negative stimulus) develops fearful environment with painful or frightening experiences (p. 382).

Hence the mental health of teachers in the university context is very important in times of different degrees in times of crisis as in the case of the COVID pandemic. The health crisis

of the Pandemic threatened the psychological balance of university teachers in Latin America (Hernan, et al., 2020). Responses should be adapted to the diversity of situations in each family and community and their support needs. Maintaining psychological, social, and emotional well-being is a challenge for all members of the education community (UNESCO report, 2020). Hence, in the academic field, problems of anguish, anxiety, and stress have been spread, which result in decreased work performance.

However, in emergencies like pandemics and natural disasters, institutions are a fundamental space for emotional support, monitoring of risks, educational continuity, and social and material support for teachers, students, and their families by psychological counseling by doctors or psychologists by video conference and mass media. Likewise, educational training should be provided to teachers of Kathmandu valley and outside of the valley for ICT tools which can imply different kinds of teaching/learning pedagogy. Teachers can engage the class by discussion, presentation of students' projects, checking their assignment etc.

Conclusion

The research was conducted focusing on Teachers' Experiences on science teaching/learning through online mediums during the COVID-19 crisis. The study also has portrayed challenges of the science learning in virtual classes. The important part is that it explored its coping measures in the coming probable crisis period. As the nature of the study area, it was adopted qualitative research design. Field data were collected with the help of in-depth interview guidelines. The selection of informants was done as the principle of purposive sampling. Coding, decoding, analyzing, and revisiting the informant's process was the saturation of data collection.

The study found that teachers faced huge difficulties in conducting science classes in the COVID-19 crisis because there was not any preparedness such as training, appropriate tools, and connectivity. Moreover, science teachers face more problems than other subject teachers because they do have not the extra knowledge and skills to conduct practical classes as well as teaching equations in chemistry, and derivation/numerical in physics. The economic problem and lack of psychological counseling were also a great problem. As per the study found such kind of hazardous condition may come again and should be well prepared since normal condition. Hence well trained for concerned stakeholders in IT knowledge, science teachers must be provided professional training. Likewise, classes must be run in blending mode also in normal period.

This study is important for the mitigation of education in the crisis by pandemic, climatic, earthquake, social violence etc. It can make awareness to communities, institutions, and stakeholders (teachers, administration, students, etc.) for preparedness to mitigate science educational problems in probable emergencies in the future.

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