



Challenges and Opportunities to Implementing ICTs in education to Manage Learning Crisis due to COVID-19 in Nepal

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Abstract: This qualitative study explored the use of Information, Communication and Technologies (ICTs) perspectives and experiences of government officers, secondary school principals, and schoolteachers to manage learning loss in schools due to the COVID-19 at Nepali secondary schools. A representative sample of two government officers who work in the Ministry of Education, Science and Technology, ten secondary school principals, and 33 secondary school teachers from seven provinces were randomly selected to participate in this study. Their experiences of using ICTs tools were explored through semi-structured interviews and documents analyses. The findings reflect that implementing digital tools in schools is hindered by a range of factors. Contradictory policy, corruption, political influence, lack of funds, lack of resources, lack of trained teachers, teacher's attitude, a lack of connection of technology to assessment and curriculum were major barriers to implementing ICTs tools in the classroom. Findings suggest that the government of Nepal needs to design a contingency action plan and provide sufficient technology devices with Internet access to manage learning loss. In addition to this, it recommends providing teachers with ICTs and Universal Design for Learning (UDL) training.

Keywords: ICTs, e-pedagogy, learning loss, distance teaching, UDL, COVID-19

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Introduction

Information, Communication and Technologies (ICTs) have become a necessary part of everyday life of human beings including education. ICTs have been used in education to assist teaching and learning activities by improving the quality of education. There is no doubt that ICTs can make the teaching and learning content accessible, affordable, and available 24/7 (Thapaliya, 2014).

During the COVID-19 pandemic, various countries have been using a range of measures such as a distance learning or online teaching approach by using ICTs through synchronous and asynchronous modes. Technologically advanced countries use both online and off-line teaching modes. For example, New Zealand has adopted the virtual learning mode, telecasted learning from television, and sent hard pack learning resources to manage learning loss during COVID-19 (Ministry of Education, New Zealand, COVID-19). Online teaching mode signals to features of Universal Design of Learning (UDL).

In response to the COVID-19 outbreak school closure, the government of Nepal, Ministry of Education, Science and Technology (MoEST) endorsed the COVID-19 Education Cluster Contingency Plan and Student Learning Facilitation Directory 2020 through Alternative System. An alternative education system means to facilitate learning from “open” and “distance education” until the school reopens (MoEST, 2020). These documents highlighted three education-specific scenarios to allow identification of the needs and strategies: a) up to mid-July, b) up to September 2020, and c) for the majority or entire duration of the 2020-21 academic year (MoEST, 2020).

Advent to COVID-19, a few research studies conducted to find out how teachers use ICTs in education to leverage and enhance learning in the classroom in the world including the USA, the UK, Europe, Asia, South Asia (see, Drent & Meelissen, 2008; Francom, 2016; Hew & Brush, 2007; Kopcha, 2012; Mcknight et al., 2016; Sipila, 2014; Yarbrow et al., 2016) and including Nepal (see, Laudari, 2019; Koirala et al., 2016). Their findings reported that lack of resources, rhetoric policy, and teachers’ attitude were major barriers to implement ICTs in education. Similarly, several researchers reported that a lack of teacher training in the use of ICTs in digital technology in the classroom was an additional barrier in using ICTs in the classroom (Albugarni & Ahmed, 2015; Cárdenas-Claros & Oyanedel, 2016; Cunningham, 2015; Hamel et al., 2013; Laferrière, Hamel, & Searson, 2013; Lim & Pannen, 2012).

However, there are limited studies conducted to find out the use of ICTs in education in Nepal to manage learning loss due to COVID-19. Dawadi, Giri, and Simkhada explore the impact of COVID-19 on the school education system of Nepal on the basis of secondary sources of data. Their findings reveal that COVID-19 had serious impacts on pupil's learning, social, emotional, and mental well-being (Dawadi et al., 2020). These studies do not focus on the use of ICTs tools in education to manage learning loss during and beyond the COVID-19 in secondary schools in Nepal. Hence, this research unpacks

the government officers, school principals, and teachers' perspectives and experiences of implementing ICTs tools in education by exploring challenges and opportunities to manage the learning crisis during and beyond COVID-19 in Nepal. This research paper begins with an understanding of the policy context (background information of Nepal and ICT education policy), learning loss due to COVID-19, Universal Design for Learning, conceptual framework, methodology, findings, discussion, and conclusion. It recommends some strategies to manage learning loss during and beyond COVID-19 pandemic situation.

Understanding policy context

Nepal is a small landlocked country with a population of approximately 26.4 million spread over an area of 147,181 square kilometers (CBS, 2011). Geographically, Nepal is divided into the Terai, Hill, and Mountain regions which include approximately 50%, 43%, and 7% of the total population respectively. Administratively, Nepal is divided into seven provinces, 77 districts, 460 rural municipalities (*Gaupalikaharu*), six metropolitan cities, 11 sub-metropolitan cities, and 276 municipalities (GoN, 2015). Despite of having a rich culture, history, ethnic diversity, natural beauty, and languages, Nepal is identified as one of the world's twenty poorest nations, (World Bank, 2019) and it continues to be heavily reliant on foreign aid.

Quality universal school education, ICT friendly school, e-learning, e-library, and e-teachers are mentioned in several education policy documents in Nepal (GoN, 2007, 2009, 2013, 2016). The School Sector Development Plan (2016-2023) highlights to set up the infrastructure required for the use of ICTs and give professional development training for teachers on use of ICTs in education. The teacher competency framework mentions that teachers must be confident enough to teach students by using ICT tools (GoN, 2016). In addition to this, the Ministry of Education, Science and Technology (MoEST) endorsed the ICT friendly Smart School Operational Manual in 2018 (2075 B.S.) by establishing seven smart public secondary schools as models in seven provinces (MoEST, 2018).

The government of Nepal enacted the Learning Facilitation Directory 2020 through Alternative System because there is more of a possibility of school closures being extended due to the COVID-19 pandemic (MoEST, 2020). This directory stated that an education cluster needs to coordinate among federal, provincial, and local governments to facilitate the transition response to longer-term response plans. Based on students' access to technology, this directory categorizes students in the following way:

Students who do not have access to technology (online, internet, TV, Radio)

Students who have access to radio, local FM
 Students who have access to television
 Students who have access to computer but no (regular/stable) access to internet
 Students who have access to internet and ICTs
 Students with additional learning needs (MoEST, 2020, p. 3)

The same directory highlights that the education cluster supports dissemination and development of the learning program in response to manage learning loss. Also, the Centre for Education and Human Resource Development (CEHRD) signed off a Memorandum of Understanding (MoU) with the Open Learning Exchange (OLE) Nepal to provide OLE's collection of digital learning content for free and open access to all learners through the CEHRD's education portal on April 23, 2020 (OLE, 2020). Digital learning content for open access to every learner links to the principles of Universal Design for Learning (UDL).

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) contains different strategies, and it involves planning and delivering programs for all learners. It applies to all aspects of education: curriculum, assessment, and pedagogy to classroom and school design (Mitchell & Sunderland, 2020). The UDL is an approach to planning and developing curricula in ways that promote access, participation, and progress in the general education curriculum for all learners (Center for Applied Special Technology [CAST], 2006). The UDL focuses on ways to provide cognitive as well as physical access to the curriculum, assessment, and pedagogy (Mitchell & Sunderland, 2020; Smith, 2020; Thapaliya et al., 2017). National Centre on Universal Design for Learning (2010) invented three principles of UDL. They are:

- Multiple means of representation: While teachers are developing curriculum, they have to provide maximum options for comprehension, language, mathematical expressions and symbols, and perception.
- Multiple means of action and expression: Teachers have to provide options for executive functions, expression and communication, and physical action while developing curriculum.
- Multiple means of engagement: Teachers have to provide options for self-regulations, sustaining effort and persistence, and recruiting interest while delivering curriculum.

COVID-19 and learning loss

A team of medical doctors from Wuhan, a city in China, detected and reported a strange pneumonia with an unknown cause to the Chinese World Health Organization (WHO) Country Office on December 31, 2019. The WHO reported that these infections were due to a new Coronavirus, named it as "Severe Acute Respiratory Coronavirus 2 (SARS-COV-2)" which is a genetic cousin of the Coronavirus of SARS outbreak in 2002 (SARS-COV). Later, it was named COVID-19. The WHO declared the outbreak to be a public health emergency of international concern on January 30, 2020 and labeled it as a global pandemic on March 11, 2020. According to WHO, 28,944,152 cases of COVID-19 have been reported in 216 countries, resulting in 924,580 deaths and 20,812,603 people have recovered from it as of September 12, 2020 in the world. In Nepal, the first COVID-19 case was reported on January 24, 2020. According to the Ministry of Health and Population of Nepal, 53,120 COVID -19 cases have been reported: 37,524 people have recovered, and 336 people died from it as of September 12, 2020.

Globally, schools shut down, cities implemented a lockdown, social distancing measures we have taken, and people self-isolated, restricting the movement of people from one place to another places. They conducted non-essential work from home, as imposed by governments to stop the spread of the virus. As a result, early childhood centers, primary schools, secondary schools, tertiary education provider institutions and universities have closed in the world including Nepal (MoEST, 2020). Several research reports described that the COVID-19 pandemic is causing more than 1.6 billion school age children to be out of school in 216 countries. This situation may increase the risk of permanent drop out for school children from education if it continues for a long period of time (UNESCO, 2020).

In Nepal, the COVID-19 impacted around 8.8 million students: 993,900 pre-primary and early childhood (3-5 years old), 5,165,186 basic education, grade 1 to 8 (5-12 years old) and 1,554,792 secondary schools, grade 9 to 12 (13 -16 years old), from early childhood to secondary school (MoEST, 2020). Therefore, it is necessary to take measures to avoid the interruption of education and guarantee access to continued and flexible learning modalities for all children using ICTs, including remote learning, online learning, mobile, audio, and video. This research examines challenges and facilitators of offering alternative teaching including e-teaching to manage learning loss during and beyond COVID-19 in Nepali schools.

Conceptual framework

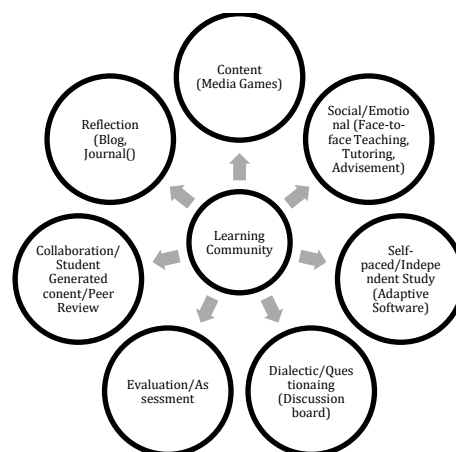
This section explains the meaning of e-education, e-learning, e-pedagogy and a conceptual framework for this study. E-education includes all forms of electronically

supported learning and teaching theories including educational technology which are blended to deliver to education. E-learning processes include web-based learning, computer-based learning, and virtual/online learning. Furthermore, online teaching or distance learning generally, requires more student-centric, inquiry-based, facilitative, and flexible teaching methods (for example, critical thinking teaching strategies, evidenced based teaching and teaching as inquiry).

There are two types of modes to imparting distance education: synchronous and asynchronous. Synchronous mode denotes real-time, simultaneous, and interactive communication between teachers and students through videoconferencing, chat, and live streaming (Skylar, 2009). Asynchronous mode means learners can access education materials and complete their work from anywhere and anytime (Bonk & Zhang, 2006). Learning materials are sent and facilitated through websites, emails, vlogs, and blogs.

E-pedagogy

Teachers need to know how to engage learners in the digital classroom by applying their knowledge of: learning area content, teaching strategies (pedagogy), and how to apply technology to achieve learning goals in the digital classroom. This study employs a Community of Inquiry and a Multimodal for Online Education (Garrison, Anderson & Archer, 2000) as a conceptual framework. The Community of Inquiry (CoI) is an interactive model of online teaching because it has discussion boards, blogs, wikis, and videoconferencing (Garrison et al., 2000). The multimodal model for online education is developed from a learning community for a larger extended academic program. The Multimodal model can be integrated with other modes of instructional delivery by using adaptive learning software (Garrison et al., 2000). It has seven components, and 1.1 diagram represents components of multimodal model for online education.



1.1 Diagram of multimodal model for online education components

In addition to this, the Manaiakalani pedagogy: Learn, Create, and Share, has been used in different schools in the world including New Zealand. In 2011, the Manaiakalani education trust, New Zealand, established to develop and deliver 21st century education to the 21st century learners who are confident to learn, create, and share their ideas with the world by using available digital technologies (Manaiakalani, 2011). Manaiakalani has developed and implemented e-pedagogical components: Learn, Create, and Share. Students learn and build curriculum knowledge through reading, discussion, or research based on which they create a digital material and share it with their learning communities, friends, teachers, and the world by publishing their work through their personal blogs.

Digital tools

Digital tools refer to the use of ICTs related devices, applications, and software that are used for teaching and learning activities (for e.g. internet, blog, videoblog, wiki, television, radio, audio-book, online game, google classroom, G-Suite, MS office, mobile application, zoom meeting, social media, and digital self-learning resources).

Methodology

This study utilized a qualitative methodology to understand and gain insight into how research participants interpret and make sense of their experiences of using digital tools in their daily teaching and learning activities by using an interpretive framework (Denzin & Lincoln, 2011; Neuman, 2016; Thapaliya, 2018). The qualitative approach provides an in-depth description; thorough analysis is more likely to generate new knowledge and deeper understandings of research subjects' perceptions and experiences of using digital tools to manage learning loss due to COVID-19 because the digital tools in learning process could help to increase students' engagement by decreasing their anxiety level.

This study was undertaken to explore how government officers, secondary school principals and schoolteachers may understand and use alternative methods of teaching and learning including distance learning in Nepali public schools. Data for this study was collected through one-on-one personal interviews with government officers, secondary school principals and schoolteachers. One hundred and ninety invitations were sent to research participants including government officers, school principals and secondary school teachers throughout Nepal. Interestingly, none of the government officers and International Nongovernmental Organization (INGO) representatives who were involved to develop the COVID-19 Education Cluster Contingency Plan of 2020 Nepal replied to my email and showed interest to participate in this study. In total, 75 acceptance emails, and messages were returned, and 45 research participants were finally ready to

participate in this study. Table 1.2 provides a summary of the total number of research participants, their workplace location, and their roles.

Table 1.2

Location	Roles of participants
Province 1	Headmaster 1 Teachers 4
Province 2	Headmasters 2 Teachers 5
Province 3	Education officer 2 Headmasters 3 Teachers 7
Province 4	Headmasters 2 Teachers 4
Province 5	Education officer 1 Headmasters 3 Teachers 4
Province 6	Headmaster 1 Teachers 4
Province 7	Education officer 1 Headmaster 1 Teachers 5

Semi-structured interview

Data were collected by using semi-structured interviews which provided me with the flexibility to establish rapport with participants (Silverman, 2006), and opportunities to seek clarification and further information about participants' understandings of issues (Taylor, Bogdan & DeVault, 2016). Specifically, I used the following guiding questions in the interviews:

- How do you define Information, Communication and Technologies (ICTs)?
- How do you define the smart school, distance teaching, and e-pedagogy?
- What kinds of digital tools and technologies do you use in your classroom to Manage learning loss due to the COVID-19 pandemic situation? Briefly explain.
- Why do you think teachers should use technology in the classroom?
- What kind of challenges and opportunities do you face while implementing alternative teaching methods including online teaching due to COVID-19? What kinds of suggestions do you advise to solve these problems?

All interviews were conducted online using social media (e.g. Skype, Viber, Facebook Messenger, Google Meet, and Zoom) and took place at the most convenient time for the participants. The interviews lasted about 40 to 50 minutes with each research participant. In addition, data was gathered from official documents such as policies related to ICTs in education. Information sheets and consent forms were distributed and collected from participants electronically. This process included an explanation of voluntary participation, the right to withdraw from the study at any time, and preserving participants' privacy and confidentiality throughout the research process. Pseudonyms are used to ensure the anonymity of the research participants. After coding and decoding these transcripts into different categories, three main themes emerged: uses of ICTs, challenges to use ICTs tools, and facilitators to use ICTs tools.

Findings

Findings are described in the three themes: uses of ICTs in education, challenges, and facilitators to use ICTs tools.

Uses of ICTs in education

Administrative work

This study found that most research participants used ICTs for teaching and administrative work. They mainly used ICTs to conduct administrative tasks such as producing test sets, writing test progress reports and examination report cards rather than using ICTs to teach students in Nepal. A research participant states:

...I took a month-long computer course at a private computer training institute... I learnt basic computing skills including MS Office package... mainly I use a computer to type questions for examination.... in my school... computer is used only for administrative work....

This participant comment is supported by another participant who was school headmaster. Their comments signal that computers are used for administrative work rather than teaching and learning activities in Nepali schools.

Teaching and learning activities

The majority of research participants used ICTs tools such as YouTube, Social Media, (e.g. private Facebook messenger group, Viber, WhatsApp) and Zoom meetings for delivering teaching and learning activities. It was interesting that 20% of the research participants of teachers did not have their own email account, but they had a Facebook account that they used to communicate with their students for homework. In addition to this, schools used social media such as the school's Facebook page to communicate with parents and students regarding the annual examination result and other information. Table 1.3 shows a list of ICTs tools that were used in the classroom.

Table 1.3 ICTs tools

ICTs tools
E-book/audio-video book
Blog/Vlog
Wiki
YouTube
Podcasts
Webinar
Interactive white board/Smart board
Television
Radio/FM

Multimedia projector

Overhead Projector (OHP)

Audio-video recorder

Mobile

MicroSoft Office

G-Suite

Social Media: Facebook, Viber, WhatsApp, Skype

Zoom Meeting

Email: hotmail, yahoo, gmail

Online learning application: Kahoot, Quizlet.com

Challenges to use ICTs in teaching

Contradictory and confusing policy

The government of Nepal has endorsed several ICT policies, acts, rules, and manuals since 2000. The Ministry of Education Science and Technology (MoEST) endorsed the COVID-19 Education Cluster Contingency Plan by projecting, highlighting, and advising some strategies to cope with the impact of learning loss during and beyond the COVID-19 pandemic. In addition to this, MoEST enacted a learning facilitation directory 2077/2020 through an alternative system (for example, Distance Learning, or Online Learning). Surprisingly, most of the research participants did not know about these plans and guidelines. Also, this study found that these components of policies were not translated into practice. This signals that there is an implementation and dissemination gap between policy and practice. By touching this ground, we can say that learning facilitation directory policies and COVID-19 education cluster contingency plans are contradictory and confusing.

Lack of sufficient computers, multimedia projectors, and infrastructure

The research participants revealed that lack of resources, infrastructure, and technology are common barriers to implementing ICTs tools in the classroom teaching and learning process across all public high schools in Nepal. One participant states:

... I have been working as a school headmaster since 2016 in this school, the government of Nepal has endorsed and enacted different IT policies.... I have requested the local education officer and district education officer for a multimedia projector, five computers and internet connection. Neither they listened to me nor they took any action regarding it....

Similar to this, another research participant says: "...I teach English language and social studies from grade 9 to 12. I want to use a multimedia projector while teaching in the classroom... but school, where I teach, does not have a multimedia projector...."

These participants' comments demonstrate that teachers are keen to use technologies in the classroom. But their schools did not have sufficient computers, multimedia projectors, and other digital tools. If there are not sufficient resources in schools, how do teachers and school headmasters manage technologies when the government told them to facilitate online teaching to manage learning loss due the COVID-19 pandemic?

Power supply and internet connectivity

This study found that power supply and internet connectivity are other challenges in implementing ICTs tools. Some research participants were disappointed with the power supply and internet connectivity. A research participant explains:

A Non-Governmental Organisation (NGO) gave us 14 computers in the school last year. But there is not a power supply and internet connectivity in the school.... I requested the School Management Committee (SMC) to manage the alternative power supply...so that students and teachers could use computers in teaching and learning activities. However, the SMC did not manage a regular power supply and internet access in the school.

These comments demonstrate that schools do not have a regular power supply and Internet connectivity. This may signal that schools do not have sufficient funds to manage alternative power supply and Internet connectivity. Another research participant comments:

The school has an internet facility... but the school headmaster does not give the internet's password for students and teachers.... I inquired about it in the staff meeting and the school principal replied to me that the internet had limited connectivity... and the internet was not for teachers and students....

Similar to this, another research participant explains:

...the school has wireless internet connectivity, but ... not working all the time...there is no system to manage that available facilities work properly...school principal does have a negative attitude regarding the use of ICTs tools in the classroom... I have an internet connection at home... after COVID-19... I teach students via Zoom application... but students' participation is very low...around 20% of students....

These comments reveal that schools have sufficient computers and Internet connectivity, but school administrators do not provide Internet access to teachers because they think that internet access was only for the school administrative work not for teaching purposes. This may signal that these school headmasters are guided by negative attitudes or deficit discourse. These comments, also mention that around 20% of students engage in online teaching and learning activities. This may mean that students do not have a regular power supply, strong Internet connectivity, and have a limited digital device/computer at home. If teachers and students do not have access to digital tools, how can teachers teach students and how students can participate in learning when teachers facilitate online teaching and learning activities? Interestingly, this finding is supported by the Flash 1 report of 2019-20 and the COVID-19 education cluster contingency plan of 2020 which states: "...13% of schools have facilities to access the internet... and 55% of households have access to the internet in their households and 51% of students could access media such as radio and TV..." (Most, 2020, p. 1)

These texts demonstrate more than 86% of schools and nearly 45% of households do not have Internet connectivity. This signals around 45% of students likely missed out on their learning opportunities.

Lack of trained teachers in ICTs

The government of Nepal endorsed education policy in line with e-pedagogy and student-centered teaching strategies. However, this research found that a lack of trained teachers and a lack of technological knowledge are barriers in using ICTs tools in teaching and learning. One of the teachers interviewed stated:

I do not have an email account... do not know how to operate the MS Office package and computer...I rarely use ICTs tools in my classroom... however, I have a Facebook account (social media account) that I used to communicate with my students. Recently, the school decided to teach students by using alternative learning model... school does not provide us ICT training...

Similar to this, another participant teacher states: "... 20 years ago, I took two months basic computer operational skills training from a private computer training institute.... now, ...I forget everything because I do not use it in my teaching..."

These comments state that this teacher had basic computer training, but he did not use a computer for teaching and learning purposes. These comments, also, may signal that teachers need refresher computer training. However, a participant teacher finds basic computer training helps to facilitate the virtual and face-to-face teaching. He explains:

... I took six months basic computer operational skills training from a private computer training institute. I learnt how to use the MS Office package and some computer programming. These training are not directly related to my profession now. However, it helps me to use ICTs tools in my classroom while I deliver lessons via online or face-to-face teaching...

These comments signal that having computer training facilitates to use ICTs tools in teaching and learning processes either face-to-face or online.

Lack of ICT trainer

This study also found that a lack of ICT trainers is another barrier. A participant education officer states: "According to the budget allocation of fiscal year 2075/2076 BS, ... we need to provide training in the use of ICTs for schoolteachers... but we do not provide training for many teachers due to a lack of sufficient trainers..." Similar to this, another research participant school headmaster explains:

The rural municipality allocated a budget for teacher training in the fiscal year 2075/2076 B.S. School headmaster inquired about it to the mayor... the municipality did not organise a teacher training due to a lack of trainers to facilitate the teacher training....

These comments reveal that there is a lack of ICT trainers to train teachers.

Teachers' attitudes to learn new skills

This study found that secondary school teachers have an egotism on learning new skills from the primary school teacher who is proficient in ICTs tools. A participant government officer states: "... the majority of secondary school teachers feel inferior if the training is facilitated by the primary school teacher...secondary school teachers believe that primary school teachers may not have sufficient knowledge to train them...."

These comments signal that secondary school teachers may think that the primary school teachers do not have sufficient knowledge and skills to give them training in ICTs. This may reveal that they may have egotism. This type of comment also reveals how social hierarchies and power distance can have an impact on innovation and the use of new technologies. In addition to this, most research participants have doubts about the transformation of teacher training of ICTs into the classroom. Some research participant believes that teachers are unlikely to transform training skills and knowledge into the classroom due to a lack of incentive and appreciation. She says: "There is not much difference in terms of salary and incentive between trained teachers in ICT and untrained teachers in ICT...."

Also, many participant teachers were doing a part-time job (for example, a real-estate agent, an insurance agent and a pandit) for extra income because their salary may not be sufficient to fulfil their daily needs.

Time constraints and lack of technical support

The present research found that time constraints and lack of technical support were other barriers to use ICTs tools in the classroom. One research participant explains:

I teach five periods per day in different classes. I need to set up a Zoom meeting by creating a meeting ID and password for students. I prepare all my teaching classes PowerPoint Presentation (PPT) slides of 5 periods per day. I spent around 6 hours extra to prepare my teaching materials...it's taking my extra time.... my computer does not turn on.... nobody is there to repair it in the school....

These comments reveal that this teacher needs six extra hours to prepare her teaching materials. This may indicate this teacher could have physical, mental health, and wellbeing issues because she needs to spend around 11 hours daily to finish up her work. Also, she is having a problem with her computer. This may mean the school has not arranged technical support to repair digital devices.

Geographical condition

This research found that geographical features were other challenges of offering alternative teaching and learning for students via remote mode. The remote parts of Nepal still have not related to high-speed Internet connectivity. This may create a problem to offer online teaching. A participant teacher states: "There is no electricity, computer lab and internet connectivity in the school where she works...the school unlikely manages resources to run an alternative teaching and learning class due to financial constraints... and geographical features...."

These comments indicate that the school where she works does not have resources accessible such as Internet, technology, and computers to offer online learning for students due to financial constraints and geographical conditions.

Political influence and corruption

A research participant who works as a deputy school principal believes that local political party leaders and the School Management Committee (SMC) members directly influence their political party ideology/manifestos in school programs and activities. Also, he thinks there may be a kind of deal or a gentle agreement when recruiting and transferring a teacher from one school to another school. But this deal may mean a kind of corruption between SMC or school headmaster and teacher to do his/her transfer. Additionally, if there is a new education officer transfer from another education office in the local education council or district education office, the school needs to please him/her to get a new fund or continuing existing fund for school infrastructure development.

Curriculum and assessment constraints

This study found that there is no connection with technology between high school curriculum and assessment system. The government of Nepal has not started to use ICT tools (for example, voice recorder software, different kinds of applications for students) to moderate student's learning in the examination process.

Facilitators***Effective teaching***

The present study found that using ICTs tools in the classroom was more effective while teaching social studies, English language and literature, history, and Nepali subjects through remote teaching. A participant teacher says:

I teach English and social studies in the school. The school management committee endorsed a policy to teach students through alternative teaching modes during the COVID-19 on 14 April 2020. ...local television, closed Facebook group messenger, YouTube, and Zoom application have been used to deliver course content for students since 15 April.... I prepared digital teaching materials to teach English subject. I found teaching English through Zoom application was more interesting and effective... because students were motivated and focused on the topic....

These comments signal that teaching language subjects online is effective because students engage with the task. This may be due to teachers investing more time for preparation of teaching and learning materials. Other reasons could be that the latest technology generates more interest in students to engage and participate in virtual learning rather than face-to-face learning in the classroom.

Collaboration among teachers, students and parents

This study found that teamwork among teachers, parents, and students is essential to engage students when teachers deliver teaching and learning content remotely. A participant teacher shared her experiences of sharing teaching materials with her colleague. She says:

I must teach four periods per day while we deliver face to face teaching. However, I teach two periods everyday through online teaching. I use the Zoom video meeting application to teach students. I share my teaching material in the online portal among other teachers... this kind of collaboration helps me to save my time. Also, I can learn from other teachers....

Her comments reveal that collaboration among teachers saves her teaching materials preparation time and teaching time. She also reuses resources from the online portal. Collaboration among teachers may help her to learn new skills for teaching from other teachers. This may reflect that a multimodal teaching modal is good for teachers and students. In addition to this, students and teachers can reuse these materials in their free time. Students do not need to be worried if they are unable to attain a lesson because recorded lessons are available in the learning portal or e-library. However, another participant teacher explains: "... parents need to supervise their child activities when

students are learning via online because students may misuse the Internet....” His comments may indicate that parents need to be more supportive and vigilant to watch what their son or daughter does while teachers are delivering teaching content remotely.

Smile smart school policy

The “Smile Smart School Policy” is a school policy that welcomes everyone as a learner in the school. Schools need to make learning materials accessible for every student through any mode of teaching and learning either face-to-face or online teaching. The Smile Smart School Policy signals to the Universal Design for Learning (UDL) features. The Smart Smile School Policy facilitates teachers to use ICTs tools. In this study, three participant headmasters said that smart school policy enhanced teaching and learning activities either we deliver course content through face-to-face or online. A participant school principal states:

...in the beginning of the academic year, my school where I work organises a staff meeting to discuss the school specific goal of the year... this year, we endorse "smile smart school policy" as a goal... every teacher has to smile when they enter the classroom ... maximise using resources including ICTs tools in the classroom... school provides sufficient teaching resources (digital or hard pack), technology and IT support for teachers... by allocating responsibility for teachers....

These comments may reflect that having a collaborative meeting with school staff to set up yearly goals of school policy, practice, and culture may help to facilitate teaching and learning activities. This school principal endorses a smile smart school policy that really helped to facilitate learning via distance mode to manage learning loss due to the COVID-19. Also, the school provides the self-study learning resources (e.g. hard pack and digital) for students. This links to the multimodal model for online education (Garrison et al., 2000).

Discussion

This paper analyses perspectives and experiences of government officers, school principals, and teachers on challenges and opportunities to implementing ICTs tools to cope with the COVID-19 pandemic situation in Nepal. Multiple factors are identified as barriers to implementing the ICTs tools to manage learning loss due to the situation surrounding COVID-19 at Nepali public secondary schools: (a) uses of ICTs; (b) challenges to use ICTs tools; (c) facilitators to use ICTs tools.

ICTs in education are mainly used for administrative works and teaching and learning activities. This finding is supported by several researchers (Koirala et al., 2016; McKnight et al., 2016; Yarbrow et al., 2016). The attitudes of research participants towards the use of ICTs tools to manage learning loss due to COVID-19 were mostly negative. These responses appeared to be influenced by a lack of resources and infrastructure, a lack of trained teachers, curriculum constraints, geographical features, political influence, and contradictory policy to implement ICTs tools to cope with the learning loss. Similar findings were reported by researchers (Drent & Meelissen, 2008; Francom, 2016; Hew & Brush, 2007; Kopcha, 2012). A lack of teacher training in the use of ICTs was reported as another barrier to using digital technology in the classroom (Albugarni & Ahmed, 2015; Cárdenas-Claros & Oyanedel, 2016; Cunningham, 2015; Hamel et al., 2013; Laferrière, Hamel, & Searson, 2013; Lim & Pannen, 2012).

In addition to this, the COVID-19 may increase the gaps between advantaged and disadvantaged students in their access to education due to parents' financial crisis (Dawadi et al., 2020). As a result, research participants constructed a negative attitude toward teaching or a deficit discourse of teaching and learning whereas some research participants had positive beliefs regarding the use of ICTs tools to manage learning loss in the classroom. Effective teaching, flexibility, a collaborative teaching plan, and the Smile Smart School Policy in line with the universal design for learning were recognized as the enablers to implementing digital tools in the classroom.

Recommendation

This study recommends the government of Nepal for implementing the following strategies to cope the impact of learning loss during and beyond the COVID-19 pandemic:

- The government must provide psycho-socio counselling to students via online or when they will come back to school.
- Schools must prepare and send a hard pack of additional learning material that contains fun activities, drawing, and core subjects work for students who do not have access to hi-tech.
- Teachers must check students' wellbeing before delivering teaching through online video meetings. Schools have to arrange hi-tech (for e.g. online/virtual teaching) mode and low-tech teaching mode (for e.g. television and radio/FM).
- Teachers need to know technological knowledge, pedagogical knowledge, and content knowledge by using ICTs tools in the classroom. The teacher's role is a facilitator rather than an authoritative one.

- School administrators/ principals should provide ICTs friendly infrastructure, resources, Internet connectivity and regular power supply for teachers. For instance, if a teacher does not have a computer, internet connectivity and a regular power supply, the school needs to provide these resources for teachers.
- The government of Nepal must make sure there is a community learning center, online learning station where teachers, parents, and students have access to useful resources. It is advised that the local government should establish one online portal learning station in every ward in the municipality or rural municipality.
- Parents should supervise their children while they are learning online. Also, parents need to teach social skills and life skills to their child/ren. Students need to follow school rules and regulations during online teaching and learning activities.
- Smart School Policy in line with the central government, provincials and local government needs to be implemented. There should be sufficient resources, infrastructure, and Internet connectivity (for instance, sufficient devices for learning (for e.g. Google chrome books, Laptop, and mobile apps).
- The Ministry of Education, Science and Technology (MoEST) makes sure that there is an alignment with curriculum and assessment with ICTs in education. The MoEST must provide teacher professional learning development training in the use of ICTs and Universal Design for Learning (UDL). The MoEST should provide an incentive or appreciation for teachers who have taken ICTs training.
- The government of Nepal should design, develop, and enact an action plan regarding the use of digital technology in school education.
- Teachers could follow or use the principles of UDL (Sutherland & Mitchell, 2020) in the classroom.

Conclusion

This study has presented research participants, government officers, school principals and schoolteachers' perspectives and experiences of implementing ICTs in education to manage learning loss during COVID-19 in Nepal. The data showed that research participants had mixed perceptions towards using ICTs in education at Nepali public schools. Participants' perspectives were analyzed based on their responses. Uses of ICTs, challenges and opportunities to use ICTs in education emerged and the data was interpreted. This study recommended some strategies to cope with learning loss due to the impacts of the pandemic.

There is no doubt that the government of Nepal cannot control the spread of viruses. But the government of Nepal can take action to manage the learning loss due to COVID-

19 by offering different kinds of students' engagement for learning. According to the literature, around 55% of students have almost no access to ICTs; the government needs to take new measures by providing hard pack learning materials and a low-technology approach (for e.g. radio programs and television programs). This reveals that the alternative teaching methods including online learning such as hi, low-, or no-tech teaching and a hard pack of teaching material may mitigate the learning loss during and beyond COVID-19. The Ministry of Education Science and Technology (MoEST) launched alternative teaching methods including online-teaching, off-line teaching, television, radio, online depository portal for digital resources, and community learning program to manage the impact of learning loss. In addition to this, the government of Nepal needs to enact an action plan to manage learning loss during and beyond the COVID-19 situation in Nepal.

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Declaration of statement

There is no potential conflict of interest in this research article.

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