

**PROBLEMS FACED BY MATHEMATICS TEACHERS AND STUDENTS IN
TEACHING-LEARNING MATHEMATICS ON ONLINE CLASS**

A
THESIS
BY
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Letter of Certificate

This is to certify Mr. **Uday Kumar Bhagat**, a student of the academic year **2018/2019** AD with thesis number **1607**, Exam Roll No. **7428323**, Campus Roll No. **58** and T.U Regd. No. **9-2-631-76-2014** has completed his thesis under my supervision during the prescribed by the rules and regulations of T.U Nepal. The thesis entitled "**Problems Faced by Mathematics Teachers and Students in Teaching-Learning Mathematics on Online Class**" has been prepared based on the results of his investigation conducted during the prescribed period under the Department of Mathematics Education, Central Department of Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward that his thesis is submitted for the evaluation as the partial requirements to awards the degree of Master of Education.

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Mr. Abatar Subedi

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Date: 10 April 2023



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Letter of Approval

This thesis entitled “**Problems Faced by Mathematics Teachers and Students in Teaching-Learning Mathematics on Online Class**” submitted by Mr. Uday Kumar Bhagat in partial fulfillment of the requirements for the Master’s Degree in Education has been approved.

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Recommendation for Acceptance

This is to certify that Mr. Uday Kumar Bhagat has completed his M.Ed. thesis entitled “**Problems Faced by Mathematics Teachers and Students in Teaching-Learning Mathematics on Online Class**” under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize final viva-voce.

.....

Prof. Dr. Bed Raj Acharya
(Supervisor)

Date: 10 April 2023

Declaration

This thesis contains no material which has been accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

Dedication

This work is affectionately dedicated to my father **Mr. Nachari Bhagat Barai**, and mother **Mrs. Jibachhi Devi**, and my wife **Mrs. Anjani Kumari** who even in a very difficult Situation gave me a great span of them Life for what I am now.

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Date

.....

Uday Kumar Bhagat

Abstract

This study entitled “Problems faced by mathematics teachers and students in teaching-learning mathematics on online class” is the emerging field of mathematics education in Nepal. The main objectives of this study were to explore the problems of the teachers in teaching mathematics on online class, explore the problems of the students in learning mathematics on online class and to explore the ways to solve the problems of teachers and students in teaching-learning mathematics on online class. The approach of this study was case study under qualitative research method. This study was bounded on Janata Secondary School, Gauridanda and Deurali Secondary School, Bardibas. This study was only related to the students studying in class 9 and 10 and also, the participants of the study were two teachers and seven students were selected purposive method. FGD with students and interview were used as tools of data collections.

Also, this study found that technical issues, lack of time management skills, problems adaptability, problems of self-motivation, communication problems, problems of understanding, problems of learning style, distraction problems, problems of students’ misconceptions, problem of course contents, engaging students, problems of teaching materials and problems of assessment are problems of teaching-learning mathematics on online classroom. Also, this study found that access of internet and device, time managements, technical issues address, distraction management, training for teachers, self-motivations and course structure and quality are ways to solve the problems of teachers and students in teaching-learning mathematics on online class.

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Chapter I

Introduction

Background of the Study

Corona Virus Disease (COVID-19) has spread all over the world since it was first reported in Wuhan, China on 31st December 2019 (World Health Organization, 2020). On January 30, 2020, WHO declared an Emergency in the Public Health of International Concern. According to the World Health Organization, as of 25 November 2020, there were 59.81 million confirmed cases of infection worldwide, resulting in 1,410,378 fatalities. In contrast, Nepal had 16,226,026 confirmed positive cases, with 1389 fatalities beginning on January 23, 2020.

As a response to the novel Coronavirus disease, the majority of the countries prohibited domestic and international travel and shut down all locations of big conferences, including educational institutions, colleges and universities, shops, offices, and other public areas (Sapkota, 2020). Government officials and public health experts are engaging in several measures, including social distancing, self-isolation, quarantine, strengthening health facilities, asking people to work from home to control the epidemic inside the country (Mustafa, 2020).

To manage the pandemic within the nation, government officials and public health specialists are taking a number of steps, including social exclusion, self-isolation, quarantine, defense of health facilities, and requesting that people work from home (Mustafa, 2020).

Since March 28, 2020, schools and other educational institutions have shuttered in 162 nations, according to a UNESCO study (Wan, 2020). All events, especially exams, conferences, workshops, and sports, have either discontinued or postponed at the typical amount of schools, universities, and institutions around the

world. Many university courses are currently providing online instruction instead of face-to-face instruction. Similar to other nations, Nepal has also implemented most of the measures put in place, including the statement that schools and universities closed starting on March 19, 2020, affecting students from primary school through graduate school. The majority of graduate college students are in the middle of their semester, and post-graduate students are about to begin their new session as they get ready to take their final exams in school (Sapkota, 2020). As a result, many colleges, universities, and schools have begun to resume their classes online.

During this pandemic, e-learning tools are essential because they help teachers, schools, and universities promote students' learning even when universities and schools are closed. In addition, the majority of these systems are free, which might promote ongoing education. Additionally, as the majority of these systems are free, they can support ongoing learning throughout the current Coronavirus epidemic (Almaiah, Al-Khasawneh, & Althunibat, 2020).

Problems arise for both students and teachers when studying and instructing at home. The process of e learning might hampered in a developing nation like Nepal by technology, educational/literacy background, and economical obstacles. Online learning is a comprehensive, economical method of delivering education. However, students who are unable to attend school because their parents' finances are in ruin can still receive an education by working to increase their income, particularly in developing nations. There is no doubt that distance learning can help establish and expand the number of highly qualified colleges in emerging nations (Challenges and Opportunity of E-learning in Developed and Developing Countries, 2020).

Online students frequently participate in discussions with other students and interact with teachers via internet. This does not include the face-to-face interaction

that occurs in traditional classrooms. Additionally, because they cannot directly interact with their instructors, students are unable to ask questions in class to improve their understanding of a subject. Another is a lack of organization, making it challenging for students who are unmotivated to learn in such a setting. There is no set time for meetings, and students do not frequently connect directly with teachers and other students who could remind them of their assignments and prod them to put in extra work (Donnay, 2014).

In the existing education system before the pandemic, online teaching was not a major form of education in schools and universities, therefore most of the teachers have no or minimal experience on online teaching. They feel problem in lack of appropriate material and resources and use it, service training, time management, difficult assemble all the students for the class, difficult to follow up the learning of the students lack of confidence and technical problem. Nepal has started to conduct training for teachers. For instance, the STFT program conducted a month-long virtual training on online teaching to whole country teachers. However, the training was limited to 1000 teachers. In this teacher training program, most of the teachers are a hindrance to taking the Program because of geographical diversity, and most are lack internet access. Additionally, just 56% of Nepal's population, the most of who live in the cities, estimated to have access to the internet. As a result, it is not practical to run online classes in Nepal's remote schools at this time. Therefore, the disparities between students who live in cities and remote areas, as well as between the rich and poor who cannot afford to access the internet, will continue to expand the gap in continuing education with e-learning during the pandemic (Dawadi, Giri, & Simkhada, 2020). This study will carry out the problems faced by mathematics teachers and students in teaching-learning mathematics on online class during COVID-19 in Nepal.

Statement of the Problems

In addition to altering the way we educate, learn, and interact with instructors and students, COVID-19 also had an impact on the world's health and economics. The traditional face-to-face teaching-learning model has replaced with online teaching-learning patterns. Nepal's ministry of education, science, and technology to begin the country's transition to online learning has granted a budget. Because of the unpredictability of the pandemic situation in Nepal, some institutions and universities have begun offering 2- to 4-hour online classes using video conferencing (Sapkota, 2020). The requirement for teachers and students to engage in the teaching-learning process is a computer, laptop, tablet, or smart phone with a reliable internet connection. Urban students may have access to devices and the internet, but because of bad connectivity, they have either missed or been unable to finish the lesson ("Nepal to Introduce "Digital Education" Amid COVID-19 Lockdown"). Similarly, students in rural areas missed the sessions because of limited access to electricity, unstable internet connections, or even a lack of equipment. Compared to other subjects, teaching mathematics requires specialized training for teachers. Like other math topics, online teaching has some significant differences. To teach math online, a math teacher has to be familiar with using e-material and resources, managing their time, feeling confident about the topic, and understanding the value of Geogebra, Latex, Mathematica, and Moodle. However, just before this epidemic, they had little or no experience teaching online.

This study was appropriate to discuss the problems faced by mathematics teachers and students in teaching learning on online class. This study tried to explore and analyze the problems faced by mathematics teachers and students in teaching-learning mathematics on online class. Especially the study intends to answer the

following questions.

- What are the problems faced by mathematics teachers and students in teaching-learning mathematics on online class?
- What are the problems faced by students learning mathematics on online class?
- How can we address the problems faced by teachers and students in teaching-learning mathematics on online class?

Objective of the Study

This study was intended to achieve the following objectives:

1. To explore the problems of the teachers in teaching mathematics on online class.
2. To explore the problems of the students in learning mathematics on online class.
3. To explore the ways to solutions the problems of teachers and students in teaching-learning mathematics on online class.

The Rationale of the Study

For COVID-19, there is currently no vaccination or specific treatment available. The main prevention strategies include avoiding social contact, limiting large gatherings, and cleaning hands properly. Therefore, the educational establishment might be pushed to switch to online education. From the administrative standpoint of a university, it is not advisable to adopt any e-learning site before understanding the preferences and difficulties of E-learning from the viewpoints of students. The study of mathematics should be a mandatory subject in schools.

Teachers and students of mathematics must deal with numerous issues. Confusion over the topic matter and the best ways to communicate it to the students might lead to issues. The lack of information about learning online additionally leads to issues. The study contributed a lot in identifying problems once they know what they were. Additionally, it enhanced mathematics instruction, particularly for inexperienced teachers. Similar to that, the results of this research offered some online resources to help teachers enhance their professional standing through addressing issues specific to their area of work. As a result, this study was useful for gaining insight into what school students thought about online learning. The study may be beneficial to academic stakeholders in the area of student-related digitalization of the educational system. Therefore, Organizations were determining their target groups to enhance the full participation of students in the teaching-learning process. It was also helpful for other researchers to conduct further research on the issue of online learning, education to the disadvantage and minority groups. The significance of this study was presented in the following ways:

- It helps to find out the problems faced by mathematics teachers and students in teaching-learning mathematics on online class.
- This study helps to policy makers, educators, administrators and teacher to improve the online teaching-learning procedures.
- It assists mathematics teachers to select effective teaching strategies to motivate the students on online learning mathematics.
- It would be useful to give some basic guidelines to the new researchers and scholars to carry out and complete to their research work in the field of the online teaching learning activities.

Delimitation of the Study

This study had following delimitations:

- The study was only delimited to the government school.
- This study was related to the problems faced by mathematics teachers and students in teaching-learning online class in the Bardibas municipality.
- The study was concerned only with online teaching problems in grade nine and ten only.
- This study was bounded Janta Secondary School, Gauridanda and Deurali Secondary School, Bardibas.
- The study was delimited to compulsory and optional mathematics.
- The research was included on the responses of two mathematics teachers and seven students.
- In-depth interview, FGD with students was used as tools of data collection.
- This study was based on case study approach under the qualitative research method.

Operational Definition of Key Terms

The terms related to this study defined by the researcher are as follows:

COVID-19. The COVID-19 virus is a new virus linked to the same family of viruses as Severe Acute Respiratory Syndrome and some types of common cold and it was referred to as '2019 novel corona virus.

STFT. Society of technology-friendly teachers Nepal which was conducted program a month long virtual training on online teaching to whole country teachers.

UNESCO. An agency of the United Nations to promotes the exchange of information, ideas, and culture.

E-Learning. Online learning or electronic learning is other names for E-learning. Utilizing electronic technologies, the teaching-learning process became popular and used in place of traditional classrooms.

FGD. FGD stands for focus group discussion and it is a good way to gather together people from similar backgrounds or experiences to discuss a specific topic of interest.

Chapter II

Review of Related Literature

Mainly the review of related literature deals with previous thesis books, journals, theories, research studies, and internet documents. This section deals with the research that problems faced by mathematics teachers and students in teaching-learning mathematics on online class. Further, some theoretical literature including policies and programmers and empirical literature is stated which is previously conducted in the related field.

Review of Empirical Literature

Johnson, Aragon, Shaik, and Palma-Rivas (2000) carried out the study entitled "Comparative analysis of learner satisfaction and learning outcomes on online and face to face learning environments" indicated that there were several problems faced by students in an online class as compared to face to face class. Instructor feedback was limited largely to email, fax, uploaded files, and periodic telephone conversations as a means of delivering feedback. Online class had no direct contact with the instructor and a part-time teaching assistant.

Dhakal and Pant (2016) carried out the study entitled "Assessment of teacher education curricula in Nepal: An ICT Perspective" included that Nepali teacher education institutions need to equip Nepali teachers with the knowledge and skills in the management of safe and responsible use of digital technology for learning.

Salehi and Salehi (2012) carried out the study entitled "Challenges for using ICT in education: teachers Insight" concluded that teachers are faced with some challenges and barriers that prevent them to employ ICT in the classroom or develop

supporting materials through ICT. Insufficient technical support at schools and little access to Internet and ICT prevent teachers from using ICT in the classroom.

Aditya and Jha (2020) carried out the study entitled "Students' perception and preference for online education in india during COVID -19 pandemic." Due to technological issues including internet access, data limits, device issues, and a lack of face-to-face engagement, they had significant difficulties when studying virtually. Additionally, more than half of the Indian respondents thought that learning online were just as pleasant as well as practical as learning in a physical classroom.

Almaiah, Al-Khasawneh, and Althunibat (2020) carried out the study entitled "Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic" showed that technological issue, lack of ICT skills, and financial constraints were the common challenges of E-learning faced by both students and teachers while adopting virtual class setup in developed as well as developing countries.

Shoni (2020) carried out the study entitled "Global impact of e-learning during COVID-19" online education includes factors such as teachers' lack of online teaching expertise, the time-consuming nature of creating lesson plans online, an insufficient amount of technical team support on platforms for online education. Due to their lack of a proper learning attitude, a lack of appropriate learning materials, a greater involvement in classroom learning, an inability to exercise self-discipline, and an inadequate learning environment at home while they are isolated, students as well as teachers face difficulties.

Subedi (2020) carried out the study entitled "Impact of e-learning during COVID-19 pandemic among nursing students and teachers on Nepal" included

technological factors are one of the major factors that have an impact on how effectively e-learning platforms are used. More than half of the students in that study experienced disruptions during their online classes due to electricity and internet issues.

Dhital (2018) carried out the study entitled "Opportunities and challenges to use ICT in government school education of Nepal" concluded that there are many obstacles in the way of the use of information and communication technology in public schools. Due to the absence of proper finance, basic infrastructure, trained professionals, and the design and execution of policies, ICTs have not yet been implemented in schools of Nepal as a means of obtaining new knowledge and skills.

Giri (2020) carried out the study entitled "Impact of COVID-19 on the education sector in Nepal challenges and copy strategies." Concluded the majority of teachers do not appear to have the necessary skills to manage online classes, as they have not received the necessary training or previous experience. In addition, it concluded that infrastructure, unfamiliarity on the part of teachers and school managers are barriers to providing distance learning.

By reviewing the above-mentioned literature, it was helpful to select the topic, objectives, methodology, and analysis of the data, findings, and to arrange thesis. Another implication of the above review has been used to find out the research gap between existing research and my research. It was encouraged for involvement in this research work. So it was helpful for the further researcher also.

Research gap. In the above empirical literature review, some research shows that "students faced p difficulties in managing technical tools", "students and teachers encountered difficulties in ICT skills," and other similar findings. Thus, the research

gap between other research and my research was (managing technical tools or ICT skills, etc.) are not the only one factors for the mathematics problems faced by mathematics teachers and students, there are many more things that have been affecting teachers and students in teaching-learning mathematics in online classes. Those other factors have been discovered and explored and deal with ways to solving the problems of teachers and students in teaching learning on online class in this research.

Theoretical Framework

The theoretical framework is what I use to evaluate the data obtained based on the theories I have chosen to interpret his research to explain his research work and reach specific conclusions (Niure, 2018). Classical conditioning, operant conditioning, trial-and-error learning, social learning, and constructivism learning theories are only a few of the learning theories that have been linked to children's learning and development. Thus, by interpreting and analyzing the information gathered in relation to this theory, I had arrived at specific conclusions.

Constructivism Theories in Learning Mathematics

Since the 1960s, Vygotsky has been an advocate of the constructivism theory. Constructivism appears to be supported by a number of philosophers, including Kant and Dewey, but the contributions of psychologists Piaget and Vygotsky are seen as unique. The key idea of this thesis was that students construct new knowledge by drawing upon their prior information, and that social interaction may play a role in the creation of mathematical knowledge (Pandit & Bhattarai, 2011). According to constructivist theory, students must often build their own knowledge through their practice and understanding. Constructivist learning theory refers to the new knowledge that students create by integrating new information with prior knowledge

(Acharya, 2017). The theory argues that students are allowed to deal with their challenges in their way. Real knowledge can be acquired by students through contact with others and/or their surroundings. Knowledge is not a stable thing; it is created by personal experience. Thus, specific aspects of constructivist learning theory include learning based on social interaction, a focus on double interaction, student-focused method, working together teaching-learning, the scaffolding contextualize learning, Zone of Proximal Development (ZPD), and so on (Sharma & Sharma, 2010, p. 298). In this conceptual structure lesson, I came to the conclusion that for online learning in mathematics, student collaboration, discussion, and social interaction are crucial. Additionally, math teachers should adapt their instruction to each student's level of competence, employing a learner-centered approach and encouraging interaction among peers to help pupils solve problems.

Connectivism Learning Theory

George Siemens introduced the concept of connectivism as a learning paradigm in 2005. Siemens is a technology and education writer who is recognized with co-creating the huge open online course. According to the connectivism theory, children learn best when they are taught how to use technology to navigate and build social networks, then use those networks to further their education. Connectivism learning theory promotes the idea that learning can successfully happen through digital channels, including social media, videos, and blogs (Siemen, 2005). Connectivism begins when an individual turns to digital technology to solve a problem. Connectivism learning theory posits that the use of digital technology helps to solve a problem and, in turn, depends the understanding of a topic.

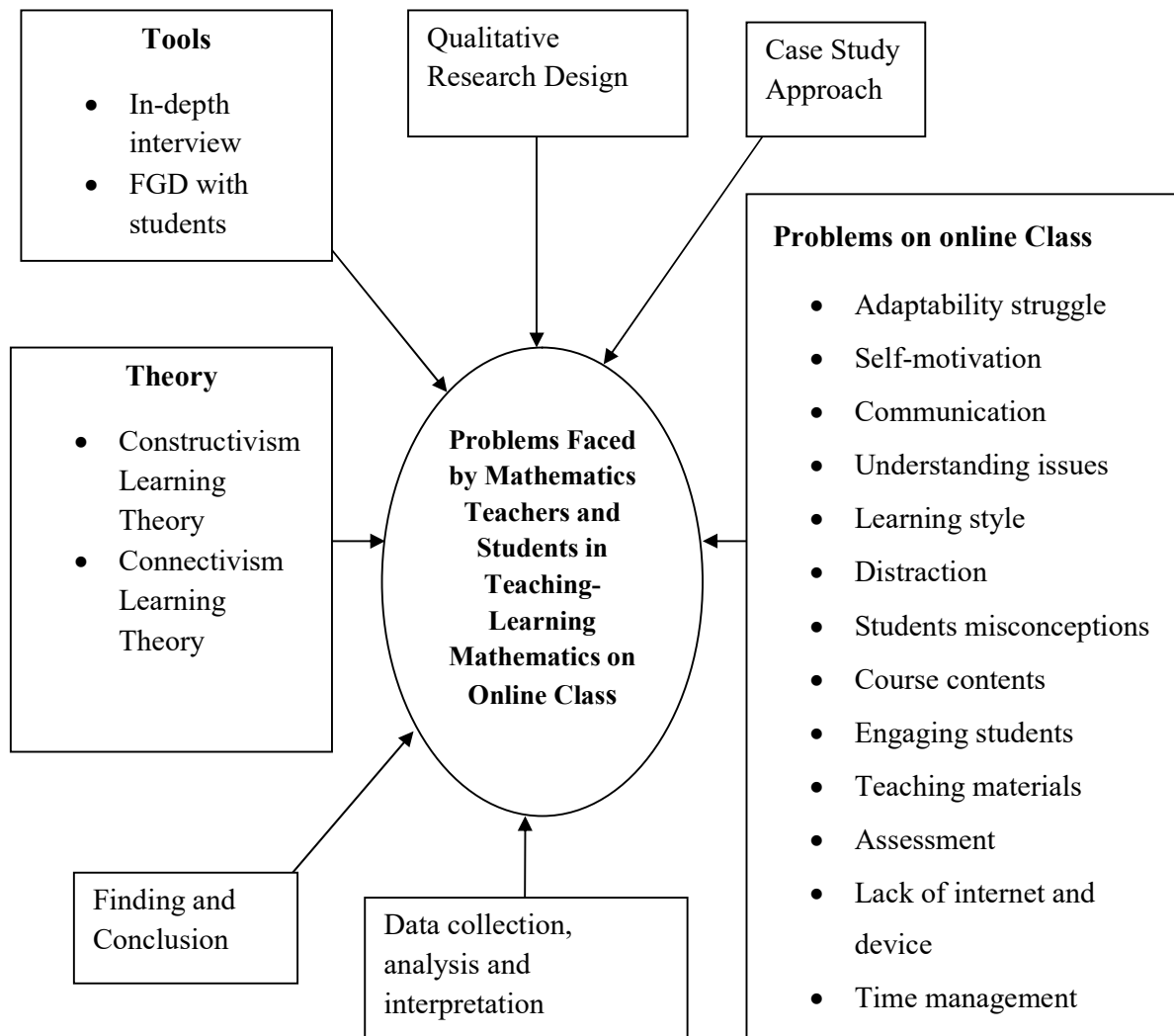
Finally, in this theoretical framework lesson, I concluded that the students are capable of using the internet. ICT is a major component of the curriculum, and

practically every student has access to the internet through a smart phone or computer. Students are given the opportunity to learn through interactions with others in this way. Learning happens when peers collaborate and connect to share ideas, thoughts, and viewpoints.

Conceptual Framework

This case study is related to the problem faced by mathematics teachers and students in teaching-learning on online class in the Bardibas municipality. The target of this study was to identify the major problems involved on online class that affect their mathematics learning achievement. I tried to find out problems faced by mathematics teachers and students in teaching-learning mathematics on online class.

The facing problems on mathematics achievement on online class lead the data collection and analysis for this study was given as below:



The conceptual framework would be helpful in findings the problems on online class in teaching mathematics. According to above figure I had moved forward to my research. This figure shows that it is a qualitative method in case study design. To collect the correct information purposive sampling was taken. In-depth interview and FGD with students were used for the research tools. Also, Constructivist, Connectivism theory was interlinked to justify the analyzed and interpretation the data. And at last this framework helped me for analyze the collected data from descriptive method.

Chapter III

Methods and Procedures

The methodology is a process to discover new facts and information about a particular subject matter. It helps to find out a reliable and effective conclusion. So that research methodology is a strategy that determines how the research becomes systematically complete. This chapter presents the procedure of the study which was carried out to achieve the objective of a problem faced by mathematics teachers and students in teaching-learning mathematics on online class and to get the answer of the research questions. This chapter included the design of the study, selection of study site, data collection method, data collection procedure and data analysis procedures.

Design of the Study

The qualitative research design helps to discover the individual viewpoints for gathering data, such as focus groups, individual interviews, and other people's participation (Carol, 2016). I chose to conduct my research using a qualitative method since it is challenging to quantify and measure students' struggles with math learning using a quantitative approach. Qualitative research can be considered 'naturalistic inquiry' in the sense that it is carried out in a natural context by attempting to prevent any intentional manipulation and distortion of the surroundings of the informants by me (Creswell, 2007).

Case study approach. According to Jack and Hersh (2008), a case study research approach is a research methodology that aids in the exploration of a phenomenon within a specific context using a variety of data sources. It also undertakes the exploration through a variety of lenses in order to demonstrate a variety of aspects of the phenomenon. In a case study, a real-time phenomena is investigated in the context of its naturally occurring environment with the

understanding that context will make a difference (Peter and Kaarbo, 1999). The main goal of my research was to identify the problems that arise when teaching math in online classes for both teachers and students. Therefore, the case study approach was chosen as part of the qualitative research methodology in order to address these important problems because, according to Creswell (2007), the data for a case study approach is gathered through direct observation in a natural environment and the actual incident as it occurs. Seven students and two teachers were chosen for this case, and information was gathered from them. Additionally, the objective of this study were to explore the problems of the teachers in teaching mathematics on online class, to explore the problems of the students in learning mathematics on online class and to explore the ways to solutions the problems of teachers and students in teaching-learning on online class. I used this methodology in this study because I believed that the case study approach was the only one that could achieve these objectives.

Selection of the Study Site

For this study, two schools of Mahottari districts are selected which is situated in Bardibas municipality. I had chosen Deurali Secondary School, Bardibas 1 and Janata Secondary school Bardibas 3. I had a convincing reason for selecting the schools that during the lockdown, these schools had started online teaching platform. Therefore, I had chosen these schools according to my research objective. The area of this study was based on secondary level students.

Selection of Respondents/ Participants

As the participants, I selected the mathematics teachers and students of Deurali Secondary School and Janata Secondary school for purposive sampling technique. For the study of my research, I selected a mathematics teacher and 4

students from Deurali Secondary School and a mathematics teacher and 3 students from Janata Secondary school for my research based on conceptual framework. I used purposive sampling technique to select participants.

Data Collection Techniques

To fulfill the purpose of the study I used interview guideline with teachers and students and FGD guideline with students.

Interview guideline. Interviews are face-to-face interpersonal role scenarios in which one person, the interviewer, asks a person being interviewed, the respondent, questions aimed at gathering responses related to the objective of the research topic, according to Kerlingern (1986: as cited in Dhital, 2018). Informal interviews could include in-depth interviews, also referred to as unstructured interviews. It was utilized to learn more in-depth information on the people in the context of the research.

I had created many interview schedule templates for math teachers and students. Open-ended questions were used during the in-depth interview with the math teachers and students. My face-to-face interactions with teachers and students improved thanks to the in-depth interviews, which also provided me with insight into how well liked teaching mathematics online is among both students and teachers.

FGD guideline. According to Baral (2016) A focus group discussion consists of bringing together people with comparable backgrounds or experiences to discuss a certain topic of interest. It is a type of qualitative study in which people are asked questions about their perceptions, attitudes, beliefs, opinions, and ideas. Participants in focus group talks are free to converse with other group members; unlike other research methodologies, it promotes conversation with other participants. It normally involves group interviewing, with typically 8 to 12 participants in the group. A facilitator (interviewer) guides the discussion, which is freely structure and covers a

range of interesting subjects. I had discussed about problems of students faced in teaching mathematics on online class. FGD helped me in collecting detail information about students.

Data Collection Procedure

I used to collect data in-depth, open-ended interviews based on the question related to problems faced by mathematics teachers and students in teaching-learning mathematics on online class after approval of the school with FGD and interview. Due to COVID-19 and its prevention, face-to-face data collection was not possible but during data collection time all the schools had started their physical class. So, I collected data by the experience of students and teachers while taking online class. Answer of interview was recorded. Focus group discussion was administrated to give emphasis on time management, self-motivation, technical issues; computer literacy. School documents were related to the study of school such as teacher's profile, online facilities of school were acquired from school administration for the purpose of collecting data.

Data Analysis Procedure

The data analysis procedure of this study had been similar to qualitative research in descriptive nature. For that, I took interview and focused on group discussion with selected students and teachers. The students' feelings and mathematics teachers' views were used to analyze descriptively. The information based on the participation of the student's activities discussion about mathematics problems and their perspectives was noted. I was careful to make the study more reliable. The data used to analyze and interpreted by using the framework and was developed by myself in conceptual framework.

Quality Standard

It is always mandatory to maintain quality standards while conducting educational research. Thus, I was attempting to develop quality criteria for my research project in order for others to rate the quality of my work based on them. My research project's attempt to tackle the quality standards I apply to produce and present my data is included in this section. Depending upon the dissertation, research questions and problems, I identify some quality standards regarding my dissertation where I conduct my research by interpretative paradigm which can be enumerated as below:

Credibility. Credibility is the criteria which talks about the idea of isomorphism between constructed realities of participants and those realities as represented by the researcher. There are several techniques for increasing the credibility of such isomorphism like; prolonged immersion in the field, checking interpretation with informants, engage in open ended or emergent inquiry (Taylor, 2011). To establish credibility in my research, I have taken in-depth interviews of the students and teachers and FGD with students. Mostly I used open-ended question in the interview.

Transferability. Transferability for a qualitative research means the degree of similarities between researcher and the readers (Shenton, 2004). To establish the transferability in my research, I had made rich description of what participants said during the interviews and what I found during the FGD with students.

Dependability. “In order to address the dependability issue directly, the process within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results”. (Shenton,

2004, p. 71) For maintaining dependability in my research, I had not participated in interviews with any pre-assumptions and beliefs. The questions of interview were open-ended. I had focused upon exploring their real views and actual data. Likewise, even while coding, theme generating and analyzing my personal beliefs and attributes would not affect meaning making and conclusion deriving process.

Conformability. The Conformability of a qualitative research ensures that the research findings are the result of experiences and ideas from the participants, rather than characteristics and preferences of the researcher. It is even the extent to which 20 researchers admits own predispositions (Shenton, 2004, p.72). For maintaining Conformability of my research, I collected data in natural setting as possible and conducted the triangulation of data to maintain the quality of data gathered.

Ethical Considerations

Ethical consideration is an integral part of the process of qualitative research design. The major ethical considerations of this research were informed consent, respect for the privacy of respondents, did not harm the beneficence of respondents, respect for anonymity and confidentiality, informing consents is one of the important aspects of this research means by which respondents' right to autonomy is strictly protected. Informed consent of this research refers to incorporating the right of autonomous individuals through self-determination and also to protect personal liberty and veracity.

The issue of anonymity and confidentiality of respondents was related to the rights of beneficence. I maintained confidentiality that goes beyond ordinary loyalty. Every respondent was free from being pressurized by me and the name of the respondents was not being disclosed. But the information related to the mathematics

knowledge which was desired by the objective was included. This research was documented in the findings of this study. Therefore, all the information given by respondents is treated as confidential and will not be disclosed by me to a third party unless required to do so by the law.

Chapter IV

Analysis and Interpretation of Data

This chapter is completely based on analysis and interpretation of the data. In order to fulfill research question and to achieve the objectives of my study, the qualitative research design method and in depth interview with teachers and students and FGD with students are data collections tools was used to collect data. Data analysis involves reducing and organizing the data, synthesizing, searching for significant patterns.

This entire phenomenon comes under the fold of online classroom practices. The online practices included the relationship, interaction and communication between teachers and students for teaching-learning process. Furthermore in this chapter, I introduced my case schools. Then after I presented the themes on the bases of my participants' responses which is given below:

Introduction of Case of School

One of the schools, I had chosen for my study was Shree Janata Secondary School, Gauridanda, Bardibas. This school is located in the Bardibas area of Mahottary district. According to Janata Secondary School;

Shree Janata Secondary School, Gauridanda, Bardibas Municipality-3, Mahottari was established in the year 2031 BS. The school was set up in view of the lack of educated manpower in the area at that time and the need to travel far for study. Mr. Laxman (pseudo name) is the Chairman of the School Management Committee which has 9 members. The Ministry of Education had also awarded the Chairman

Mr. Laxman (pseudo name) in the year 2069 BS for his significant contribution in efficient management and education. After his management, there has been significant improvement in education along with the construction of physical infrastructure in the school. The school, which is currently teaching in English medium from class 1 to 10, has made further improvements in the administrative and teaching spheres during the tenure of Mr. Netra Bahadur Ramtel (pseudo name) as the headmaster of the school.

The COVID-19 has transformed how we teach, learn, and interact with teachers and students, as well as how our global health and economy are affected. Online teaching-learning (Sapkota, 2020), has replaced the traditional face-to-face teaching-learning model. Due to the unpredictability of the pandemic scenario in Nepal, Janata Secondary School started providing their online courses with the use of Google Meet. The math teacher at this school claims that there are all different kinds of students studying there as well, from those with low incomes to those with high incomes, as well as students from various classes and varied family backgrounds. In accordance with Janata Secondary, attendance of class 10 students in physical class and online class in three months in average is presented below;

Table: 4.1 Attendance of class 10 students in physical class and online class

Months	Physical class		Months	Online class	
	Total no. Std.	Present Students		Total no.Std.	Present Students
Paush	35	33	Baishakh	35	16
Magh	35	34	Jestha	35	15
Falgun	35	33	Asar	35	17

Table 4.1 refers to the attendance of the class 10 students in physical class and online class and also it can be seen that the regularity of the students in physical class in all three months was very well. Comparing to physical class the regularity of the students on online class was very poor. According to the selected students, most of the students are of poor economic families. They had a lot of problems to face to manage device and also due to electricity problem in rural area. Forementioned problems created a direct impact on students' regularity on online class. Because of irregularity of students, they faced lot problems in learning mathematics on online classroom.

Another school I have chosen for his research was Shree Deurali Secondary School. This school is located in the Bardibas area of Mahottary district. According to Deurali Secondary School;

Shree Deurali Secondary School, Bardibas Municipality-1, Mahottari was established in the year 2039BS. The school, which is currently teaching in English medium from class 1 to 10, has made further improvements in the administrative and teaching spheres during the

tenure of Mr. Rajan (pseudo name) as the headmaster of the school.

First, I edited and structured the data gathered from student and teacher interviews, as well as from focus groups with students then I generated the difference code related to problems faced by mathematics teachers and students in teaching-learning mathematics on online class according to the responses of the participants. I had generated the code based on their similarities and also, I had generated the theme.

This chapter is divided into two sections

Section I: Deal with challenges faced by teachers and students in teaching-learning mathematics on online class.

Section II: Deal with way of solving the problems of teachers and students in teaching-learning mathematics on online class.

Section I: Deal with challenges faced by mathematics teachers and students in teaching-learning on online class.

In this section I collected the data few interview with teachers and students and FGD with students on the basis of participants' responses. I generated the following themes.

Problems of Adaptability

Students find it challenging to adapt from physical classroom instruction to an online classroom instruction right away. Due to the sudden change, they are not able to adapt to the computer based learning. Students who have only ever studied in a traditional classroom setting struggle to concentrate on online learning environments. They must be open-minded in their acceptance of the new learning environment. During the interview time, I had asked the question “*At the initially time how you feel*

teaching-learning mathematics on online class?” In this question, Teacher A replied that,

“Students may no longer have an internet connection, a device to use, or a space to learn in. Some students may not be available to meet at specific times. Others may have a lot going on in the background that they're trying to block out or even hide from the rest of the class.”

And students’ respondents replied that

“Due to the suddenly changes teaching-learning platform, I had struggle to use online class because before this I had not taken any online class so I have faced a lot problems to use Google meet like, joining problem, unmuting problem with teachers and interacting problem like physical etc.”

(Respondents A)

“At the initial phase I felt very badly to engage with online learning class due to missing face to face interaction with teacher, asking confusing questions with friends, time management and understanding problems.”

(Respondents C)

Therefore, from the above information of my participants, it can be claimed that students were struggled to adapt new learning platform. So, the adaptability struggle on online class is problems that affect the students’ mathematics learning on online class. In this line Siemen, (2005) also argued that technology is changing how students learn in and out of the classroom. Rather the learning from teachers and textbooks, smart phone and laptop serve as hub of information of today’s students. Technology is a major part of learning process and our constant connectedness gives

us opportunities to make choice about learning. Connectivism promotes learning that happens outside of an individual, such as through social media, online network and blogs. So, lack of technical skills is the problem of teaching-learning on online platform. In this line Giri, (2020) also claimed that infrastructure, unfamiliarity on the part of teachers, schools and managers are barriers to providing distance learning.

Problems of Self-motivation

Once they encountered difficulties with online learning, students began to lose hope. For students to be engaged in their learning and finish activities, motivation is necessary. Lack of motivation is a common challenge for all students. During the interview time, I had asked the questions “*How did you self-motivate on online class?*” In this question, students’ respondents replied that

“It was very tough to self- motivate on online class. On online class we lost the real expressions of teachers and friends that we had experienced in face to face class.”

(Student F)

I asked a question to teacher B “*How did you motivate shy students to engage in ZOOM?*”

Teacher B replied that,

“I had faced lots of shy students who used to escape from conversations or from the given duties. I have discovered that the best solution for this is to do more group games (using games that they like the most) and try to make these shy students group leaders. Also a good method to motivate them get encouraged is to praise them all the time by saying that they are doing very

well even if they not actually.”

Therefore, from the above information of my participants, it can be claimed that students were struggled to self-motivate in new learning platform. So the self-motivate on online class is problems that affect the student’s mathematics learning on online class. In this line Esmael, (2021) also argued that because there is no interaction between the students and the teacher in online sessions, many complain about lack of motivation. The online learning methodology does not yet have solutions for the need for students to interact physically in order to retain engagement.

Communication Problems

During online learning, students lack the necessary communication skills. Teachers assign reading and writing exercises to students in order to help them become better writers and readers, but it's possible that they won't be able to communicate their ideas in their writing well enough for teachers to comprehend them. Due to the new educational approach, some children find it difficult to talk to their teachers and students. It could occur for a variety of reasons, including a lack of interest, low technological proficiency with apps and video calls, or an inability to communicate effectively through live chats, emails, or text messages. I asked question *“How to affect online class in mathematics learning?”* In this question, teacher A replied that,

“Mathematics is subject that focuses on practical solution rather than theoretically .It needs direct communication between students and teachers for understanding subject matters but on online class it is not possible.”

Therefore, from the above information of my participants, it can be claimed that students were struggled to communication with teachers and students in new

learning platform. So communication on online class is the problems that affect the students' mathematics learning on online class. In this line Vygotsky (1978) also claimed that learners could build the mathematical knowledge by participation in variety of social activities, interacting with others.

Problems of understanding

Online classes make it easier for teachers to give their students reading materials, homework, communication via email, live chats, or messages, and content delivery through live sessions, presentations, recorded films, or lectures. Despite all of these activities, some students still do not seem as engaged as they would be in a face-to-face setting. Communication might be challenging for students who have conceptual difficulties. These students frequently do not approach teachers to clarify their doubts. I asked question "*Were you feeling comfortable to study online class? How*" In this question, students' respondents replied that,

"I was not feeling comfortable on online class because I didn't understand mathematics problems and also science numerical problems clearly as compared to physical class. That negatively affected on my result report card."

(Respondents E)

"I was also not feeling comfortable because teachers were asked to solve problems where they provided some genuine tricks to solve it. All the students could not understand the problem in that process."

(Respondents F)

Therefore, from the above information of my participants, it can be claimed that students were faced problems with understanding in new learning platform. So, Understanding issues on online class is the problem that affect the students' mathematics learning on online class. In this line Bringula (2021) also argued that Online learners have negative notions about their capabilities in terms of understanding the lessons, solving problems easily, finishing the course, performing better relative to their classmates' abilities, and performing better relative to their schoolmates' abilities.

Problems of Learning Style

The majority of students have received their education in traditional educational environments. You can become more flexible with learning styles by engaging in online education. Some students can rapidly adjust to these teaching methods, whereas other pupils need more time. In these situations, students struggle to focus, comprehend the lecture in real time, and complete technologically-based projects and assignments. I asked question "*Were you feeling comfortable to study online class? How*"

In this question, students' respondents replied that,

"No, I never felt online class comfortable. I faced difficult to concentrate in study. Online class cannot show proper guidance and care towards all students where the learning process seems to be uncomfortable."

(Respondents D)

Therefore, from the above information of my participants, it can be claimed that students were struggled to adapt same learning style on online class. So, the

learning style on online class is the problem that affects the students' mathematics learning on online class. In this line Leo (2022) also argued that on online learning students faced difficult to concentrate in study. The students might not had the opportunity the entire week with their teachers and classmates to discuss subjects they are unfamiliar with, which could explain why they lacked the incentive to self-study. Due to the students' lack of previous online learning experience, these might have resulted in the time management problem. In the typical face-to-face learning environment, students have the opportunity to communicate and discuss their challenges in their leisure time. However, they are now left alone at home. They are hampered by the many educational tasks for the various subjects, and some of them have family responsibilities.

Distraction Problems

Learning from home is an incredible experience. You could anticipate your surroundings to have the appearance of a school. However, things are different at home. For instance, you could desire a sizable classroom, friends, teachers, parks, playgrounds, and canteens nearby so that you can be guided and educated. With online learning, however, you must manage everything in a single room while your parents are present. Small things at home might quickly divert your attention. I asked question "*Did you feel comfortable in taking online class*"? In this question, students' respondents replied that,

"I didn't feel comfortable in taking online class because on online class, you have to manage everything in one room with parents around you. Home environment was not suitable for learning as it leads to lot of disturbances from children and relatives. You can easily distracted by small things at home."

(Respondents C)

The above information of my participants, it can be concluded that the distraction is one of the problem that affect the students in teaching-learning environment. In this line Esmael, (2021) also argued that Studying or teaching from home can be more distracting than in-person classes. Family issues, small children, or younger siblings can take up time and focus. Building a proper schedule and figuring out a concrete plan for each day can utilize and balance both work and home.

Problems of Students' Misconceptions

Mathematics is practical subject .To learn mathematics students have to focus each and every steps of the solution. Sometimes due to bad network students were unable to get full concept of subject of matter. I asked question *“What are your views about online class was better than physical class to get full concept? How”* In this question, students' respondents replied that,

“No, an online class seems never better than physical class. Being a student, I can directly interact with my subject teacher in physical class which is not sure on online class. I find online class only a simple and short term learning process which cannot get full concept of the subject matter. Physical class is overall far better than online class to get full concept.”

(Respondents B)

“No, an online class was not better than physical class. Sometimes due to poor network quality students left the class and unable to get full concept of the topic.”

(Respondents C)

Therefore, from the above information of my participants, it can be claimed that students struggle with misconception in new learning platform. So the students' misconception on online class is problems that affect the teaching-learning on online environment. In this line Subedi (2020) also claimed that students disturbed for their online class because of electricity and internet problems. Dhawan (2020) also argued that frequent electricity shortages have made it a problem to implement online learning in India because it causes a disruption to the students.

Problems of Course of Contents

The course materials were originally developed with face-to-face courses in mind. However, the transition to online learning necessitated a redesign of the course, which can take a lot of time and effort. If it had begun much earlier for higher learning outcomes, it would have been a success. In the majority of situations, these courses performed well in traditional educational environments but poorly when taken online. It occurs when there are no content-related activities, assignments, or projects that can be completed online. I asked question to teachers "*How did you feel about same course of contents on online class?*"

Teacher A replied that,

"I struggled to teach same course of content on online class. Same course of contents was not suitable for online class because it had not more images, videos, GIFs/comic etc., appropriate to the course content would make it more interesting and feel good for students thereby magnetize the concentration of the students."

Teacher B replied that, "*I was feeling very difficult to teach same course of contents because expertise in imparting knowledge and digital literacy."*

Therefore, from the above information of my participants, it can be claimed that teachers struggle with course of contents in new learning platform. So the course of contents on online class is problems that affect the teaching-learning on online environment. In this line Dhital, (2018) also believed that ICT have not been used as a way of acquiring new knowledge and skills in school of Nepal due to inadequacy of curriculum content and limited access.

Problems of Engaging

It becomes challenging to focus on the screen for long periods. Students can be easily distracted by social media or other sites. Hence, it becomes difficult for the teachers too to keep their online teaching efficient in engaging, and interactive to help students stay focused on the topics. Moreover, there was no personalized attention from teachers with regards to face-to-face interactions and feedback. I asked question “*How was your experience to engage with students on online class?*”

Teacher B replied that,

“It was very tough to engage with students on online class. In a class there were varieties of students some of taken serious and some were not in study. I faced problems on engage to those students who were not taking study seriously.”

The above information of my participants, it can be concluded that the engaging students is one of the problems that affect the teachers and students in teaching-learning environment. In this line Vygotsky, (1978) also claimed that the learners must be active and they should be build the knowledge for themselves, learners could build mathematics knowledge by participation in a variety of social activities, interacting with others. So less participation is the problems in learning

mathematics on online class.

Problems of Teaching Materials

Teaching material is one of key factors to effective teaching-learning mathematics. In a school, there are several teachers. Some of them are new version and some old. Due to transform of physical class to online class, old version teachers as well as new all faced challenges using teaching material on online class. During interview time I asked question to teachers “*were you feeling comfortable to using teaching material on online class?*”

Teacher B replied that, “*No, I was not feeling comfortable to using teaching material on online class because of lack of training skills to use material on online class.*”

Therefore, from the above information of my participants, it can be claimed that teachers struggle with using teaching material in new learning platform. So, the teaching material on online class is the problem that affects the teaching-learning on online environment. In this line Giri (2020) also believed that lack of training skill to use of online class is the major problem of teachers and students in teaching-learning on online class. In this line Shoni, (2020) also argued that students facing challenges due to their deficiency of proper learning attitude and lack of suitable material for learning.

Problems of Assessment

Assessment is the most crucial component of online learning for both students and teachers. Additionally, it occasionally stresses out students. Therefore, teachers may encounter many inquiries from the students anytime there are tasks or

projects. Less communication between students and teachers results in different expectations for students' performances. Less homework, fewer assignments, or no exams may occasionally be given to students. This might make it challenging teachers to assess students. I asked question "*Were you doing homework regularly?*" In this question, students' respondents replied that,

"Yes, I was doing homework regularly but teachers didn't check homework due to lack of basic skills on online to check homework."

(Respondents C)

"No, I was not doing homework regularly because teachers didn't check homework as well as give feedback."

(Respondents D)

Same question I asked teachers "*How was your opinion about homework checking on online class?*"

Teacher B replied that,

"I didn't check homework regularly because of less practice, lack of basic skills and time management problems on online class to check homework."

Therefore, from the above information of my participants, it can be claimed that students as well teachers both struggle with assessment in new learning platform. So, the assessment class is problems that affect the teaching-learning on online environment. In this line Johnson, Aragon, Shaik, & Palma-Rivas (2000) argued that instructor feedback was limited largely to email, fax uploaded files. In this line Shoni, (2020) also believed that assessment problem of educators is lack of online training skills.

Section II: Deal with ways of solving the problems of teachers and students in teaching-learning mathematics on online class.

Access of internet and device

One of the major stumbling blocks with regard to online learning is the lack of strong and stable internet connections, as the ones conventionally used at homes have either low bandwidth. I asked question *“What are your views about access of internet on online class?”*

Students’ respondents replied that,

“Sometimes I missed the class because for the entire duration of class, many times I was disconnected. So it was very painful for me. Most of my friends were having the same problems. They had to go outside to find cellular network and to attend the class.”

(Respondents A)

“I was facing several problems and during the rainy season, I had to attend classroom with umbrella, because there was no internet speed in my room. I would say this is the curse for rural people nowadays in this era of the internet.”

(Respondents B)

“Even in Kathmandu, electricity doesn’t go for long time, but in my district sometimes it happens that it’s not present for the whole day. So I can’t charge my laptop, I can’t charge my mobile phone, a mobile phone can run up to 12 hours without charging. But it’s not possible for a laptop. It’s hardly 3 to 4 hours; it’s no more than that.”

(Respondents C)

“I am from rural area and I got access to internet using their SIM card. I had to buy data, and then attend online class. The price of data is too high in our country. Mostly, had to pay around Rs 192 to buy 4GB of data to attend our three or four online class every day, it’s not possible to afford such costs.”

(Respondents E)

“I saw in my village, most of young boys had cell phone, but most of girls didn’t have cell phones they own. They could use cell phone from their parents or brothers, but they did not have their own device.”

(Respondents F)

I asked question *“Was there enough online discussion with the students?”*

Teacher A replied that,

“Sometimes Zoom lessons could have technological difficulties. This fact is not anyone’s fault because it is a technological issue. For ZOOM to be effective, you really need a stable Wi-Fi. Without that, the sound is not stable; students and teachers will hear an echo and repeat themselves. Regarding teachers’ schedule, the class duration was 20 minutes maximum, so teachers think there was not enough discussion about topics, just going straight forward to aims. Therefore, according to these kinds of problems teachers could not say that the discussions were effective enough”.

From the above information of my participants, it concludes that the access of internet and device is one of the problems that affect the teachers and students in

teaching-learning environment. In this line Aditya, & Jha, (2020) also argued that students faced major challenges in virtual learning due to technical failure, like internet connectivity, data limit and device problem. To overcome of problems of internet and device, Governments should make an investment in granting public libraries and schools free access to computers and the internet. Private financing companies should provide grants and scholarships to enable people to gain access to computers and the internet. Access to computers and the internet should be free at neighborhood community centers provided by nonprofit groups. Students should have access to computer laboratories and the internet through educational institutions. Local governments should make available Internet access in parks and other public areas.

Time Management

Many times, students found it challenging to manage their time while participating in online learning. They had never studied online before, and it is challenging. For successful management of their time, they require a schedule planner. Unlike traditional classes, online learning allows for flexible scheduling. However, some people have trouble adjusting to the amount of time necessary for online learning. During the interview time, I had asked the questions “*Was it easy to time management on online class?*” In this question, respondents replied that

“No, it was not easy to manage time on online class because online class was new for me and it was difficult to make rescheduled like traditional class scheduled and also implementation.”

(Respondents A)

“It was too difficult to managing time while using teaching material on online

class because of less practice teaching-learning on online class”.

(Teacher B)

The above information of my participants, it can be concluded that the time management is one of the problems that affect the teachers and the students on online teaching-learning environment. Students who are good at time management are more likely to be disciplined and focused. Students need to learn this skill to effectively manage their academic work and still have time for family, friends, and leisure. Staying disciplined and goal-focused is directly related to time management. Students must manage their time and tasks to leave time for play, fun, and relaxation in order to keep up with busy 24-hour schedules. Each student has to complete this. However, everyone tackles extra tasks and time management in a different way. Multitasking can aid in time management for many students. Students can save time and meet deadlines by balancing two tasks at once. However, not everyone can multitask effectively. It may be distressing and ineffective for some students. They work best when they focus on achieving each item on their list of tasks and completing one activity at a time. They can turn their goal sheet into a list of things to do each day and choose the most effective times to complete each job. Students will find it much simpler to manage time and be more productive if this becomes a habit in their behavior.

Technical Tool Issues Management

Many students lack the high-speed internet connections necessary for online learning. As a result, individuals have difficulties using live online learning platforms and other software that needs an internet connection. They have technical problems because they do not know much about computers and technology. How quickly you

can join the class and make it to any live sessions might be significantly impacted by your internet connection speed, both sluggish and fast. If you are having difficulty downloading essential information or viewing unclear videos, your connectivity may be inadequate. During the interview time, I had asked the questions *“Why did you not understand mathematics on online class?”* In this question I have listed participant’s views in the following lines;

“Mathematics is a subject that focuses on practical solutions rather than theoretically. It needs direct interaction between students and a teachers for understanding subject matters and in an online teaching platform teaching system can attend the class and do not miss any live sessions but due to technical issues like slow and lack of high internet connection, low quality visual graphics ineffective that why I faced understanding problems learning mathematics on online class.”

(Respondents F)

“I did not understand mathematics on online class due to mobile hanging, heating and charging problem, mobile got shut down that why I leaved class and left basic part of mathematics”.

(Respondents G)

And also, I asked questions

“Did you regularly join the class? If not then why”

And students’ respondent r replied that

“I didn’t join regular class due to network problem or some time due to device problem.”

(Respondents D)

From the above information of my participants, it can be concluded that the technical issues is one of the problems that affect the teachers and students in teaching-learning environment. In this line Almaiah, Al-Khasawneh,& Althunibat,(2020) also believed that technical issue, lack of ICT skills affect the online class. To solve the problems related technical issues, Private businesses should be encouraged to support online learning initiatives by providing free or discounted access to computers and the internet. Technical support should be made available to both teachers and students to help identify and address any issues that arise. Schools should provide technical support staff or contact info to help troubleshoot any technical issues. Schools should also provide training and support to help develop digital literacy skills. This could be in the form of webinars, tutorials, and courses that cover topics such as online communication etiquette and student rights and responsibilities in an online learning environment. Schools should also invest in reliable and secure online learning platforms. This would help ensure that online learning sessions are not disrupted by technical issues.

Distraction Management

Learning from home is an incredible experience. You could anticipate your surroundings to have the appearance of a school. However, things are different at home. For instance, you could desire a sizable classroom, friends, teachers, parks, playgrounds, and canteens nearby so that you can be guided and educated. With online learning, however, you must manage everything in a single room while your parents are present. Small things at home might quickly divert your attention. I asked question “*Did you feel comfortable in taking online class*”? In this question, students’ respondents replied that,

“I didn’t feel comfortable in taking online class because on online class, you have to manage everything in one room with parents around you. Home environment was not suitable for learning as it leads to lot of disturbances from children and relatives. You can easily distracted by small things at home.”

(Respondents C)

The above information of my participants, it can be concluded that the distraction is one of the problem that affect the students in teaching-learning environment. In this line Esmael, (2021) also argued that Studying or teaching from home can be more distracting than in-person classes. Family issues, small children, or younger siblings can take up time and focus. Building a proper schedule and figuring out a concrete plan for each day can utilize and balance both work and home. Setting up a clear structure for online classes with clear goals, objectives, and expectations will help to solve the distracting issues. Whiteboards and breakout rooms are interactive equipment that can be used in-group learning activities. To maintain students' interest, incorporate engaging activities like video projects, online surveys, and quizzes. To prevent pupils from engaging in other activities while in class, establish a strict discipline strategy and implement it. To prevent burnout and to keep students recharged and motivated, encourage them to take breaks in between classes. Give awards and recognition to students who finish their assignments on time and who participate in class. Student advisors, teachers, and peers provide a safe and comfortable learning environment.

Self-Motivation

Students started losing hope once they found difficult on online learning. It requires motivation to complete tasks and engage students with their learning. Lack of motivation is a common challenge for all students. During the interview time, I had asked the questions “*How did you self-motivate on online class?*” In this question, students’ respondents replied that

“It was very tough to self-motivate on online class. On online class we lost the real expressions of teachers and friends that we had experienced in face to face class.”

(Student F)

I asked a question to teacher B “*How did you motivate shy students to engage in ZOOM?*”

Teacher B replied that,

“I had faced lots of shy students who used to escape from conversations or from the given duties. I have discovered that the best solution for this is to do more group games (using games that they like the most) and try to make these shy students group leaders. Also a good method to motivate them get encouraged is to praise them all the time by saying that they are doing very well even if they not actually.”

Therefore, from the above information of my participants, it can be claimed that students were struggled to self-motivate in new learning platform. So the self-motivate on online class is problems that affect the student’s mathematics learning on online class. In this line Esmael, (2021) also argued that Due to a lack of interpersonal

contact between the students and the teachers in the online classes, students complain of being unmotivated. The online learning methodology does not yet have solutions for the need for students to interact physically in order to maintain attention. Setting goals and making a plan for staying true to them throughout the program are the first steps to take in order to address issues with self-motivation. Goals for one's academic future can vary depending on the person and their circumstances. Consequently, there is no need to worry about a certain structure. There are several self-help books and websites available, which offer excellent counsel to individuals seeking instruction. Students who are enrolled in distance learning programs can set some long-term objectives that correspond to the duration of the program. Time management skills can assist individuals in staying on track with tests, assignments, and projects. The majority of students discover that making a list of daily objectives or commotion items is a wonderful way to get things done and meet deadlines. Crossing off successes is a powerful motivator for reaching goals. This helps stimulate online students. Introduce prizes and praise for students who contribute actively to the online learning environment. Giving them certificates or other prizes, such course price discounts, could accomplish this. To keep students interested, break up lengthy lectures and sessions with interactive exercises like tests and polls. To promote student interaction and engagement, incorporate discussion boards into the online learning environment. Allow learners to work in small groups or teams to encourage teamwork. Make lessons more interesting by including images. Use animations, films, and other graphics to keep students engaged.

Course Structure and Quality

The course content was originally created for face-to-face courses. However, with the change to online learning, course updating was required, which can take a

significant amount of time and work. For greater learning outcomes, it would have been successful if it had begun much earlier. In most cases, these courses worked effectively in face-to-face classrooms but failed badly in online learning. It occurs when there are no content-related activities, assignments, or projects that can be completed online. I asked question to teachers *“How did you feel about same course of contents on online class?”*

Teacher A replied that,

“I struggled to teach same course of content on online class. Same course of contents was not suitable for online class because it had not more images, videos, GIFs/comic etc., appropriate to the course content would make it more interesting and feel good for students thereby magnetize the concentration of the students.”

Teacher B replied that, *“I was feeling very difficult to teach same course of contents because expertise in imparting knowledge and digital literacy.”*

Therefore, from the above information of my participants, it can be claimed that teachers struggle with course of contents in new learning platform. So the course of contents on online class is problems that affect the teaching-learning on online environment. In this line Dhital, (2018) also believed that Due to lack of curriculum content and limited accessibility, ICT has not been used as a means of obtaining new knowledge and skills in Nepali schools. To address course content difficulties, schools should redesign their courses to make them more interesting and relevant. They ought to concentrate on offering more practical information and skills rather than just theoretical understanding. Institutions should also focus on developing courses that are more relevant to today's environment. Institutions should also

consider developing more adaptable course structures. This may include the ability to take courses online or in person, as well as the ability to create your own curriculum. Institutions should also concentrate on creating high quality content. They should make certain that their content is up to date with the most recent developments in the industry, and that they give high-quality audio and video content. Finally, colleges should prioritize improving student support. This might involve offering more online tutoring choices, as well as building online forums and discussion groups where students can ask problems and obtain help.

Provide Teacher Training for Teachers

Lack of teacher training is one of main problem faced by teachers teaching mathematics in online. Teachers responded on lack of training skill, which includes lack of knowledge about teaching material, assessment and visualize the solution of problems while attending online class, unable to use live classes, unable to check online assignment etc.

During interview time I asked question to teachers *“were you feeling comfortable to using teaching material on online class?”*

Teacher B replied that, *“No, I was not feeling comfortable to using teaching material on online class because of lack of training skills to use material on online class.”*

I asked teachers *“How was your opinion about homework checking on online class?”*

Teacher B replied that,

“I didn’t check homework regularly because of less practice, lack of basic skills and time management problems on online class to check homework.”

From the above information of my participants, it can be concluded that the teacher training is one of the problems that affect the teachers and students in teaching learning on online class. In this line Giri (2020) also believed that lack of training skill to use of online class is the major problem of teachers and students in teaching-learning on online class. To overcome the problems related teacher training on online class, institutions need to be providing teacher training to teachers. A teacher-training program is a course that gives instructors the skills and contemporary pedagogical methods they need to connect with, manage, and instruct their students in a way that assures that all students are engaged and learning. When carried out properly and with the appropriate content, teacher-training programs have the potential to develop teachers to the point where they are beneficial to students not only academically but also socially. Teachers are the only people who can assist students recover from learning loss. So, especially now, training teachers is an essential for our educational system. Educating teachers on how to recognize their students as individuals with diverse learning styles. Teachers will favorably influence hundreds of thousands of students once they realize this and know how to adapt to the varied learning styles. Teacher training is also more important than ever because teachers have difficulty with new technologies and bridging learning gaps in students in order to bring them up to grade level. They must also complete the current year's syllabus. Teachers cannot be expected to handle these problems on their own without the proper knowledge, resources, and abilities. They are given the chance to continue their professional development and pick up new techniques, approaches, tactics, abilities, and tools. When teachers improve their skills, they feel more confident, happy, and inspired to achieve more with their students. Teachers that are confident and cheerful instill confidence and happiness in their students. Learn new strategies and techniques that they can use in the classroom to help students learn more effectively.

Chapter V

Findings, Conclusion and implication

In this chapter, I provided the study's findings, conclusions, and implications based on the presentation, analysis, and interpretation of the obtained data. Based on the studied data, the following study summary, findings, and conclusions have been drawn. I have provided the study summary, findings, conclusions, and implications under different sections to make it more understandable.

Finding of the study

The specific objectives of the study are to explore problems faced by mathematics teachers and students in teaching-learning on online class and to explore the ways of solution of problems faced by mathematics teachers and students in teaching-learning on online class. The use of ICT in mathematics online classes increases student attention, contextualizes the subject, and visualizes the content in mathematics education. One of the most difficult jobs for teachers in Nepal is motivating students; it visualizes the curriculum so that the virtual class becomes more dynamic and exciting, and it additionally connects the class with international collaborative partner courses. Different mathematical software, You Tube videos, and other internet sites could assist students in conceptual learning; it leads our students to self-learning and connects teachers from across the world in real time.

Based on the interview results, one of the teachers believes that online learning will never replace face-to-face learning and that face-to-face learning is more beneficial. According to the research, using unique methods and tools makes online teaching more successful since learners are better prepared and receive information more quickly. However, another teacher responded that online teaching is not always

successful due to physical infrastructure difficulties such as internet, electricity, laptop, and online whiteboard. There are additionally issues with teachers learning how to use online teaching materials, doing assessments, and using technical tools such as Google Meet, Zoom, and online whiteboards. Furthermore, teachers feel that measuring students' interest is easier in online learning since teachers can teach learners in their own unique method utilizing various tools such as slides, video platforms, and a variety of other tools.

I took several representative tasks while taking an online class in mathematics education that obtained a lot of response based on student opinions after gathering responses. This is unstable network, has issues with adaptability, a lack of motivation, a lack of technical knowledge, notification distraction, communication issues, understanding issues, learning style issues, a lack of devices, unnecessary advertising, expensive networks, learner capability and confidence levels, time management, distractions, frustration, anxiety, and confusion, lack of personal/physical interest, and complexities. The most frequently mentioned obstacle by respondents was a lack of trustworthy internet access at home. There is little variation between the student's research of online learning and the prior research's findings. However, there are solutions to problems faced by mathematics teachers and students in online teaching-learning mathematics in this study, and they are as follows: access to the internet and device, time management, technical tool issues management, a distraction management, structure of courses and quality, self-motivation, and providing teacher training for teachers.

Finally, data analysis of online learning during a pandemic situation in mathematics education demonstrates that there are numerous issues with attending online classes in mathematics education. Response from students demonstrates that

solutions encounter online class issues. Online learning gives an excellent chance for developing-country schools to improve their teaching and learning processes.

According to the students' responses, online classes in mathematics education are beneficial; however, they encountered numerous challenges when adjusting to online classrooms.

Conclusion

This current study addresses general issues from the standpoint of teachers at Shree Janata Secondary School and Shree Deurai Secondary School. For future research, I propose focusing on the pedagogical issues of doing online learning in order to maximize learning outcomes. Meanwhile, the research concentrates on and investigates deeper into the pedagogical component. As a result, additional research can be performed in different regions of Nepal to determine the most appropriate strategy toward the suitable continuous process for online learning goals.

This Covid-19 epidemic leads in a period of change in the education system. After three to four months of lockdown, the whole school system is ready to transition from face to face to online learning. This epidemic has provided an opportunity for educators to include information technology into their teaching methods. Teachers and students must overcome many obstacles when using the new teaching-learning methodology.

From the overall study, I concluded that the problems of teachers and students in teaching-learning mathematics on online class. In these factors I concluded that, problems faced by teachers while taking online class are problems of physical infrastructure like internet, electricity, laptop, online whiteboard. In addition, there are

problems of teachers training skills to use online teaching material, taking assessment, using technical tools like Google meet, zoom, online whiteboard etc. And problems of student while taking online class are problems of adaptability struggle, lack of motivation, lack of time management skills, problems in submitting their assignments, lack of interaction with teachers on, problems of understanding, problems of students' misconceptions, lack of reliable internet connectivity, insufficient electrical supply, and a lack of finances for parents who cannot afford to buy a laptop or an Android phone for their children. Also, I concluded that the ways to solve problems faced by mathematics teachers and students in online teaching-learning mathematics are to provide teachers with training on learning software that allows them to teach and guide students effectively and efficiently, to motivate online students - the learning environment should be designed in an appealing manner, and teachers should focus on critical based learning rather than knowledge-based learning. To avoid internet connection troubles, the government and other private companies should improve internet connection. Despite all of the problems of online teaching, teachers are encouraged to learn new technologies and make the most use of all available tools for effective teaching. This study can be utilized as a resource to further investigate the challenges that students meet when online learning is applied.

Implication of the Study

From the above finding and conclusion, it could help other to know some ideas and apply them in the time they need in a particular kind of situation. Therefore, the main implication of this study can be listed as follows;

Pedagogical Implications

- It assists teachers in selecting effective teaching tactics to motivate students in online mathematics learning.
- It aids in identifying teachers' and students' difficulties in teaching and studying mathematics.

Professional Implications

- It is beneficial to those teachers who are just starting out in their careers to read this research.

Theoretical Implications

- It benefits math educators, students, researchers, curriculum designers, textbook authors' educators, and the students themselves.

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Appendix-I

Students Interview Guideline

1. Students Name
2. Students Age
3. Students Gender
4. Students Grade
5. Do you have a taking online class? i) Yes ii) No
6. Do you use your mobile or any other digital tools at home for taking online class?

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The main question of the research was an investigation of student's attitude towards problems faced by students in learning mathematics on online class. To get answer of these questions were asked:

1. At the initially time how you feel learning mathematics on online classes?
2. How did you self-motive on online class?
3. Were you feeling comfortable to study online classes?
4. What are your views about online classes was better than physical classes to get full concept?
5. What type of the problems encounter while taking online class in mathematics education?
6. Which software you use for taking online class?
7. Were you doing homework regularly?
8. Which methods apply for evaluation on online class?

Appendix-II

Teachers Interview Guideline

1. Name of the teacher
2. Temporary Address
3. School Address
4. Teaching experience
5. Training

Interview Questions

1. How was your experience to engage with students in online class?
2. What do you think that makes online teaching and learning successful?
3. How was your opinion about homework checking in online class?
4. Were you feeling comfortable to using teaching material in online class?
5. Was it easy to time management in online class?
6. What are some effective ways of monitoring students' engagement and learning during online class?
7. How was the student motivation in virtual learning?
8. Was there enough online discussion with the students?
9. What are your views about access of internet in online class?
10. How did you motivate shy students to engage in online learning?