ROLES OF MATHEMATICS TEACHERS IN CLASSROOM INTERACTIONS: A NARRATIVE INQUIRY

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Dissertation

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DECLARATION

I at this moment declare that this dissertation has not been submitted earlier for the candidature for any other degree.

_____ 3 August 2021

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DEDICATION

This dissertation is dedicated to my father Bil Bdr. Mali, my mother Asta Maya Mali, and my wife Kabita Mali who always encouraged me with full support and to my lovely son Rojak Mali who made me always happy, whose entrance in my life encouraged me to complete my dissertation work.

Master of Education in Mathematics, dissertation of *Niroj Mali* entitled *"Roles of Mathematics Teachers in Classroom Interactions: A Narrative Inquiry"* was presented at school of Education, Kathmandu University on 3 August 2021.

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I understand and agree that my dissertation will become a part of the permanent collection of the Kathmandu University Library. My signature below authorizes the release of my dissertation to any reader upon request for scholarly purposes.

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ABSTRACT

An abstract of the dissertation of *Niroj Mali* for the degree of *Master of Education in Mathematics Education* presented at School of Education, Kathmandu University on 3 August 2021.

Title: *Roles of Mathematics Teachers in Classroom Interactions: A Narrative Inquiry*

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One of the biggest problems of mathematics education in Nepal is that a large number of children do not complete the entire cycle of primary education (Wagle, 2012 as cited in Lamichhane, 2018), and most of them fail in mathematics (Lamichhane, 2018). According to the National Assessment of Student Achievement (ERO, 2018), many students are at the underperforming level in Mathematics. 32 out of 100 students fall below basic level in Mathematics achieving only 5% of the tested curriculum, and only 28% of curriculum is achieved by basic level students. Only 29% of the students have adequate knowledge and skills in the mathematics curriculum. Students' learning level is found questionable, and the students are not able to answer even very easy questions satisfactorily. The study showed that the students who were provided regular homework and feedback on a regular basis from the teachers performed better than those who were not provided homework and feedback (ERO, 2018). So, the role of the teacher is responsible for the achievement of the students in Mathematics. The purpose of the study was to explore the roles of mathematics teachers in classroom interactions. My research will encourage

mathematics teachers to teach mathematics in an interactive way. The reader will get knowledge about the importance of classroom interactions. Students, teachers, school, parents, researchers, trainer and other academic personals will be directly and indirectly benefitted from this study. I have considered Vygotsky's "Social Constructivism Theory" and "Mezirow's Transformative Learning Theory" as a theoretical referent.

I chose interpretivism as my paradigm and narrative inquiry as a research method to understand and interpret the real-life experiences of the teachers and the cultures of their schools. I focused on the beliefs, stories and teachers' experiences of their classroom interactions during the interview with three participants who were purposively selected from Kathmandu and Lalitpur districts. Due to the pandemic situation of COVID-19, I took interviews by using Google meet and phone calls. I did the audio and video recording of their in-depth interviews following ethical considerations and made the typed form of the narrations. Then I developed the themes based on the narratives and discussed them with the support of literature and theories as referents.

The roles of mathematics teachers changed from the traditional roles. It is not sufficient to teach the students only solving the problems by using the chalk and talk method. The roles of the mathematics teachers for classroom interactions change from traditional to modern. My research participants played various roles in the classroom interactions. According to their experiences and ideas, the roles of the mathematics teachers are the bridges that connect the contents of mathematics to the real-life for classroom interactions, the planner who plans for the activities according to the chapters or topics, which leads the meaningful interactions between mathematics teachers and students, and students and students. Mathematics teacher needs to

practice democracy where all the students get equal opportunities to learn. Mathematics teachers provide opportunities to students during democratic practices in the classroom to meet democratic values such as freedom of expression and participation, respect for diversity, equality, and tolerance. Mathematics teachers need to create a favorable environment for the classroom interactions and address the students' queries, to be polite and courageous to the students.

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ABBREVIATIONS

B. S.	:	Bikram Sambat
A. D.	:	Anno Domini
B. A.	:	Bachelor of Arts
B. Sc.	:	Bachelor of Science
COVID	:	Coronavirus Disease
PCL	:	Post Certificate Level
I. Sc.	:	Intermediate of Science
ERO	:	Education Review Office
KU	:	Kathmandu University
LSA	:	Lateral Surface Area
M. Ed.	:	Master of Education
MOES	:	Ministry of Education, Science and Technology
NASA	:	National Assessment of Student Achievement
SEE	:	Secondary Education Examination
SLC	:	School Leaving Certificate
T. U.	:	Tribhuvan University
TSA	:	Total Surface Area
VDC	:	Village Development Committee
ZPD	:	Zone of Proximal Development

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CHAPTER I

INTRODUCTION

Chapter Overview

In this chapter, I discussed the background of my research study through my experiences of learning and teaching mathematics. While doing so, I presented the journey of my academic life as a student and a mathematics teacher under different sub-headings. This background, further, helped me to develop the "Problem Statement" in which I discussed the core research problem. After presenting my research problem, I developed the "Purpose of the Study" and generated the research questions. Finally, this chapter is closed after discussing the "Significance of the Study", and the "Chapter Summary".

Background of the Study

Based on my experience, I believe that the role of the teachers is one of the major factors which directly influence the learning of the child. Teachers can create an atmosphere of learning within the classroom and outside of the classroom. Teachers can encourage students to actively participate in the teaching-learning activities. The learning of the students directly or indirectly depends on the classroom environment. So, to create a learning environment for students, the teacher's role is inherent. If the teacher adopts effective teaching and learning methods, it definitely impacts the students' academic performance positively.

My Journey of Learning as a Student

As a mathematics student of secondary level, I encountered so many problems in learning mathematics, such as I cannot apply the correct formulae at the right time.

I could not find the connection between the steps, i.e., no clearance in steps while solving the problems. It was very difficult for me to understand the different concepts at different levels, such as the use of variation in the unitary method, difficulty understanding the verbal problems and making an equation according to the given statements, etc. In this scenario, my senior brothers and sisters would tell me that mathematics would be difficult than the previous level. Most of the students at our school would say that 'mathematics is the most difficult subject'. It was not easy to get out of that kind of perception for me. To get out of that kind of illusion, either our mathematics teacher could help us, or we had to work hard. But the classroom environment of mathematics was different from the classroom environment of other subjects. In the mathematics class, we were not allowed to speak, and we were dominated by the fear of the teacher. Our job in that class was just to copy the solutions of the problems, whatever he did on the blackboard. He was very famous for his strict behavior. No one could see his eyes and talk with him; even we could not be able to ask the obscure steps while he was solving the problems on the blackboard. My friends used to call him with the nickname "angry man". He used to write the formulae on the blackboard, which we had to remember. I still remember that our mathematics teacher used to do any one or two questions from the exercise and give the rest of all the questions as homework. Most of my time was spent doing homework of mathematics. There was no interaction between teacher and students due to such environment of the mathematics classroom. Mostly, he used the chalk and talk method. Our classroom was like a full of non-living beings because there was no interaction between him and us. We were not able to discuss this with him due to his strict behaviour toward us.

It was any day of June 2000 A.D. (2059B.S.), we were in class ten. Most of my friends were in fear because they did not do the homework. My friends were murmuring by saying ‘laa aaja sir le marne bho” (Translation: Oh! The teacher will kill us today). On the previous day, our mathematics teacher had taught us “circle” chapter from geometry and theorems were given as homework. Most of my friends were saying that they could not understand. Suddenly our teacher entered the classroom, and we greeted him in a trembling voice. The mathematics teacher asked us, “Have you done your homework?”. A few of my friends, including me, said ‘yes’. Then our teacher started to check the homework from my bench. And he went serially to my friends. He said to stand up to those who did not do their homework, and then my friends began to stand up. He completed one round of checking homework and began to punish physically those of my friends who did not do their homework. One of my friends who was standing up was fainted due to the fear of our teacher. Suddenly my other teacher came to the classroom who was teaching in the next classroom and called the ambulance. Our teachers lifted her and carried her to the ambulance. She was sent to the hospital. The classroom environment was changed, few of my friends started crying. We were so much afraid of the inhumane action of the teacher and worried for that friend. After few days, she recovered and was discharged from the hospital. She did not come to the school for a month. Obviously, such kind of rude behaviour of our teacher took us to the part of mathematics learning. Was that the role of a good teacher? Was that kind of behaviour suitable to teach the students? Was he good/bad teacher? Were there alternatives ways to teach? These sorts of questions arose in my mind. My full sympathy went towards my friend. Then, I thought that if our teacher had taught in an interactive and friendly environment, such an incident would not have happened because, in an interactive

classroom, there is a healthy relationship between a teacher and students, and students are allowed to discuss the issues and problems with their active involvement.

My Journey of Teaching Mathematics

I was supposed to be a good achiever student in a school as I was the first boy in class ten. I was good at mathematics to solve the algorithms. I taught my three sisters studying in class seven when I was a student of class nine. After passing the School Leaving Certificate (S.L.C.) examination, I taught the tuition classes to the S.L.C. batch and my friends who failed in mathematics. Most of my friends and students were successful in the S.L.C. examination. Then I taught the tuitions of mathematics to the students of the different classes. Most of the students gave me good feedback. Even they compared me to as a good teacher with the mathematics teacher of the school from which I passed my S.L.C. examination. I was encouraged to be a mathematics teacher by the feedbacks of the students. Then, I chose mathematics teacher as my aim in life.

After passing the B.A., I got an opportunity to teach mathematics as a secondary-level mathematics teacher. In the beginning days of my teaching, I imitated my teachers. I taught my students as I was taught. I believed in quotes like “Practice makes one perfect" and "Try-try until you die," etc. Heavily, I used the chalk and talk method or lecture method. I used to solve the questions from the books and question banks without giving any introduction to the chapters. I just prepared students for the examination as a battle of their life. Nearly one decade of teaching mathematics was just preparation students for an examination only.

Sometimes, I punished the students to those students who did not do the home works. So, my students were feared by me, and they were hesitant to ask questions to me. Few students who were good achiever in mathematics were friendly to me and

they liked me most. In the classes of mathematics, I used to bring the good achiever students in front of them who could solve the problems to encourage the other students. Low achiever students were dominated by the other students. I categorized the students into three levels in the mathematics class on the basis of achievement of the students for teaching mathematics. The first level of the students who were below average students, struggling to obtain the pass marks. The second level of the students was average, was able to secure around 50 marks in mathematics. And the third level of the students was good students who could be able to secure more marks and solve the problems by using their understandings. I focused on preparing the students for the final examination. I made them practice more questions. In the mathematics class, I used to ask the obscure steps while solving the questions. Generally, there were fewer or no interactions in my classes. Now I realise that I was a teacher acting as an authoritative knowledge transmitter and my students were passive recipients of knowledge (Shrestha, Luitel, Pant, 2020).

Enrollment in Kathmandu University

Nearly a decade of my teaching experience, which I had gained in mathematics for the secondary level education, my attitudes towards teaching and learning mathematics were not changed though years were changed, and the experience was bulked. My perspective towards the teaching was static. My aim was to finish my master's degree in mathematics education. So, I had searched so many colleges and universities for study. I could not find a suitable time. I had a long gap in the study though I had the will to study mathematics. One of my colleagues gave me the suggestion to me to study mathematics education at Kathmandu University. I requested her to inquiry about the procedures and fees. The next day she brought the prospectus of the Kathmandu University School of Education, where I saw the

subjects offered and the requirements to enroll in the master's in mathematics education Program (M. Ed). I was pleased about the class time. Then I went to KU for an inquiry. I fill the forms, and the system of Kathmandu University was totally different. I was given time for the entrance exam. I was so much afraid because I had a long gap in the study. Then I faced the entrance exam, and we were notified that only the successful students were called for an interview. I received the notice for an interview. I was excited about an interview. I faced the interview and selected. That was the happiest moment of my life.

The environment of the University was different from other universities. The professors were friendly and helpful. The classes were amazingly good. The classes were reflective, practical, and interactive. Most of the approaches of the teaching were very helpful for us. The classrooms were very interactive, where we were guided by a perfect teacher and teacher trainer. We were guided by both theoretical and practical perspectives. Though there were some new courses, we really enjoyed the course contents. My perceptions towards teaching and learning mathematics were totally changed. I began to teach the students interactively.

Problem Statement

The Nepalese educational system is based on traditional teacher-centered lecture-based methods, low resources, less use of teaching and learning materials where learners get a rare opportunity for independent learning in the classroom. Our traditional assessment systems, curriculum, and the lack of implementation of the right plan are the barriers to meaningful teaching and learning mathematics. The objective of the curriculum does not emphasize the construction of the new knowledge by the students (Panthi & Belbase, 2017). Also, it does not encourage teachers to engage in the active construction of knowledge by the students. The

classroom sizes with a large number of students are problematic for meaningful teaching and learning from the social and interactive contexts. Teachers are not able to involve students in the teaching-learning activities due to large class sizes, or general lack of the importance of group interactions, or a lack of motivation to do it (Panthi & Belbase, 2017). Most of the mathematics teachers seem to follow the banking pedagogy where teachers deposit the knowledge. Students are the passive receiver.

One of the biggest problems of mathematics education in Nepal is that a large number of children do not complete the full cycle of primary education (Wagle, 2012 as cited in Lamichhane, 2018), and most of them fail in mathematics (Lamichhane, 2018). According to the National Assessment of Student Achievement [NASA] (ERO, 2018), a considerable mass of the students is at the underperforming level in Mathematics. 32 out of 100 students fall below the basic level in Mathematics, achieving only 5% of the tested curriculum, and only 28% of the curriculum is achieved by basic level students. Only 29% of the students have adequate knowledge and skills in the mathematics curriculum. Students' learning level is found questionable, and the students are not able to answer even very easy questions satisfactorily. The study showed that the students who were provided regular homework and feedback on a regular basis from the teachers performed better than those who were not provided homework and feedback (ERO, 2018). So, the role of the teacher is responsible for the achievement of the students in Mathematics.

As we observe the results of S.E.E., most of the students of Nepal are low achievers in mathematics. Most of the teachers of mathematics teach mathematics in a traditional way. They used the chalk and talk method to the mathematics in the classroom. Mostly, teachers are teaching mathematics as draconian teachers in an

autocratic way. The traditional approach of teaching is adopted by most of the teachers, where the learners used to be dependent on the lecture delivered by the teacher, where the voices of the students are not heard in the mathematics classes. Still, there is a lack of knowledge about how teachers learn and transfer their knowledge into practice in the classrooms. Students in the schools of Nepal are systematically deprived of opportunities for human development. During classroom observation in the public school, Khanal (2021) found that the teacher was using only the traditional lecture method without considering students' interests and ways of learning. Students were trying to talk with peers, but the teacher did not allow them to talk to each other and kept the classroom silent. The teacher was delivering a lecture and solved mathematical problems on the whiteboard without allowing them to discuss them. These narratives and classroom scenarios show that the teacher only maintained silence in the class (Khanal, 2021).

Extreme pressure by over-emphasis on examination results has taken away their natural instincts of childhood. Schools are not doing any justice to students. They are ignoring joyful learning for creativity, emotional intelligence, personality development, and socialization of students (Ministry of Education Science and Technology [MOEST], 2006). They were not exposed to enough practice of speaking on their own, and hence the interaction among the students in the classroom is almost absent. So, the role of a teacher is crucial to bring a positive impact in mathematics learning in a meaningful way. In this situation, many questions arose. Who is responsible for the poor achievement of the students? Why is a mathematical achievement very poor? What are the factors? What are the possible roles of the mathematics teachers for classroom interactions? These incidents and experiences gave me insights to improve my teaching practices. The success of the students is

definitely mine too. So, teaching to the students is a responsible job that shapes the career of the students. For the better learning of students, I chose the interactive ways of teaching, which I have been using till now. So as a novice researcher, I tried to find out about this issue.

Purpose of Study

The main purpose of the study was to explore the roles of mathematics teachers in classroom interactions. More especially, my research study aimed to find the different roles of the mathematics teachers to teach mathematics in interactively so that students can learn mathematics in better way.

Research Questions

I generated the following research question:

- How do mathematics teachers narrate their roles in classroom interactions?

Significance of the Study

I believe that this research will encourage mathematics teachers to teach mathematics in an interactive way. This research study will be useful for all the teachers of mathematics as well as the teachers who are teaching different subjects at different levels. My research participants got an opportunity to reflect on their daily works, experiences and think forward for their development. The reader will get knowledge about the importance of classroom interactions. Students, teachers, school, parents, researchers, trainer and other academic personals will be directly and indirectly benefitted from this study.

Chapter Summary

In this chapter, I intended to put forward my beliefs on the interactive classroom in the mathematics subject can be helpful to explore the mathematical concepts of the students and the meaningful learning the mathematics. For the

meaningful learning of mathematics, the role of the teacher is crucial. Most of the teachers of mathematics in Nepal have to adopt the traditional instructive methods to teach, which is not sufficient for meaningful learning mathematics. To provide the proper insight on that, I have tried to bring my own past experiences as a mathematics student, with a possible role of the mathematics teacher in the classroom interactions.

CHAPTER II

LITERATURE REVIEW

This chapter includes a brief review of the different pieces of literature related to the roles of mathematics teachers in classroom interaction. The review of the literature provides the foundation for the investigation by exploring research and other scholarly writings related to the topic. The literature review is not just a descriptive summary, but an organized and developed argument, usually with subtitles, such that, if the materials were presented in a sequence other than that used, the literature review would lose meaning, coherence, cogency, logic,, and purpose (Cohen et al., 2018). It includes a critical description of pieces of literature relevant to my research which provides me with a handy guide and will act as a stepping stone to my study. These reviews are concerned with the incorporation of roles of the mathematics teachers in classroom interaction. Similarly, different theories are related, and supporting ideas in the research have been discussed in this chapter.

Thematic Review

This section constitutes the major theme/themes of this research study. The research question of this study wants to dig out the roles of the mathematics teachers in creating an interacting classroom. Consequently, the major themes of this study are the interaction between students and mathematics teachers, roles of students and teachers, and classroom environment for the effective teaching and learning of mathematics.

Classroom Interaction

The interaction between the teacher and students is an essential part of the teaching and learning process. It provides fuels to the students for better learning. Through the interaction, students can develop competency and become critical thinkers. Interaction can be seen as providing a facilitative space of exchange. Interaction is one important point of the successful teaching-learning process because the interaction is a collaborative exchange of thought, feeling, or ideas between a teacher and learner or a learner and other learners resulting in a reciprocal effect on each other. According to Moore (1989), there are three types of interactions: learner-content interaction, learner-instructor interaction, and learner-learner interaction.

Classroom interaction is a practice that enhances the development of two very important language skills, which are speaking and listening among the learners. Interaction helps the learners to be competent enough to think critically and share their views among their peers. Through classroom interaction, the learners can be able to get themselves involved with concepts, ideas for learning. At the core of classroom instruction are the interactions between teacher, student(s), and content (Cohen et al., 2003). It fuels student encouragement and helps the students see the relevance of the teacher's topic. It increases participation as all students are involved and engaged in the mathematical discourses. Mathematics classroom interaction is an essential context for the involvement of the students where the students can ask about their unclear doubts and obscure steps, even they can share their various understandings to the teacher and among friends. The interaction can be between students and teachers where the students can express or share their voices or opinion, or viewpoints in the class. Till now, in most of the mathematics classrooms, the students are dominated by the mathematics teacher, students are not allowed to speak, and they cannon share

their ideas with the teacher and friends. In the context of Nepal, the mathematics teacher instructs the students in a traditional way such as lecture method, drilling method and practice method, rote memorization method, etc. After the instruction, the teacher gives problems to be solved, often from the textbook, and students are assigned homework. So, teacher-student interaction is still not really in the focus of mathematics teachers.

According to Gage (1971), teaching means arranging the conditions of learning that are external to the learners. It refers to all the facilities provided by the teacher which could facilitate students' learning and increase their involvement in different classroom activities. These facilities are such as providing clear instruction, obtaining students' attention, arranging materials required, responding to students' needs, explaining clearly, providing feedback, deal effectively with students. The role of the mathematics teacher is to create a learning atmosphere inside and outside of the classroom. A mathematics teacher is a facilitator who helps the learners to construct innovative learning products through group discussions, debates, and other forms of activities. In contradiction, our teacher used the traditional methods and corporal punishment. Without drawing our attention, mathematics teacher could teach the course contents. There was no value of students' perception and interest. He had to finish the course as soon as possible to make free from his duty.

Learner-Content Interaction

According to Soo and Bonk (1998, p. 3), "Learner-Content interaction is the interaction the student has with the subject matter that is presented for study. Interaction between learners and content refers to learners constructing knowledge through a process of accommodating new understanding into their cognitive structures". It is the process of intellectually interacting with content that results in

changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind. In this type of interaction, learners talk to themselves about the information and ideas they encounter in a text, Holmberg (1986) calls this type of interaction "internal didactic conversation". Learning is self-directed, and no other professional teaching expertise is provided. The interaction between the learner and the content plays an important part in the distance learning process. It is generally accepted that during this basic form of interactively in distance education, the learner gains and constructs knowledge by working directly with the subject materials (Malinovski et al., 2012). In this type of interaction, the role of the teacher is just informer or less in comparison to other forms of the interactions.

Learner Instructor Interaction

Learner-instructor interaction refers to the assistance, counsel, organization, stimulation, and support that the instructor provides to the learner in helping the latter construct a new understanding of the content (Soo & Bonk, 1998). Teaching is an interactive act whereas is the communication among teacher and students which run continuously as responsive acts (Hanum, 2017). This type of interaction is regarded as essential by many educators and highly desirable by many learners. Teaching is successful and meaningful when there is an interaction between students and teachers (Karki, 2017). Generally, the teacher planned the content to be taught to motivate the students to learn and to enhance and maintain the learner's interest. The teacher organizes evaluations to ascertain if learners are making progress and to help decide whether to change the strategies. Finally, the teacher or instructor provides support and encouragement to each learner. The nature of the support varies according to the educational level of the learners, the teacher's personality, and philosophy. In the context of Nepal, teaching and learning are heavily guided by this type of interaction.

A positive teacher-students interaction has a very crucial role for effective teaching and learning to take place (Kelly et al., 2003). Teacher-students interaction has an impact on classroom management and affects learning and growth. There is still a necessary power imbalance between teachers and students. The teacher is the only member of the classroom community who can assess which of the students' constructions constitute a productive basis for further learning.

Learner-Learner Interaction

Learner-learner interaction refers to the interaction between one learner and other learners, whether alone or in group settings, with or without the real-time presence of an instructor (Soo & Bonk, 1998). Learner-learner interaction among members of a class or other group is an extremely valuable resource for learning and is sometimes even essential. Interaction helps them to achieve educational outcomes, recall the information and apply knowledge to new and novel situations. Their learning is meaningful when the students embark on the interaction among them (Karki, 2017). In the classroom, mathematics teachers can make the interactions by making the peers of students.

Before reviewing this, I was supposed that interactions would be happened only by the students and teacher. But, after reviewing these different types of interactions, I got a clear vision about my research study and interactions. Although I had gone through different kinds of literature regarding this topic, I was in a dilemma, but this review helped me go forward in my research study.

Roles of Teachers

Teachers are the most important agents in shaping education for students and bringing change and innovation in educational practices. Teachers have a major impact on students' attitudes and learning. The teacher is the most influential factor in

the development of mathematical concepts. The teacher is the chief means for the students to get the knowledge in the classroom. The teacher acts as a facilitator. Since students do not interact well with each other, so encouragement is necessary. The role of the teacher is inherent in making the environment of the classroom (Sherin et al., 2011). One of the popular sayings is that the future development of a nation truly lies in the hands of good teachers. Their main task is not only teaching but also preparing children for a better tomorrow. Good teachers are the closest companions of the students. They can make learning easier by connecting different topics to real-life situations, and teachers can create opportunities for critical thinking by providing content that introduces new ideas. The teacher is like a model to the students, so the behaviors must be the right ones in front of the students. The teacher must be dedicated to his/her work because they need to pass the enthusiasm to get a better environment in the classroom. The teacher has to perform various roles like controller, tutor, organizer, assessor, observer, facilitator, etc. A good teacher helps the student to learn and can contribute towards the goal in a number of ways (Harden & Crosby, 2000). The teacher's role goes beyond information giving, with the teacher having a range of key roles to play in the education process. The following figure shows some of the essential roles of the teachers.

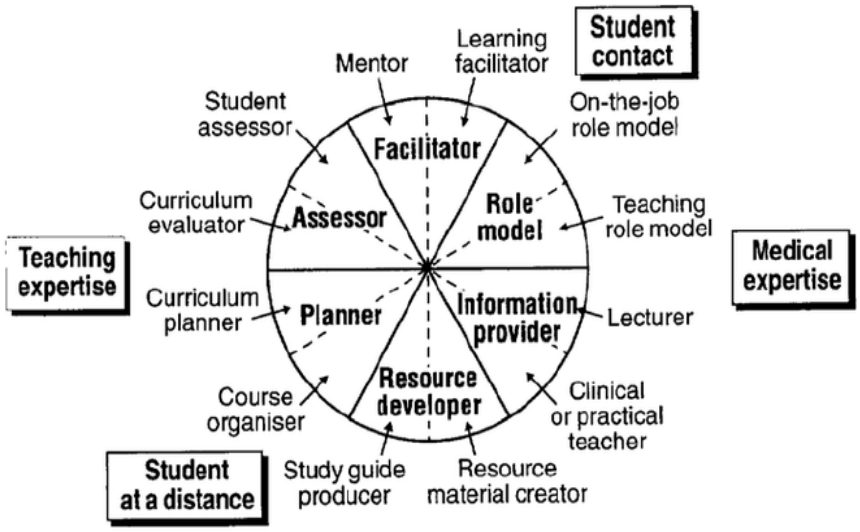

Figure 1. The 12 roles of the teacher (Harden & Crosby, 2000)

One fact of the teacher's active and demanding role is, therefore, to facilitate mathematical discussion or interactions between students. At the same time, mathematics teacher needs to act as a participant who can legitimize certain aspects of their mathematical activity and approve others which means mathematics teachers need to participate in the classroom interaction as well as she/ he needs to check the direction of the interactions among students. In doing so, the teacher ideally provides a running commentary on the students' constructive activities from his or her vantage point as an acculturated member of the wider community, but in terms that mathematics teacher infers comprehensible to the students given their current mathematical ways of knowing. Thus, the teacher still acts to constrain students' mathematical interpretations and solutions but does so in a communicative context that involves the explicit negotiation of mathematical meanings. At the time the sample episode occurred, both the classroom teacher and we were still in the process of developing a form of classroom practice compatible with this brief characterization and, more generally, with a socio-constructivist view of learning and teaching (Cobb et al., 1992). After reviewing this, it helped me think about the various roles of

mathematics teachers in teaching mathematics effectively. It gave me insight into the roles of mathematics teachers beyond the classroom.

Classroom Environment

A child, when it comes into this world, knows nothing. He/she learns everything from the environment and society. Although the home environment was more influential than the classroom environment in terms of students' attitudes, the classroom environment was more influential than the home environment in terms of achievement (Adamski et al., 2013). I believe that the teacher could influence the students' career directly or indirectly based on the mode of conducting their teaching practices in a classroom environment, and a good classroom environment can promote students' learning and affect their academic efficacy and adaption as a large amount of time of the student is spent in the classroom. In contradiction, the passive instructions and teacher center approaches in the classroom are the barrier to the meaningful learning of mathematics. For the students, the classroom is not just an intellectual space. Moreover, it includes a social, emotional, and physical environment. If we have to divide the classroom environment, we can see from the two dimensions; first physical and second psychological environment. The physical environment includes the physical conditions of the classrooms like furniture arrangement, seating arrangement, temperature, lighting, different wall paintings, etc. On the psychological climate, students' relationships with peers and teachers, security of the students, and teaching and learning are included. For learning, both types of environments play an important role.

A classroom environment is the learning environment that teacher creates in the classroom that will maximize instructional time to help students feel secure and supported and motivate them to learn and get succeeded. It includes the choices that

teacher makes about expectations, rules and regulations, discipline and reward system, class procedures, seating arrangement, available tools and resources, and class culture. As students learn to work with each other in cooperative learning situations, they are provided chances to discover alternate ideas and to establish models of problem-solving. That is, students are given opportunities to develop working relationships with their peers and to establish a learning environment. Thus, through discourse and interactions, the students, along with the classroom teacher, shape the environment of the mathematics classroom. So, after reviewing this theme, I came to know that mathematics teachers need to create a learning environment for better achievement of students and to create such an environment, mathematics teachers need to play different roles.

Communication

Communication is sharing feelings, ideas, and views with others. In the classroom, the meaning of communication is related to the messages which constitute the teaching and learning process. Communication is the means by which the feelings and attitudes of teachers and students are conveyed to each other in order to establish cooperation and get the learning outcomes. So, communication is an integral part of the teaching and learning process. If there is no proper communication between teacher and students, then the objectives of the education can't be attained. So, mathematics teachers must communicate with students properly for effective teaching and learning. Communication and interaction in the mathematics classroom are critical elements for learning mathematics with understanding (Soucy & McCrone, 1997). Proper communication between teacher and students in the classroom includes the conveying of clear messages by the teacher and the teacher's receiving clear messages from students. Interaction between teachers and students primarily occurs

within the classroom, but communication also occurs outside of the classroom (Frymier, 2005). For proper communication in the interaction between mathematics teachers and students, the role of mathematics teachers is important. Mathematics teachers can play the role of mediators, catalysts, etc. in classroom interactions.

Democratic Practices in Mathematics Classroom

Democratic education refers to the fact that all the individuals regardless of their economic status should get hold of civic values, knowledge and skills that are required to establish democracy in a society, it includes freedom to choose learning without any obligations, democratic processes, civic values, citizenship and school governance and global aspects and self-actualization (Alshurman, 2015). Every student in democratic classroom have right to learn without any kind of biasness and pour their feeling and ideas among them. Even students get equal chance to participate in the classroom activities and interact with each other.

Democratic practices in mathematics classroom may have a positive impact on students' learning outcomes and it is essential in the classroom to nourish the different aspects of students' learning and prepare them as future citizens (Daher & Saifi, 2016). Mathematics teachers need to encourage the students who seldom respond in the classroom. The teacher should be friendly enough so that the students are not afraid of making mistakes, and should not show priority to any student over others in any matter nor discriminatory when dealing with students. Ample of opportunities must be provided to the students from the diverse backgrounds to participate actively in classroom activities and classroom interactions.

Theoretical Review

According to Cohen et al. (2018, p. 68), "A theory is a statement, suggestion or proposition that brings together concepts and constructs into a coherent whole,

framework or system which has clearly set limits and assumptions. The theory guides the research to the destination". So, the theoretical literature review is the most important section. "Social constructive theory" and "Transformative learning theory" are reviewed which helped me to find the theoretical concepts which were used by different researchers previously in their thesis or dissertations, books, articles, journals, etc.

Social Constructivism Theory

We all construct knowledge by interacting, contacting others in a society. To see the scenario in-depth, I want to use the lens of social constructivism theory. Social constructivism assumes that social worlds develop out of individuals' interactions with their culture and society. Learners learn concepts or construct meaning about ideas through their interaction with others with their world, and through interpretations of that world by actively constructing meaning. Learners construct knowledge or understanding as a result of active learning, thinking, and doing in social contexts.

According to Chapman (2004) learning takes place in a social setting and emphasizes human interactions as a key factor to facilitate learning. Vygotsky (1978) believed that the lifelong process of development is dependent on social interaction and that social learning leads to cognitive development. It means social interaction is one of the inseparable parts of learning. Children learn more through interactions, social interactions on the basis of their prior knowledge. Learning happens with the assistance of other people. Cognition is socially situated, and knowledge construction is a social activity rather than an individual enterprise, an outcome of the dialectical relationship between individual and social context. Mental processes, including higher cognitive skills, have social origins. A fundamental aspect of Vygotsky's theory is the

Zone of Proximal Development (ZPD) (Jeon, 2000) which is a range of tasks that are too difficult for an individual to master alone but can be mastered with the assistance of adults or more skilled peers. Another part of this theory is scaffolding which is giving the learner the right amount of help or assistance at the right time. Scaffolding might appear at the beginning strongly, disappears on some occasions, and reappear when necessary (Ameriana & Mehri, 2014). Students must get sufficient help from their teachers and peers for better learning. If the teacher can provide adequate help to the students at the right moment, then she/he will definitely learn in a meaningful way. Knowledge is not gained by receiving the given knowledge from the other, but it is constructed by interacting with the experiential world. From a social constructivism perspective, a learning environment can be created where students construct their mathematical knowledge. Social constructivism theory calls for students to co-construct their knowledge through collaboration with their peers on meaningful activities. Interaction and collaboration are seen as key to learning success. The social context constructed in the course of their interaction helps to enhance the students' thinking and learning in the classroom.

The theory of social constructivism addresses that students' classroom interactions involve exchanges of mathematical knowledge with the teacher and with peers. The above description of the theory of social constructivism is appropriate with the belief that mathematics learning is a social phenomenon. Paying attention to the interactions and developing the ways of interacting for meaningful mathematical learning are the most important things the teacher has to do. So, the social constructivism theory emphasizes the interaction between mathematics teachers and students.

This lens of social constructivism theory assumes that learners construct knowledge socially interacting with society and culture and search for the roles of teachers for the better learning of the students in an interactive way. It helped my research study to know about situations of construction of knowledge needed to create by mathematics teachers like favourable classroom environment for the students, conducting different activities etc. Also, it includes scaffolding of the students for ZPD. Mathematics teachers need to interact with their students to know about students' level of understanding and give adequate help. For this, mathematics teachers need to play different roles to interact with students. So, this theory helped me to explore the roles of mathematics teachers in classroom interactions.

Transformative Learning Theory

Transformative learning theory is an adult learning theory, which Jack Mezirow first introduced. It is based on the principle that personal experience is an integral part of the learning process. This theory suggests that a learner's interpretation of the experience creates meaning which leads to a change in the behavior, mindset, and beliefs. It is described as being "constructivist, an orientation which holds that the way learners interpret and reinterpret their sense experience is central to making meaning and hence learning" (Mezirow, 1991). Transformative learning involves a radical change in sets of assumptions and expectations such as meaning perspectives, habits of minds, etc. This theory has two basic kinds of learning; instrumental and communicative learning. Instrumental learning focuses on learning through task-oriented problem solving and determination of causes and effect relationships, whereas communicative learning involves how individuals communicate their feelings, needs, and desires. Meaning structures are understood and developed through reflection. Mezirow states that reflection involves a critique of

assumptions to determine whether the belief, often acquired through cultural assimilation in childhood, remains functional for us as adults (Mezirow, 1991). Reflection is similar to problem-solving, and Mezirow talks about how we reflect on the content of the problem, the process of problem-solving, or the premise of the problem. Through this reflection, we are able to understand ourselves more and then understand our learning better (Mezirow, 1991).

Mezirow also proposed that there are four ways of learning, and they are "by refining or elaborating our meaning schemes, learning new meaning schemes, transforming meaning schemes and transforming meaning perspectives (Mezirow, 1991). These four processes can be refined as (a) Elaborating an existing point of view, (b) Establishing new points of view, (c) Transforming our point of view, and (d) Transforming our ethnocentric habit of mind. Firstly, learners describe their viewpoints when seeking further evidence to support our initial bias regarding a group and expand the range of our point of view. Secondly, learners establish new viewpoints when encountering a new group and create new negative meaning schemes for them by focusing on their perceived shortcomings as dictated by our propensity for ethnocentricity. Thirdly, learners transform their viewpoint by having an experience in another culture that results in our critically reflecting on their misconceptions of this particular group. Fourthly, learners transform their ethnocentric habit of mind by becoming aware and critically reflective of our generalized bias in the way we view groups other than our own.

I experienced a change in my mindset after enrolling at Kathmandu University (KU). During teaching mathematics for 10 years, I just imitated my teachers who taught me. I used traditional approaches to teach mathematics like lecture method, rote memorization, etc. At that time, I believed that the strictness of the teacher was

an inevitable quality to teach mathematics. My mathematics teacher was very strict in nature, so I also behaved to students in the same way. Some of my colleagues said to me that I was so unfamiliar to them as I did not express my feeling, attitudes to them. Even I did not speak to them informally. I did not change my teaching methodology for so many years. I did not want to change because I was comfortable with my teaching. My mindset was fixed for teaching mathematics. After joining Kathmandu University (KU), I came to know that we can teach mathematics in a better way. Students must be in the center, and we need to focus on students centered approaches. Now, I have been teaching my students in an interactive environment. My perception towards teaching mathematics was transformed from traditional.

In the traditional approaches of teaching, teachers are supposed to be only the source of knowledge who transmits the knowledge from his/her head to the students' heads. Then whatever teacher knows was sufficient. But now, teachers need to be changed according to the time and context. They need to change their teaching methodologies, perceptions, and traditional mindset. Mathematics teachers need to play different roles in different situations. Students were suppressed, and they were not allowed to speak or interact in the traditional way of teaching. But now, teachers have to encourage students to participate in classroom interactions. They have to transform from knowledge givers to creators of the appropriate opportunities for learning. The mathematics teachers need to be up to date and make the students also up to date. For classroom interactions, mathematics teachers need to play different roles and change the traditional mindset.

Empirical Literature Review

In this review, I had gone through the research works of other researchers on the same topic or similar topic. Empirical literature review helped me to find the

research gap. I had conducted research on the topic “Roles of the mathematics teachers for the classroom interactions”. I explored the three dissertation papers on a similar topic.

Karki (2017) had done a dissertation on the topic “Classroom Interaction at Grade Ten”. The primary purposes of this research were to explore the existing situation of classroom interaction in English language learning, the usefulness of interaction in English language learning, level of interaction, and aspects of classroom interaction for its importance. When students were asked about interactive activities, 60% of teachers encouraged learners in interactive activities, 15% of teachers encouraged their students excellently, but 25% of them could not encourage their students to learn properly. Similarly, he observed the use of teaching material, and he found that a few teachers, only 5% teachers used the teaching materials in a proper way that was conductive and facilitative in learning. 25% of them used teaching material in improper ways and less conductive ways. 20% of teachers could not use the materials in a proper way, and they were also not nice looking. Other 50% of teachers did not use any materials.

Prestwich (2015) had conducted research during his master's in arts on the topic “Mathematical Interactions between Teachers and Students in the Finnish Mathematics Classroom”. The purpose of the study was to address the questions “What does mathematics instruction in the Finnish mathematic classroom look like?”, “Are the mathematical interactions of high or low quality with respect to cognitive demand?” And “Are there any patterns to the interactions that might help in better understanding Finnish mathematics instruction?” Eight Finnish mathematics classes, from sixth to ninth grade were recorded, translated and analyzed using the Mathematical Quality of Instruction (MQI) 2013 video coding protocol. Other aspects

and observations of these classes also were discussed. He found that the teachers gave solid instruction, which was primarily error-free. Students were focused and interacted with the teacher and other students throughout class time and seemed to be comfortable making comments and asking questions. Teachers and support staff, like special education teachers and aides, are available to help with student difficulties. Math happened throughout the entire class, without significant breaks in learning, and students, for the most part, stayed focused throughout class time. Students also seem to be building their mathematical knowledge on a solid conceptual base beginning in elementary school. Additional outside needs are also addressed, for example, sufficient breaks, healthy nutrition, and parent support. Multiple factors are being addressed in the Finnish school system which would contribute to the success of their students, and they are able to do this with less instructional time and less stress caused by measures like high-stakes testing.

Saputra (2019) had done a thesis on the topic "The Classroom Interaction between a Teacher and the Tenth Grade Students at SMA AI-Falah Islam Jambi". The purpose of this study was to explore the "How classroom interaction in English teaching-learning at SMA AI- Falah Islam Jambi is, and the reason of the teacher choose the type of interaction. The researcher found that the classroom interaction that occurs during the teaching and learning process generally runs well, which means that both the teacher and learner were cooperative to build the interactive condition in the classroom interaction. The researcher found three types of interaction: a) interaction among students or student-students interaction that happened during the small group discussion and during the classroom discussion b) teacher-students interaction that happened during class discussion and also happened when the teacher conveyed learning material and gave instructions to the students c) students- teacher

interaction that happened when the students find some difficulties in understanding the material or sometimes do not know the meaning of a word in English, they chose to ask and to discuss with the teacher.

Research Gap

The above research studies primarily are related only to the interactions between teachers and students in their own contexts, but none of them addressed the roles of teachers in classroom interactions. In my experience, teaching is a profession that requires a significant amount of time and dedication. After going through the empirical review, I planned to conduct research on the roles of mathematics teachers for classroom interactions, and the findings of my research were different. The significant gap I found in the above studies is the roles of the teachers for the classroom interactions

The research studies conducted similar to my issues are not specific in the subject matter I have reviewed. There are a few investigations or research in the roles of the mathematics teachers in classroom interaction in the context of Nepal. So, I plan to conduct this study on this topic to explore the different roles of mathematics teachers in classroom interaction for better teaching and learning mathematics.

Chapter Summary

In this chapter, I discussed various concepts by reviewing different literature available for my research study. These were the essential part that I needed to discuss for my research study since these reviews helped me to know about the roles of mathematics teachers, theoretical frameworks, and research gap. In the theoretical review section, I brought various theories that backed up and provided strength to my research from the existing theoretical trends in educational research. In other words, I conducted my research based on those theories. Similarly, the empirical review

section of my research study advocated that I did not find such an empirical research study done previously on a similar topic. I believed the literature review in this section had provided me with the necessary guidance and path to find my research goal.

CHAPTER III

RESEARCH METHODOLOGY

Chapter Overview

In this chapter, I have discussed the research methodology of my research study. I begin this chapter with my ontological, epistemological, and axiological assumptions. I discuss the interpretive paradigm followed by a narrative inquiry as a qualitative research methodology. Besides this, data collection tools and techniques of the research and the process of data analysis were also presented here. It further offered the information about the research site and research participants that I look forward to using in my research. It also includes the quality standards of my research along with some ethical considerations that I planned to preserve as a researcher.

Philosophical Considerations

I discussed ontological, epistemological, and axiological in relation to the roles of the mathematics teachers for classroom interactions in this section.

Ontology

Ontology is concerned with the nature of reality (or being or existence), and various ontological reflect different prescriptions of what can be real and what cannot (Willis, 2007). In this study, there are different contexts, such as classrooms and schools, and different participants from different backgrounds. The reality is different for each person according to their experiences. Also, the participants came from different contexts, environments, and cultures. The answers given by them are also different. I found multiple realities in a particular context. In this study, I have been bounded by exploring the multiple realities embedded in the culture of education.

These realities were derived from the participants' subjective interpretations based on their experiences of teaching mathematics to the students.

Epistemology

Narrowly, epistemology is the study of knowledge. It is concerned with ways of knowing and learning about the social world (Snape & Spencer, 2003). It is a philosophy that deals with how knowledge is constructed. It is concerned with the nature and forms of knowledge, how it can be acquired and how communication to other human beings (Cohen et al., 2007). In my research, I focused on producing subjective knowledge through prolonged interactions and engagement with my research participants. I brought the narratives of my research participants as the source of knowledge. I believe more upon that mathematics teachers can assist with students interactively for the learning mathematics and the roles of the teachers as a major factor. My epistemology in relation to my research agenda is concerned with the roles of the mathematics teachers for classroom interactions.

Axiology

Axiology is the philosophical study of value. It involves the values and belief systems of a paradigm comprising the study of values. In my study, my concern was how the mathematics teachers value the roles for the classroom interactions. I listened to know about my research participants' life experiences and stories and made the meanings by giving value to their ideas. I understand that axiology is concerned with the nature of human beings and their environments in particular. So, I respected the mental and emotional state of my research participants and valued them. Ontology of my research is affected by subjective experiences and socially constructed values.

Research Paradigm

The research paradigm governs the researchers' queries into the policies and practices of education. According to Willis (2007, p. 8), "A paradigm is thus a comprehensive belief system, world view, or framework that guides research and practice in a field." The purpose of my research study was to explore the roles of mathematics teachers in classroom interactions. So, I chose interpretative paradigm which enables researchers to build rich local understandings of the life-world experiences of teachers and students and of the cultures of classrooms, schools, and the communities they serve (Taylaor & Medina, 2011). I tried to understand and interpret the real-life experiences of the teachers and the cultures of their schools. I focused on the beliefs, stories, and teachers' experiences of their classroom interactions during the interview with the participants. This interpretive paradigm facilitated me to engage in the field for a longer period of time to understand my research participants' perceptions, beliefs, and attitudes towards the roles of the mathematics teachers for classroom interactions.

Research Methodology

A narrative research method, typically focuses on studying a single person gathering data through the collection of stories, reporting individual experiences, and discussing the meaning of those experiences for the individual (Creswell, 2012). I used narrative inquiry as a research method so that I could explore my research participants' experiences in my research study for the classroom interactions. The aim of my research was to explore the roles of mathematics teachers in classroom interactions. Narrative research best suits my research design because narrative research design helped me to describe the lives of individuals, collect and tell stories about people's lives and write narratives of individual experiences (Connelly &

Clandinin, 1990, as cited in Creswell, 2012). Also, it helped me generate the stories of my research participants with regard to the roles of the mathematics teachers for the classroom interactions and analyze them. As a narrative inquirer, my work is to research, to try to understand, to systematically inquire into the phenomenon of experience, that is, the storied experiences of people (Clandinin et al., 2017). By investing the quality amount of time in interviewing three participants, I explored the roles of the mathematics teachers for classroom interactions. During the interview, I went for an in-depth understanding of the research participant, focusing on studying individual participants, gathering data from stories, narrating individual stories, and making meaning from the data. I motivated my research participants to share their actual stories and experiences to understand their perspectives in their natural scenarios.

Research Participants and Sites

As a narrative researcher, I was dependent on my research participants for the information for my research study, which could be gathered from their lived experiences, ideas and stories. In purposeful sampling, the researcher intentionally selects individuals and sites to learn or understand the central phenomenon (Creswell, 2012). I chose the three research participants purposefully who had experiences of more than five years and taught mathematics in schools. To reach participants who met those criteria, I asked to my friends who are teaching mathematics for access to my research participants. Finally, I selected three participants (Bibek, Prakash, and Sanubabu) out of four candidates according to their will, enthusiasm and availability.

Two of them are teaching in the different schools of Lalitpur Metropolitan City, and one is teaching in the school of Kathmandu Metropolitan City. My research participants were dedicated and experienced secondary-level mathematics teachers

who taught for more than a decade in different schools. I selected these three participants to easily reach them for the interview according to the requirement of my research work.

Tools and Techniques

As my research was qualitative research through narrative research design, I believe an in-depth interview as an effective tool and technique for the data collection to conduct my research more effectively and strongly. One-on-one interview with open-ended questions (Creswell, 2012) was the process of data collection in my research study. To acquire the necessary information for my study, it was crucial to invest a substantial amount of time with my research participants having prolonged interaction. Taking proper field notes provided an additional assist in receiving the required information. Different kinds of literature were studied to support my research study.

Interview

An important technique or tool to collect information in qualitative research design is an interview. The interview is a flexible tool for data collection, enabling multi-sensory channels to be used: verbal, non-verbal spoken, and heard (Cohen et al., 2007). Interviews intend to provide detailed information on any topic. To ensure this, I conducted my research interview with semi-structured questionnaires, which provided plenty of space to present their view openly. Further, I tried to bring participants' livelihood experiences and stories in the interview. I worked immensely in making my questions short and understandable. The information they provided was encouraging me to conduct my research study, but in order to get additional information, I visited numerous mathematics teachers.

I used open-ended questions in the interview and made the field notes, audio and video recordings of the interviews conducted with my research participants. The interviews were taken in two rounds. After receiving the narratives, experiences, and ideas of the research participants based on the interview questions, I prepared for the second interview to get in-depth knowledge about the roles of the mathematics teachers for classroom interactions.

Data Analysis and Interpretation

The information collected through various data collecting tools and techniques were analyzed and interpreted wisely to make meaningful sense. It was really very difficult to draw the conclusion and relate the outcome with the research question and purpose. Qualitative data analysis involves organizing, accounting for, and explaining the data: in short, making sense of data in terms of the participants' definitions of the situation, noting patterns, themes, categories, and regularities (Cohen et al., 2007). For this, I transcribed the videos and audios that I have recorded during the interview. The data analysis process was then followed by systematic searching and arranging field notes that I have collected to simplify my understanding and to facilitate myself to present my findings in more effective ways. I felt that this process demands a deep understanding of the researcher towards the data and competency to draw the meaning from my research participants.

The data analysis and interpretation were carried out in a systematic manner. Initially, the collected data was organized and followed by presenting the findings accordingly. For this, I transcribed the interviews that I conducted and noted down the important information in points. Then only the findings were interpreted with critical analysis regarding the related theories and experiences. I went through different literature, theories, and articles of the scholars and tried to put my insight on the basis

of those theories, articles, and literature. I performed data analysis and interpretation by considering these three parts as major steps (Creswell, 2012) of data analysis and interpretation in my research study with qualitative research design. While interpreting the data, there is always some risk of misinterpretation of the collected data leading to wrong conclusions. Proper attention was given to the data analysis process. For this, I went through both the audio and video recordings of the interviews with my research participants multiple times to make sure that I did not miss any vital information and events.

Quality Standards

Quality Standards are vital to ensure the Reliability and Validity of the research. According to Babbie (2004) 'reliability' is a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time and validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration. Besides this, my research aims to preserve the following quality standards.

Trustworthiness

Trustworthiness is an important quality standard that every researcher must think about. Research findings should be as trustworthy as possible, and every research study must be evaluated in relation to the procedures used to generate the findings. The major ways that the researchers had adopted while drawing the conclusions from the data must be taken under proper consideration to ensure that the research study can be relied on (Graneheim & Lundman, 2003). I have always tried my best to maintain the trustworthiness of my research through the collection of data which I accomplished by going to the real field, authenticity through appreciating

social state, understandings the perspectives of participants. The research was conducted in a personal, social, and natural setting.

I assured that the conducted research is a comprehensive approach using multiple theories, data, and methods. To maintain credibility, I tried to ensure whether the findings were well presented as well as meaningful or not. By doing this, I could boost my confidence in my research findings. The research participants should be given an equal chance to express their feelings, beliefs, opinions about the topic to ease the environment. A semi-structured questionnaire was designed to ensure dependability in the research.

Similarly, due care was given to the transferability in my research, for which I tried to bring the findings of my research into practice for good. I tried to demonstrate how my research findings are equally applicable to other mathematics teachers for teaching mathematics in a better way.

Pedagogical Thoughtfulness

Pedagogical thoughtfulness is a quality of research writing that engages the reader (and the writer) in thinking about educational issues, especially teaching and learning (Ellis & Bochner, 2000). Through writing, readers should be made able to reflect on their own teaching. Through my research, I tried to explore the roles of mathematics teachers in classroom interactions. I believed that the findings of my research will pose high significance in classroom interactions and can contribute to the readers to get the insight about the roles they need to play to teach mathematics in effective way. So that students can get opportunities to learn mathematics in an interactively and meaningful way.

Ethical Considerations

Every research is highly sensitive to the moral characters and ethics of the researcher. It is the ethics of the researcher to respect the beliefs, opinions, and ideas of the research participants in the research study. I focused on keeping in mind that the nature of the research participants and the environment in which the research process is being carried out can change the outcome of the research. My research should be advantageous for the entire mathematics teachers, and it must be fruitful for the students and administrators too. Hence, I emphasized on setting up a good relationship with my research participants and also a comfortable environment in which the research is going to carry out. For this, I informed my research participants about the purpose of my study and how they are important as research participants. A good rapport with them played a vital role in assisting valuable information and data. It was a matter of concern to avoid unwanted information that may be presented during interviewing the research participants (Patton, 2002). At the same time, they were well informed well about their role in the research.

Furthermore, talking about the ethical considerations of the research, I have not done unavoidable force to the research participants with the aim of getting more information for my research. There was total freedom for them to get out of the research process whenever they desired. The process of the research would only be preceded after the permission of the research participants. Similarly, confidentiality was promised, which means information or data provided by them would be kept far from other people. Similarly, I was well aware that there must not be any type of physical and mental harm to the research participants during my research.

We can find researchers including information from others' research extensively. In other words, they try to present others' work as their own work. With

due care, without including any other researchers, I have tried to present my findings as it is; without any personal biases. Another important ethical issue that I tried to maintain in my research is participants would not be blamed for providing less information. I also ensured that the information provided was respected properly.

Anonymity

In my research work, I used the pseudo names of my research participants, institutions where they are working maintaining their anonymity. The essence of anonymity is that information provided by the research participants should in no way reveal their identity (Cohen et al., 2018). The principal way of ensuring anonymity is removing any means of identification of the research participants and use of code for identifying people.

Chapter Summary

In this chapter, I discussed the major methods that guided me to conduct my research study in an organized way. I tried to present insight for the ways of choosing my research participants who have supported me by providing valuable data and information that can contribute to addressing my research questions. I tried to make sure that my research included all the demanding quality standards and the factors that can ensure the validity of the research method were taken into consideration. Analysis of the data was carried out to meet the requirement for qualitative research since my research study has a qualitative research design. Due care was paid to interpreting the data in a wise way drawing the meaning crucial to uncover the cultural aspect of mathematics from the collected data. Furthermore, various ethical considerations that needed to be well cared about during my research study were well presented in this section.

CHAPTER IV

EXAMINING THE ROLES OF MATHEMATICS TEACHERS IN CLASSROOM INTERACTIONS

Chapter Overview

In this chapter, I presented the narratives of my three mathematics teachers' while in the next chapter, I presented my interpretation of their narratives to make meaning. Each participant shared their ideas about the interaction for meaningful learning mathematics and the roles for the classroom interactions. Each of them shared their experiences as mathematics teachers. While presenting their stories, I used their pseudo names. I analyzed their experiences and stories. Then I produced different themes based on their narratives. I presented the narratives of each based on generated themes.

Engagement With Mr. Bibek

Introduction

The name of the participant is Mr. Bibek (Pseudo name), resident of the Chandaragiri Municipality ward number 15. He had passed his S.L.C. from the Bright Future Secondary School, which was the renowned boarding school on his locality where he had read all the school levels. He completed his +2 level in the Science stream from Prashaadi Higher Secondary School. After completing +2 level, he joined the Tri-Chandra College and finished his bachelor. He has been teaching mathematics for eleven years. Currently, he is working at the Kathmandu Bidhyakunja School in Tokha Municipality.

Interview with Mr. Bibek

Due to the pandemic situation of COVID-19 in Nepal, it was not possible to meet him. So, I called him for an interview. I asked him about his free time, but he replied to me that he was very busy with his school works for two days. Then, I did not disturb him. After two days, I called him on his mobile and asked about the interview. I explained all the things about my dissertation work. He agreed, and we fixed the date and time of the interview. On the day of the interview, I sent him the text message for remembrance before 1 hour. He replied to me as he was ready for an interview. Then I planned to record the interview on my mobile set and video on the laptop. I set the time for an interview in 'Zoom Meeting' application, then I sent the link on the messenger. We were connected for an interview. The interview was started with an introduction.

After the introduction, I asked him about how he entered in teaching field. Then he replied to me that he started his teaching career from his nearest private school as there was no option for him other than the teaching profession or go abroad. In the teaching field, he found two subjects Science and Mathematics for teaching as he was a student of science. He supposed that he knew mathematics very well at that time so he had joined the teaching mathematics field. Luckily, he had got chance to work with one experienced and the founder member of the council of the mathematics of Nepal, who was the trainer of the mathematics teachers. After working with him, he got an interest in mathematics education. Then he decided to teach mathematics and do something in this field as he was encouraged. He remembered that in his third year of bachelor level, he had started his teaching career to earn some money and use his leisure time. At that time, he did not think that he would be engaged in the teaching field for a long period of time.

I asked him about his school days and mathematics class. Then he replied that as a student of school level, he was listed as a good student who performed well academically. He had no bitter experience of the school days, although he enjoyed his friend circle and schooling very much. But he had a fear of the mathematics teacher due to the strict nature of the mathematics teacher. He agreed that he learned so many things from school. But nowadays, as he is the teacher of Mathematics, he is angry with his mathematics teacher for the teaching method which his teacher used. At that time, they were prepared for the S.L.C. for securing good marks. In his school, there was an assumption that students who were good in mathematics could do other subjects easily, and they were prepared for the examinations only. They were never taught the skills of mathematics which ease the life of the people. And the teaching mathematics was stung on the two aspects one was read the formulae and solve the problems from the exercise book. Even the simple addition was not connected with the real-life events while teaching mathematics. They were more focused on the exercises of the books. So, he is angry with his mathematics teacher for not connecting the problems to real-life problems. If that happens, they could learn mathematics in a meaningful way.

Remembering the beginning days of his teaching career, while I asked about him the use of lesson plans, he replied to me that he did not know about the lesson plan. He would teach mathematics to the students as he was taught at the school level. After two or three years, he knew about the lesson plan, and he realized that lesson plan is the most important thing in teaching, which helps to develop clear ideas to the teacher about what to do in the classroom and how to manage the time in fruitful ways and it also helps to clear the doubts. He also stated that the lesson plan helps the teacher to achieve the required goal according to the curriculum. In the beginning

days, he would make the lesson plans for the problem-solving purpose only. But later on, he focused on the concepts so that students could be able to solve the other problems. He tried to connect the problems to real-life problems in two aspects. According to him, the first one is the introduction of the context and the second one is the application. The application is the use of the problems.

Then I asked about meaningful teaching and learning mathematics. He said to me that meaningful teaching mathematics is about connecting the problems of mathematics to real life. Still, he thinks that connecting to real-life or contextualizing is not only meaningful, but he argues that sense-making and fostering the sense of mathematics are the important aspects of meaningful teaching mathematics. Moreover, he finds the three aspects of meaningful teaching mathematics and they are contextualization, sense-making, and application. While solving the problems of mathematics, we think in different ways and connect the different things. If we could use this art of solving the problems to solve the problems of life, then it makes meaningful mathematics. To make meaningful mathematics teaching, the mindset of the teacher is the first factor that affects learning. Mathematics teachers need to think about why we are teaching mathematics. The second factor is planning, which negatively affects meaningful mathematics teaching if the mathematics teacher goes to the classroom without any plan and solves the problems. Then students will make the solution, but there is a lack of sense-making. And the third factor is the activities. Without activities, a teacher cannot know how much students learn just by looking at the faces of the students. In the classroom, using only the lecture method is not sufficient for meaningful learning of mathematics. Mathematics teachers need to develop different activities where students can show/learn the different skills. Interaction is the most important for meaningful mathematics learning, which happens

through various classroom activities. Mathematics teacher must not think that she/he is superior, knows everything, knowledge giver and whatever she/he says students must do accordingly, rather the mathematics teacher needs to think that she/he can also get the knowledge from the students. Mathematics teachers need to exhibit the image of the learner, explorer and then students also investigate, learn and explore the mathematics. Also, students become enthusiastic to investigate, learn, and interact. So that, collaboratively, mathematics teachers and students can construct the knowledge.

While asking about his experiences of teaching mathematics by connecting the contents to real-life, he shared his one teaching day. On any day of 2012 of his teaching, it was a turn of "Rounding off Decimal" chapter to teach. His students insisted on playing a game instead of learning. He did not write the topic on the board. Then he was agreed not to teach, but he made one clause. If the students were able to answer certain questions, then he would let them play. Then students were agreed with that proposal. He posed some questions to the students, like how many houses are in the Kathmandu valley? How many people are living in the Kathmandu valley? How many people were there in your locality? Then the students answered the numbers in round figures like the population of the Kathmandu valley is 40,00,000.

In that class, he also gave the work to plan for the picnic in which students had to estimate the foods, material, and cost. They planned for different materials and goods. Then he asked students to give few examples. Then they replied about the number of eggs. The number of students was 32, and the exact required number of eggs was 64 if each student was given two eggs. But while going to the picnic, maybe a few eggs would be damaged or would be broken, so they decided to buy 70 eggs. They came to the round-off in the number of the required materials and their cost of every material. They shared the quantity of the materials and their cost. The students

were engaged where they learned and participated enthusiastically. They came that every student had to pay nearly Rs475 to Rs 480. But they concluded the discussion with the conclusion that every student needed to pay Rs 500 with some stocks. While the mathematics teacher connects the contents of the mathematics to real-life, then the students interact spontaneously without any type of hesitation. He thinks that for the interactive classroom, the mathematics teacher needs to connect the contents of the mathematics to the real-life.

Then I asked about the interactive classroom and his activities lined to conduct the interactive classroom. Then he poured his thought and ideas. According to him, we mathematics teachers are unable to give everything to the students to search, explore and learn mathematics. Still, we have to tell them, teach them and show them how mathematics can be connected with daily life. We can ask them to put the viewpoint of the students about right and wrong and about the possible relation of the problem to real life. In the group, we can ask the students about the alternative methods of the solutions for the interactive classroom. If the teacher thinks that she/he is the only source of the knowledge and follows the information by doing the solutions of the problems on the board and explaining it with a loud voice only does not make the classroom interactive. For the interactive classroom, he used to ask the students to search the alternative solutions to the problems, how the solution could be found, and why that solution was for the problem. Suppose the teacher could make sense for that and share among students to students, teacher to students, and students to the teacher for the interactive classroom. Nowadays, there are so many videos and materials of mathematics. By showing videos and discussing that will really help for making the classroom interactive. While bringing the materials, the mathematics teacher can easily draw the attention of the students. How are the materials made? In

which topic is it helpful, and how does it clear the related topic? Discussing these types of questions can make the classroom interactive. The use of mathematical materials can make the students curious and enthusiastic, which helps to make the classroom interactive.

After pouring these thoughts and ideas about the classroom environment, I asked him about his own experience in his teaching by creating an interactive classroom environment. Then he shared his teaching "Place Value of Numbers" chapter. On one of the days of 2013 A.D., while he was teaching about the place value in mathematics, students often got confused about the question where the digits are repeated in the questions like 5676585. In this question, 5 comes in three places at ones, hundreds, and ten lakh places. To clear the confusion of this type of the question he asked his students what the relation of their father in a house is; students replied that he is a father of them and their grandfather calls him a son. How was your father known in office? Students replied as an employee. He added more that if your father plays games and is selected for the team, then how is your father known? Students replied as a player. Then he connected this example in the place value. He said to the students that according to the places and relations of an individual, the values or positions are changed. Similarly, the place values of the digits are also changing according to their positions.

Then he stressed on such a classroom environment where the students raise the questions without any hesitation and fear. They must feel free to share their ideas. While making activities, the mathematics teacher needs to design the activities where the students can focus and participate enthusiastically rather than in favor of the teacher. The mathematics teacher needs to make the students ask their own questions instead of asking the questions to the students. The development of ownership is the

major part of the interactive classroom. The classroom is not sole of teacher in place of that the students also have the share of that. The teacher needs to make students comfortable by using the appropriate languages.

He believed that through the activities, mathematics teachers could teach the students in an interactive way where all the students can be included. He applied the different activities to make the classroom interactive. He gave one example of the activity while I asked him about the example of an activity that helped him to make an interactive classroom.

Jigsaw Activity*:* He was satisfied with this activity very much. He said that through this activity, the mathematics teacher could teach a large number of the questions because, in one activity, students learn the number of the questions as their number of the groups. So, it reduces the time. According to him, by conducting activities, students felt the ownership and realized that they needed to speak, share the ideas and bear the responsibility. Moreover, there were two aspects one was the learning process, and another was the teaching process by which effective learning was happening. Even students became critical thinkers to reach accurate answer by interacting with their group members. It built collaboration and teamwork.

Then, I asked him about the importance of classroom interaction. Then he said that, "Our evaluation system is that where the one question from each chapter is asked and if she/he could do or solve that problem then it is judged that she/he knows everything. Without interacting with the students, teachers can't evaluate or know about the learning of the students. So, to know about actual learning, interaction is necessary. It is helpful to provide adequate support to the students by knowing the level of understanding by interacting with the students. It really helps to increase the level of the understanding of the students. He experienced that the ways of solving the

problems of his students are better than his own. He founded that the logical ways of solving the problems of students were far better than his way. In an interactive classroom, students get an opportunity to share those kinds of ideas, and they can build the sharing ideas. So, the interactive classroom helps the students to develop the skills of sharing, communicating, and critical thinking.

He found that the students were missing the conceptual knowledge of mathematics while he had examined the prior knowledge. He shared one of his experiences of interacting with his students. Students were asking about the slope= $\tan\theta = \frac{p}{b}$. Why is the tangent ratio equal to $\frac{p}{b}$? Then he showed the scale and put it on the surface of the bench, forming a right-angled triangle. Then students estimated the angles as inclinations of the scale. Then he asked the students about changing factors of the angle. Students found that perpendicular and base were changing, but the length of the scale remained constant. They realized that the changing factors of the slope are perpendicular and base. They concluded that the ratio of the tangent is the ratio of the perpendicular and base of a right-angled triangle.

Then I asked him about the roles of the mathematics teachers for the effective learning of mathematics. He opined that the teacher must have passion and patience. The mathematics teacher needs to make the plan to conduct the activities and plan for the classroom interaction. The teacher needs to create an environment for meaningful interaction where the students feel free to ask questions. Moreover, mathematics teacher needs to create the floor of the interaction. Mathematics teacher needs to be ready for the adequate support in proper situation of the learning.

Exchanging Gratitude with Mr. Bibek

I thank Bibek for sharing his experiences and thoughts instead of his busy schedule. He also thanked me for giving this opportunity to share his ideas about the

roles of mathematics teachers for classroom interaction and meaningful mathematics learning. He permitted me to use his narratives in my dissertation. For assurance, I sent him the transcribe data. He responded and said that everything was fine. Finally, I used his narratives in this research study.

Engagement with Mr. Prakash

Introduction

The name of the second participant was Mr. Prakash of age 35 years. His birthplace is Muga V.D.C., Dhankuta district. He had completed his S.L.C. in 2000 A.D., from Shree Jalpa Devi Higher Secondary School which is located at Pakhribaas V.D.C. Then he shifted to the Dhankuta headquarter, he joined the PCL level in science stream at Dhankuta Multiple Campus. After passing PCL, he came to Kathmandu, the capital city of Nepal. Then he joined the humanities stream taking mathematics as a major subject from the T.U. He has been teaching mathematics for 15 years.

Interview with Mr. Prakash

The situation of Nepal was getting worst due to COVID-19 pandemic in April, 2021. Our supervisor frequently encouraged me to complete my dissertation work. I planned to take the interview against these days. I asked my friend for the mobile number. He gave me the number, then I called him. I informed him about my purposes and dissertation. He agreed with me, and we fixed our time and date of the interview and it was for 3:00 p.m. on 28 April 2021. On that day, I called him at 11:00 am in morning, but he was very busy with his work and requested to postpone it for two days. Then we fixed the interview for 3:00 p.m. on 30 April 2021. We started the interview with an introduction.

After the introduction, I asked him about his schooling days, and then he replied that his primary school was an English boarding school, and later on, he joined the government school. He remembered that at the school level, he was a hard-working student. He was excellent in mathematics, so his friends would ask questions with him, and he felt very proud when he could do that question. He loved solving the problems of mathematics. Still, he remembered that some of the questions which his friends could not do, he would try a whole night with different methods. Those students who were good in mathematics would sit on the first bench, including him. His teacher used to solve the problems on the blackboard. Students interested in mathematics used to solve the problems of the exercise book based on the examples and the solved questions provided by the teacher. Sometimes his teacher called him and his friends who were good in mathematics to solve the problems on the blackboard. He was so happy to solve the problems in front of others. At that time, the teacher of mathematics would praise them for solving the problems.

Then I asked him about how he joined the teaching profession, then he replied to me in this way; after giving the examination of I.Sc., then he returned to his village, and he worked for one or one-half years as a mathematics and Science teacher at Baal Pancha Lower Secondary School. He also worked for a year in a private school which was nearer than the previous one. Then he came to Kathmandu and worked as a full-time mathematics teacher. He entered the teaching field because of his interest in mathematics. After passing S.L.C., he would teach the tuition classes to the brother and sisters of the village. Due to this activity, he was encouraged. After completing I.Sc., he saw the vacancy in science and mathematics, and then he went there. Most schools were giving priority to the mathematics and science teachers, and then he

became the mathematics teacher, and his journey of teaching mathematics begun like this.

While I asked him about his experiences of teaching mathematics, remembering his beginning days of teaching, he replied to me that while teaching in the first school, the students were as aged as him, and he felt that the students were like friends. He would teach students with enthusiasm and motivation though his colleagues used to sunbathe in the daytime. In the beginning days of the teaching, he would teach the students without any plan. He asked the students to take out the books and where they reached yesterday. He would do any examples of the topic and elaborate on that. Gradually he understood the qualities of the teacher and knew about the importance of planning. He would prepare the topic and materials a day before. He makes the plan for effective teaching and interactive classroom, which includes the different activities for that he searches the examples and the locally available teaching materials. Based on the curriculum, he uses daily life examples and materials. He focuses on the important questions which were asked in the exams. For that, he uses the inquiry method, or he would ask the students to do simple kinds of questions by using student ability and knowledge.

While I asked him about meaningful teaching mathematics, he said, "meaningful mathematics teaching is that which enables the students to solve the daily life problems." For that, he has given the example of simple interest. While her mother took the loan or paid the loan, he tried to calculate the interest by using formula $I=\frac{PTR}{100}$ but he failed. At the same time, her mother calculated the interest amount by using her fingers.

When I asked him about his role in the interactive classroom, he would make the students able to talk and express their queries for the interactive classroom. He

would ask the brain-storming questions which are related to the real life of the students. With respect to the questions, they express their prior knowledge, and he would scaffold them according to the necessity. For the interaction, there should be two or more are discussing and communicating to each other or expressing their thoughts to each other. Students need to be given priority or chance or push to express their thoughts, feelings. Students sit calmly because they have no idea or they do not know. We make them share the ideas and encourage them or give the value of their arguments or thoughts, it helps the students to be encouraged, and they will get the confidence to participate in the classroom activities. Sometimes mathematics teachers need to give the chance to put their thoughts in the group as well as individually.

I asked him about how he started his class and how he makes his classroom interactive. Then he replied that he started his class with the refreshment activities. Sometimes he would share the jokes, stories, sing a song. He would make the routine for the students to share the ideas, facts of mathematics every day which enables students to concentrate. According to the topics, he would conduct the group discussion. For example, to teach the types of the sets in class six, he divided the students into four groups. They were assigned the four types: Null or empty set, Unit or Singleton set, Finite set, and Infinite set. In each group, students were engaged to interact with their friends of the group. In each group, some of them were making meaning, some of them were making notes to present, some of them brought examples. He asked each group to present the type of group in which they were assigned. They presented very well with an example. From this activity, he found those students who were shy and introvert also participated actively in the group activity. By creating these types of environments, the mathematics teachers can increase the participation of the students in classroom interactions.

He believed that mathematics is made abstract and is made mysterious. It is not foreign, but it is our own subject. We have mathematics around us. If we can convey or teach mathematics as our own subject and we borrow the real-life problems to the classroom, then they will learn mathematics in a meaningful way. Then I asked him about his experiences of teaching mathematics through connecting the contents of mathematics to real-life problems. He suddenly replied me by giving the example of teaching simple interest to the class 7 or 8 which are as follow;

In the beginning days of his teaching mathematics, while he was teaching simple interest in class seven or eight, he would teach mathematics just by writing the formula on the board. He would ask the students to find principal (P), rate of interest (R), time (T) according to the questions of the textbook, and he used to apply the formula or he used to ask the students to use the formula to find the required answers. Later on, he used to give the context related to their lives. He asked the students to share the loans taken or given by their families. Some of the students were shared, and he made them calculate the amount of interest paid for Rs100. By which students learn to find the rate of interest in percentage. Similarly, students were asked to find the sum, time amount also. He remembered that to teach the simple interest he gave the students to play the roles like loan giver (saahu) and loan taker (rinni) for the interactive classroom. The loan taker asked for a loan, and the loan giver asked for how much, for how many years. Through the negotiation, they fixed the principal, time, and rate of interest. And various conditions were discussed, and other students suggested the participants solve the questions. This made the classroom very interactive, and students participated interactively to develop a deeper understanding.

While I asked him about the planning for the interactive classroom, he stressed the importance of the lesson plan for teaching mathematics. Mathematics teachers

need to make the plan for the interacting classroom. How to bring the issues and why those topics are selected, how the classroom can be managed. Mathematics teacher needs to play the major role for the interacting classroom. For the interacting classroom, mathematics teacher needs to bring the provoking issues or the issues which are related to the daily life of the students so that students enthusiastically participate in the classroom. After teaching with interactive classroom, students had got improvements due to improvements in the learning of the students, students, parents and school management were very happy. Even he got satisfaction in teaching mathematics. He shared his one of planning to conduct the classroom through activities in this way:

While teaching the circle chapter in class seven or eight, he had made a plan to teach the students about the value of the pie through the activity. He divided the class into a certain number of groups. Each group had to find the value of the pie (π). They needed to search the circular objects in the home like Bala (circular material which is worn in the hands), nanglo, etc. They had to find the center of the circular objects. They needed to find the diameter and circumference of the circular objects which they had at their homes as his instructions. They came to the school in next day with the measurements of diameter and circumference. If possible, they had to bring the circular materials to the school. Students brought the different circular things in the classroom like rings, and bala (circular material which is wore in the hands). He called each group of students to discuss the measurements and objects. He asked the groups of students to find the ratio of the circumference and its diameter ($\frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$). Each group had to present the value of the ratio, and they had presented. They got a certain decimal number, approximately 3.142…. The

ratio did not change with respect to the sizes of the circular materials. Then he concluded about the meaning of pie i.e. $\pi = \frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$ and value of the pie $(\pi) = 3.142 \ldots \sim \frac{22}{7}$.

Concluding his interview, he said that learning is not one way. Both teacher and students are the sources of knowledge. Everyone has an experience, and we need to listen to them. To draw the attention of the students and to make them enthusiastic, learners' interaction is necessary. Students know or learn more and understand them more. There are different types of students from different backgrounds in the classroom. Extrovert students can easily express their voices. We need to address and give a chance for the introvert or multidimensional students through the interaction in a mathematics classroom.

Exchanging Gratitude with Mr. Prakash

I thank Prakash for sharing his experiences and thoughts instead of his busy schedule. With him, I conducted several interviews through which I got a clear insight. He also thanked me for giving him this opportunity to share his ideas and experiences about the roles of mathematics teachers for classroom interaction. He permitted me to use his narrative in my dissertation. For assurance, I sent the transcribe data to him.

Engagement with Mr. Sanubabu

Introduction

The name of the participant is Sanubabu (Pseudo name), of age 31 years, and he is living at Dhapakhel, Lalitpur. Currently, he is working in the Premier International School, Satdobato, Lalitpur as a mathematics teacher. He had finished his school-leaving certificate level in 2005 A.D. from the nearest government school.

The name of that school is Shree Padhma Prakash Ma. Vi. After passing the S.L.C., he had joined the Pinnacle College at Lagankhel in Science faculty and successfully completed his higher secondary level education. Then he was admitted to Patan Multiple Campus in B.Sc. in physics group. He had completed his B.Sc. in 2014 A.D.

Interview with Mr. Sanbabu

As the date and time were fixed through the telephone conversation, we met at 1:30 P.M. on 25th April 2021 at his tuition center which is located at Dhapakhel, Lalitpur. I entered the compound of his tuition center. I saw the small paddy field behind his tuition center and an open meadow just in front. I parked my vehicle on the meadow and called him by mobile. He came outside and welcomed me with his tender voice me. We entered his office room. I noticed there was a drawer where the books on the different levels of mathematics were kept. He offered me tea or cold drinks. Then I called for a glass of water. After taking a glass of water, we discussed a few informal things. I took permission with him to record the interview. I narrate the interview with him as follows:

We started the interview with an introduction. I asked him about his hobbies, and he said to me that he had no particular hobbies and he was too busy. So, he could not do whatever he likes. He had the aim of being a mathematics teacher. So, after passing the S.L.C., he consulted with his teachers about it. He stressed that he chose this teaching mathematics so that students would get a chance to learn mathematics in a better way and they would not get the difficulties whatever he got at the school level. Luckily, he got an opportunity to teach at his school, from where he passed his S.L.C. in 2005 A.D. At that time, he used to teach the students as well as he continued his study. After passing B.Sc., he joined different private schools.

Although his favorite subject at the school level was mathematics, he was not satisfied with his mathematics teachers. There were two mathematics teachers at the secondary level one was from the government source, and another was from the private source. At that time, he and his friends were not able to ask obscure questions to the teachers because of the fear of the teacher. He told me that his teachers were not friendly. But he is one of the mathematics teachers, who was appointed from the private source used to the teacher very well. As a student, my first participant could not find the connection of mathematics to his own daily life activities and problems. In the context of Nepal, most of the schools are providing the knowledge for the preparation of the examination only. They are prepared for tackling the question which will ask in the examination. Students need to memorize the algorithms with steps and formulae. He also faced the same kind of problem. His mathematics teacher used to come to the classroom and do the problems on the blackboard, which they needed to copy.

I asked him about lesson plans, then he replied to me, to teach his students, he would make his plans by using modern technology, and he mainly focused on connecting the content with the daily life of the students. He would research the content on the internet to teach students in an interactive way. He opposed the traditional ways of teaching. He used to start the class by asking about the previous class and revise the content of the previous class, and discussing confusion. Then, he checks the prior knowledge of the students to enter the new chapter by asking some of the questions related to the chapter.

I asked him about meaningful teaching and learning mathematics. To him, the meaningful learning of mathematics is the connecting of the learning with daily activities, solving problems by using the learning, and teachers need to connect the

mathematics to the life of the students, which helps the students for long-term memory. He tries to make his teaching meaningful not only by drawing the figures on the board, but he also uses the papers while teaching TSA, CSA, and Volume of the Cone and Cylinder. Moreover, he gives examples of shapes that are available in the home. For example, while teaching the cylinder, he brings the example of the cylinder of the gas, different pipes, etc.

I posed my query about how he makes his classroom interactive, and then he replied, “Involvement of all the students without any kind of business can be made the interactive classroom.” He emphasizes the active participation of all level students in the classroom. While asking the question to students, they need to have an equal opportunity even low achiever students are given more priority. He stresses the use of familiar materials for the interactive classroom.

I asked him about the roles of the mathematics teachers in classroom interactions. He focused on the active role of the mathematics teacher in classroom interaction. The role of the teacher differs by the topic of the chapter. A teacher needs to manage the classroom properly. A teacher needs to guide the students about the topic and criteria for the students to avoid unnecessary discussion as well as so that students can achieve the required answer or learning. A teacher needs to be polite and encourage the students. Teachers should not distinguish the students by their intelligence, however, students need to be addressed equally. The teacher needs to monitor the students for accurate learning. Teachers need to be friendly so that students can feel free to ask obscure questions.

When I posed the question about the importance of the interactive classroom, he said that for the complete teaching or transmission of the knowledge, interaction is the most. In the previous era, it was believed that only the teacher could teach the

students. But through the interactive classroom, teachers also can get knowledge from the students. By dividing students into different groups, students can get the life skills like communication skills, working on team and presentations skill even students are able to share the ideas.

Exchanging Gratitude with Mr. Sanubabu

I thank Sanubabu for sharing his experiences and thoughts instead of his busy schedule. He also thanked me for giving him this opportunity to share his ideas about the roles of mathematics teachers for classroom interaction and meaningful mathematics teaching. He permitted me to use his narrative in my dissertation. For assurance, I sent him the transcribe data.

Chapter Summary

In this chapter, I have presented the narratives of the three mathematics teachers which includes their experiences and understanding. Also, I have explored their roles for classroom interaction while teaching mathematics in a meaningful way. The narrative of the Bibek was presented in the first, Prakash's was presented in the second. And the narratives of and Sanubabu were presented in third, respectively.

CHAPTER V

ROLES PLAYED BY MATHEMATICS TEACHERS IN CLASSROOM INTERACTIONS

Chapter Overview

In this chapter, I discussed and interpreted the narratives of my research participants- Bibek, Prakash, and Sanubabu, which were presented in chapter IV for the meaning-making process. I generated different themes according to their narratives. Some of the themes were common and articulated in separate way. I discussed all themes and drew meaning with supporting literature.

From the Narration of Mr. Bibek

Bibek is a highly dedicated and experienced mathematics teacher who has an experience of eleven years of teaching in different schools. He is very helpful and friendly. He had two choices at the beginning of his teaching career because he was from a science background. After meeting one of the renowned people in the field of mathematics education, he got an interest in mathematics. Then he chose to teach mathematics as a career. As a student of school level, he was listed as a good student who studied well. He had no bitter experience of the school days. He enjoyed his friend circle and schooling very much. But he had a fear of the mathematics teacher due to the strict nature of the mathematics teacher. He agreed that he learned so many things from the school. But nowadays, as he is the teacher of mathematics, he is angry with his mathematics teacher for the teaching method which his teacher used. At that time, they were prepared for the S.L.C. for securing good marks. In his school, there was an assumption that students who were good in mathematics could do other

subjects easily and they were prepared for the examinations only. They were never taught the skills of mathematics which ease the life of the people. And the teaching mathematics was stung on the two aspects one was read the formulae and solving the problems from the exercise book. Even the simple addition was not connected with the real-life events while teaching mathematics. They were more focused on the exercises of the books. So, he is not satisfied with his mathematics teacher for not connecting the problems to real life. He thinks that if that would happen, then they could learn mathematics in a better way.

Connecting the Contents of the Mathematics to Real-life to Promote the Classroom Interaction

On any day of his teaching, it was a turn of round-off chapter to teach. His students insisted on playing a game instead of learning. He did not write the topic on the board. Then he was agreed not to teach, but he made one clause. If the students were able to answer certain questions, then he would let them play. Then students were agreed with that proposal. He posed some questions to the students, such as: how many houses are in the Kathmandu valley? How many people are living in the Kathmandu valley? How many people were there in your locality? Then the students answered the numbers in round figures like the population of the Kathmandu valley is around 40,00,000 and from another corner around 35,00,000 etc. In that class, he also gave the work to plan for the picnic in which students had to estimate the foods, material, and cost. They came to the conclusion that every student had to pay nearly Rs 475 to Rs 480, but they agreed to pay Rs 500. They calculated the number of eggs as 70 when he asked the students, they replied that they were 32 in number, the exact required number is 64, but the eggs may be damaged or would be broken, so they decided to buy 70 eggs. They came to the round-off in the number of the required

materials and their cost of every material. They shared the quantity of the materials and their cost. The students were engaged interactively where they learned and participated enthusiastically.

On another day, while he was teaching about the place value in mathematics, students often got confused about the question where the digits are repeated in the questions like 5676585. In this question, five comes in three places at once, hundreds and ten lakh places. To clear the confusion of this type of question, he asked his students what the relation of their father in a house is, and students replied that he is a father of them and their grandfather calls him a son. How was your father known in the office? Students replied as an employee. He added more that if your father plays games and is selected for the team, then how is your father known? All Students replied as a player. Then he connected this example in the place value. He said to the students that according to the places and relations of an individual, the values or positions are changed. Similarly, the place values of the digits are also changed according to their positions.

From the above narratives of Bibek, I have articulated the themes such as connecting contents of the mathematics to real-life for classroom interaction. Here I developed the themes to address my research question and made meaning to relate it to the theory. After reading his narratives, it seems clear that mathematics teacher needs to connect the contents of mathematics to the real-life for the classroom interaction through which students learn mathematics in a meaningful way. In the above two stories, the contents of the mathematics like “round off and the place value” are connected with real life. According to Benson et al. (2009), the real-life connections provide a deeper understanding of the purpose of math concepts and skills. While he was teaching to the students, all the students participated

enthusiastically because they found the contents of mathematics in their lives. Students' participation is the most important in teaching. So, the connection of mathematics to real-life triggers classroom interaction.

According to Sarma and Ahmed (2013), mathematics is the only subject among all that we study which is used in every sphere of our lives. It is used in all the disciplines and fields of the world. Bibek sir also considers that mathematics is not far from our real life. He said, "We mathematics teachers are unable to give everything to the students to search, explore and learn the mathematics. Still, we have to tell them, teach them and show them how mathematics can be connected with daily life. We can ask them to put the viewpoint of the students about right and wrong and about the possible relation of the problem to real life. In the group, we can ask the students about the alternative methods of the solutions for the interactive classroom. If a teacher thinks that she/he is the only source of the knowledge and follows the information by doing the solutions of the problems in the board and explaining it with loud voice only does not make the classroom interactive." Classroom interaction is the collaborative exchange of thoughts, feelings, or ideas between two or more people, resulting in a reciprocal effect on each other that takes place in the classroom (Nuraini, 2019). For the interactive classroom, he used to ask the students to search the alternative solutions to the problems, how the solution could be found, and why that solution was for the problem. If the teacher could be able to make sense of that and share among students to students, teacher to students, and students to the teacher for the interactive classroom. He further stated that while mathematics teacher connects the contents of the mathematics to real-life, then the students interact spontaneously without any type of hesitation.

Arthur et al. (2018) said that the teaching of mathematics is made interesting to students when teachers are able to connect mathematical concepts to real-life problems and experiences as well as establishing an authentic connection between the various forms of mathematical knowledge. Connecting the contents of mathematics to real life is an important part of the interaction of the classroom. It gives life to the classroom. He also argues to connect mathematics to real-life for meaningful interaction in the classroom.

As a researcher and mathematics teacher, I also have the same kind of experience of connecting the content of mathematics to real life. While teaching that chapter of the equation, I used to find the ages of the students by giving the different conditions and used to solve that mentally. For example, if the age of one of the students is 12 years, then I used to ask him to multiply his/her age by two and add the five years; then what is your answer now? That student used to do on the paper and tell me the answer as 29 years. I solved the problems mentally, and I gave the answer them as your present age is 12 years. They were shocked, and I asked them to assign the variable x for the age and make the mathematical statement (e.g., $2x+5=29$) according to the given conditions and solve ($x = 12$). Through this example, I taught them the formation of an equation and found the value of the unknown variable. After teaching that method, I used to give the remaining time for asking a question and giving answers pearly. Through this, I also noticed that the students participated enthusiastically and learned so quickly. When they came to their ages, suddenly their interest arose, and they engaged with full of interest and energy. So, connecting the contents of the mathematics to the real-life mathematics teacher can increase the interest of the students then students actively participate in the classroom interaction.

Implementing Plans and Activities to Enhance the Classroom Interaction

Through the narration of the interview of the Bibek, I have developed another theme that is implementing plans and activities to enhance the classroom interaction. At the beginning of his teaching career, he did not know about the lesson plan. He used to teach mathematics to the students as he was taught at the school level. After two or three years, he knew about the lesson plan; he realized that lesson plan is the most important in teaching, which helps to develop clear ideas to the teacher about what to do in the classroom and how to manage the time in fruitful ways and it also helps to clear the doubts. According to Brahier (2013), "A lesson plan is a written document that details the goals and objectives, the necessary tools, and the activities to be used in a particular classroom teaching episode. It is a road map that can be used by the teacher to provide structure to the lesson." Bibek sir stated that the lesson plan helps the teachers to achieve the required goals of the curriculum.

After knowing that a lesson plan is important, he used to make the lesson plans for the problem-solving purpose only. But later on, he focused on the concepts so that students could be able to solve the other problems. Lesson plans provide classroom teachers with important resources for establishing lessons goals, deliberating about available resources, and designing activities accordingly (Lee & Takahashi, 2011). In his planning, he mostly tried to connect the problems to real-life problems in three aspects. The first one is the introduction of the context where he used to interact with the students to search the mathematics in real life. And the second one is the application. The application is the use of the problems. If the mathematics teachers go to the classroom without any plan and solve the problems only, then students will make the solution, but there is a lack of sense-making. And the third factor is the activities. Without activities, a teacher cannot know how much

students learn just by looking at the faces of the students. In the classroom, using only the lecture method is not sufficient for meaningful learning of mathematics. Mathematics teachers need to develop different activities where students can show/learn the different skills.

Nowadays, there are so many videos and materials of mathematics. By showing videos and discussing that will help for making the classroom interactive. While bringing the materials, the mathematics teacher can easily draw the attention of the students. How are the materials made? In which topic is it helpful, and how does it clear the related topic? Discussing these types of questions can make the classroom interactive. The use of mathematical materials can make the students curious and enthusiastic, which helps to make the classroom interactive.

He believes that through the activities, mathematics teachers could teach the students in an interactive way where all the students can be included. He applied the different activities to make the classroom interactive. He gave one example of the activity while I asked him about the example.

Jigsaw Activity: He was satisfied with this activity very much. He said that through this activity, the mathematics teacher could teach a large number of questions because in one activity, students learn the number of questions as to their number of the groups. So, it reduces the time. By conducting this activity, students felt the ownership and realized that they needed to speak, share the ideas and bear the responsibility. Moreover, there were two aspects, one is the learning process, and another is the teaching process by which effective learning was happening. He stated that “Even students became critical thinkers to reach the accurate answer by interacting with their group members. It built the collaboration and teamwork.”

Planning is the essential part of teaching mathematics, and activities are the means for learning. Planning to conduct different kinds of activities can increase the participation of the students in classroom interaction. Even mathematic teachers can increase the level of interest of the students by conducting activities. So, mathematics teachers can plan the activities for classroom interaction. He suggested that while making activities, the mathematics teacher needs to design the activities where the students can focus and participate enthusiastically.

Creating the Classroom Environment for Classroom Interaction

At the school level, he was good at mathematics and enjoyed his school days very much with his friends. But he faced the fear problem as most students faced at the school level. There was an assumption that mathematics teachers were very strict in nature. He also had the same assumption at that time that his mathematics teacher was very strict, so he and his friend could not be able to ask the questions. A classroom environment that was not positive and full of restrictions and rigid rules impaired their learning by narrowing a students' focus and inhabiting students' ability to explore multiple viewpoints and solve problems. His mathematics teacher narrated the traditional roles where the voices of the students were suppressed. Even his mathematics teacher used to prepare them for an examination only. Teaching mathematics was just for securing good marks in the examination. In the school, there was the myth or assumption that those students who were good in mathematics could do well in all other subjects. They were never taught about the mathematical skills which help to face real-life problems. The mathematics teacher of his school taught them in two perspectives, and one was to read the formula and use the formula to solve the problems of the exercises of the mathematics book. As a mathematics teacher now, he is not satisfied with his mathematics teacher about the teaching

methods adopted by him. He stated, “The mathematics teacher needs to create a learning environment where the students feel valued, safe and eager to learn.” According to Verma (2019, p. 1), “Classroom environment is one of the most important factors that affect student learning. An ideal learning classroom is when students view their classrooms as positive and supportive. It is a space where students feel safe and secure." Bibek Khadka also explained the role of the mathematics teacher to create such an environment where the students raise questions without any hesitation and fear. He also stressed that students must feel free to share their ideas. The mathematics teacher needs to make the students ask their own questions instead of asking the questions to the students. Development of ownership is the major part of the interactive classroom. He believed that the classroom is not the sole of the teacher in place of that the students also have the share of that. The teacher needs to make students comfortable by using the appropriate languages.

Teachers need to make sure that there will be a conducive atmosphere in the classroom to conduct an interactive lesson in the teaching and learning process (Nuraini, 2019). Mathematics teachers must think that the classroom is the students’ second home, so mathematics teachers must make students feel as comfortable as possible. Besides teachers, the classroom environment also influences the learning and teaching process. Mathematics teachers should strive to create an environment that is more focused to engage students and learning. A positive classroom helps to improve attention and supports in participation in classroom interaction. A positive environment is where children are able to work as a team, celebrate each other’s achievements, and learn from mistakes. It enhances students’ ability to learn and to be productive in the true sense of learning things on their own. A few factors that contribute to creating a positive learning environment are establishing a supportive

learning culture, addressing a learner's needs, and encouraging a student's involvement in all activities (Verma, 2019). Therefore, the classroom learning environment should meet the needs of teachers, students, and learning activities conducted, able to stimulate learning, and encourage active participation and more importantly, it has to be easily facilitated and monitored by the teacher (Ahmad et al., 2017).

From The Narration of Mr. Prakash

Prakash is a cooperative and professional teacher with a sound personality. He is always seemed happy and smiling. He has been teaching mathematics for 15 years. As a student, he was an excellent student in mathematics. His friends used to ask for help to solve the different questions. He confessed that he was good to do the algorithmic problems of mathematics. He did not get sufficient opportunities to connect the contents of mathematics to real-life for the classroom interaction. But he got the chance to do the problems on the blackboard so many times, by which he was encouraged and felt proud. Whenever he got the higher ability questions from his friends to solve, even he was engaged for late night to solve that kind of problems of mathematics. If he could do that kind of problems, he would feel very happy.

Connecting the Contents of the Mathematics to the Real-life to Promote the Classroom Interaction

He expressed, "Mathematics is abstract and is made mysterious. It is not foreign but it is our own subject. We have mathematics around us. If we can convey or we can teach mathematics as our own subject, and we borrow the real-life problems to the classroom, then they will learn mathematics in a meaningful way." According to Lemonidis (2008), mathematics teachers should be able to make connections between school mathematics and real-life mathematics. Prakash Tamang

also thinks that the contents of the mathematics must be connected with real-life for classroom interactions.

In the beginning days of his teaching mathematics, while he was teaching simple interest in class seven or eight, he would teach mathematics just by writing the formula on the board. He would ask the students to find principal (P), rate of interest (R), time (T) according to the questions of the textbook, and he used to apply the formula or he used to ask the students to use the formula to find the required answers. Later on, he used to give the context related to their lives. He asked the students to share the loans taken or given by their families. Some of the students were shared, and he made them calculate the amount of interest paid for Rs100. By which students learn to find the rate of interest in percentage. Similarly, students were asked to find the sum, time amount also. He remembered that to teach the simple interest he gave the students to play the roles like loan giver (saahu) and loan taker (rinni) for the interactive classroom. The loan taker asked for a loan, and the loan giver asked for how much, for how many years. Through the negotiation, they fixed the principal, time, and rate of interest. And various conditions were discussed, and other students suggested the participants solve the questions. This made the classroom very interactive, and students participated interactively to develop a deeper understanding.

The above strategies of teaching mathematics depicted the connection of the contents of mathematics to real-life. He also conducted the different activities by which the classroom interactions were promoted. In the above activities, the students brought their experiences from the outside of the school, and they played various roles. By playing the various roles and interacting with each other, they had learned the contents of mathematics. According to Masingila et al. (1996), there should be a constant interaction between in and out of school mathematical experience in order to

bridge the gap that keeps apart classroom practices and everyday life. This involves having students discuss their out-of-school experiences and what mathematics concepts and processes they used in those experiences.

Implementing Plans and Activities to Enhance the Classroom Interaction

After passing S.L.C., he would teach the tuition classes to the brother and sisters of the village. Due to this activity, he was encouraged. After giving I.Sc., he saw the vacancy in science and mathematics, and then he went there. Most schools seem to give priority to the mathematics and science teachers. In that situation, he was selected as a mathematics teacher from where his journey of teaching mathematics begun. In the beginning days of the teaching, he used to teach the students without any plan. He asked the students to take out the books and where they reached yesterday. He used to do any one example of the topic and elaborate on that. Gradually he understood the qualities of the teacher and knew about the importance of planning. He used to prepare the topic and materials the day before. He makes the plan for effective teaching and interactive classroom, which includes the different activities for that he searches the examples and the locally available teaching materials. Based on the curriculum, he uses daily life examples and materials. He focuses on the important questions which were asked in the exams. For that, he uses the inquiry method or he used to ask the students to do simple kinds of questions by using the students' ability and knowledge.

According to the topics, he would conduct the group activities for the classroom interactions. Here I have presented one of the activities which he conducted about the value of the pie.

While teaching the circle chapter in class seven or eight, he had made a plan to teach the students about the value of the pie through the activity. He divided the class

into a certain number of groups. Each group had to find the value of the pie (π). They needed to search the circular objects in the home like Bala (circular material which is wear in the hands), nanglo etc. They had to find the center of the circular objects. They needed to find the diameter and circumference of the circular objects which they had at their homes as his instructions. They came to the school in next day with the measurements of diameter and circumference. If possible, they had to bring the circular materials to the school. Students brought the different circular things in the classroom like rings, bala (circular material which is wear in the hands). He called each group of students to discuss the measurements and objects. He asked the groups of students to find the ratio of the circumference and its diameter ($\frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$). Each group had to present the value of the ratio and they had presented. They got a certain decimal number approximately 3.142… . The ratio did not change with respect to the sizes of the circular materials. Then he concluded about the meaning of pie i.e., $\pi = \frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$ and value of the pie $(\pi) = 3.142 \ldots \sim \frac{22}{7}$.

Through this activity, he found that every student of the class engaged in the learning. Moreover, students were interacting with each other about the materials which they had brought and measurements of the circumferences and length of the diameter. Most of the students came up with the materials and posed questions to him and their friends. Students were able to reach the value of the pie. In the classroom, teachers play important roles in maintaining the interactions among the students. Teachers set or design and also plan a lesson before having the lessons with the

students (Nuraini, 2019). Effective planning to conduct the activities increase the learning the mathematics interactively.

Teaching includes not only the physical expressions during which teachers interact with students, but it includes the time teachers spend preparing for those interactions. So, planning for activities to teach the students interactively demands the optimum time and labor. Mathematics teachers need to address the demands and challenges of classroom interactions. In particular, teachers must identify a particular mathematical topic to discuss and the means necessary to cover that topic without necessarily delineating the precise steps needed to teach that topic. Therefore, planning for reform-oriented instruction requires teachers to select specific topics or concepts and to identify particular activities, instructional strategies, and suitable materials for discussing and engaging students with the topics (Superfine, 2008).

Creating the Classroom Environment for Classroom Interaction

He starts his class with refreshment activities. Sometimes he used to share jokes, stories, sing a song. He used to make the routine for the students to share the ideas, facts of mathematics every day which enables students to concentrate. According to the topics he used to conduct the group discussion. For example, to teach the types of the sets in class six, he divided the students into four groups. They were assigned the four types: Null or empty set, Unit or Singleton set, Finite set and Infinite set. In each group, students were engaged to interact with their friends of the group. In each group, some of them were making meaning, some of them were making notes to present, some of them brought examples. He asked each group to present the type of group in which they were assigned. They presented very well with an example. From this activity, he found those students who were shy and introvert also participated actively in the group activity. By creating these types of

environments, mathematics teachers can increase the participation of the students in classroom interactions.

With the existence of teachers, children or learners will feel secure and accepted by the environment, and teachers help them learn together with the other learners. At this moment, teachers' role is to create an accessible environment for the children and make them feel secure and accepted, that is by creating a friendly atmosphere. This initial encounter is also the first step for learners to start to have interaction with their teacher and with the other learners in their class. Once children are comfortable with the classroom, they will be able to have their initial interaction with the teacher and the other children as well (Nuraini, 2019).

The understanding of mathematics teaching and learning has also shifted from a purely cognitive process to a more social process (Murata, 2016). So, students need to be given priority or chance or push to express their thoughts, feelings. Students sit calmly because they have no idea or they do not know. He thinks that the mathematics teachers need to make them share the ideas and encourage them or give the value of their arguments or thoughts, which helps the students to be encouraged. As a consequence, students will get the confidence to participate in classroom activities. Sometimes mathematics teachers need to give the chance to put their thoughts in the group as well as individually.

From the Narration of Mr. Sanbabu

Sanubabu is a professional teacher of mathematics who engages him with teaching too much. He has experiences of several years of teaching mathematics. He had made the plan to be a mathematics teacher after discussing with his school teachers, who encouraged him in a positive way. He stressed choosing this profession to teach the students in a better way so that they will not have to face the problems

whatever he felt. Luckily, he got an opportunity to teach his own school from which he had passed his S.L.C. examination

Plans for Connecting the Contents to Real-life for Interactive Classroom

Regarding his plans for teaching mathematics, he used to make his lesson plans by using modern technologies (Svetlana & Valentina, 2010), in which he focused on connecting the content with the daily life of the students. For the interactive classroom and effectiveness of teaching mathematics, he used to search/research the contents and methods on the internet. Arthur et al. (2018) said that "the teaching of mathematics is made interesting to students when teachers are able to connect mathematical concepts to real-life problems and experiences as well as establishing a connection between the various forms of mathematical knowledge." He also used to research the content on the internet to teach students interestingly and easily. He used to start the class by asking about the previous class and revise the content of the previous class, and discussing confusion. His teaching strategy is activating students' prior mathematics knowledge at the start of a lesson, and thus enabling them to build new knowledge on existing structures, is a practical translation of these insights (Lui & Bonner, 2016).

He stated, "The meaningful learning mathematics is the connecting of the learning with daily activities and solving the real-life problems by using the learning." Meaningful learning emerges in the context of what the learner already knows. So, he checks the prior knowledge of the students. He stressed that the teachers need to prepare or make plans for a mathematical environment in such a way that it offers learners some cues that relate to their preexisting cognitive structures and that can be used as an 'anchoring point' for embedding the newly learned material in the cognitive structure (Ausubel, 1968). He assumes that connecting mathematics with

daily life activities helps the students to participate actively in the classroom interactions and it also helps for long-term memory. He tries to make his teaching meaningful. So, he gave examples of the uses of papers for the demonstration of TSA, CSA, and Volume of the cone rather than drawing only figures on the board. He also found that while teaching the students by making plans and connecting the mathematics to real-life increases the participation of the students in the classroom interactions. He believed that teaching mathematics through making plans can make meaningful where students actively participate the classroom interactions. Students can learn presentation skills, communication skills through classroom interactions. He uses familiar materials for the activities where students can participate enthusiastically. The activities that teachers plan, and the sorts of mathematical discussions that take place around those activities, are crucially important to learning. Effective teachers plan their classroom discussions with many factors in mind, including the individual student's knowledge and experiences and the participation norms established in the classroom (Walshaw & Anthony, 2008).

Democratic Practices in the Classroom

According to Sanubabu, an interactive classroom can be made by the involvement of all the students without any kind of biasness. He emphasizes the active participation of all the students in the mathematics classroom, which helps the teaching and learning of mathematics. Teachers provide opportunities to students during democratic practices in the classroom to meet democratic values such as freedom of expression and participation, respect for diversity, equality, and tolerance. Teachers help students in actualizing and exercising democratic practices for their social development (Murtaza & Akbar, 2019). Mathematics teachers need to

manipulate the environment and make use of all opportunities to enrich and experience of students and to ensure their all-round development of personality. Questioning has been found to be a crucial part of mathematics classroom interaction, which seems to be significant to enable teachers to identify students' needs in mathematics (Dahal et al., 2019). So, he seeks equal opportunity to the students while asking the questions even he argues that the low achiever students have to give more priority. Uses of the materials in the math classroom can be helpful for the interactive classroom. He also uses different materials while teaching mathematics. He stressed the familiar material for the interactive classroom.

He focuses on the active role of the mathematics teacher in classroom interaction. The role of the teacher in the traditional system of teaching proved to be ineffective and inadequate for the students. The mathematics teacher in the traditional way of teaching appeared as the main agent of teaching and learning, where the mathematics teacher appears in the role of the information provider who passes the information only. Staying with this much role is not enough in this 21st-century. The role of the mathematics teachers must differ by the topic of the chapter. He does not believe in the static role of the mathematics teacher. Mathematics teacher needs to manage the classroom properly. The teacher needs to guide the students about the topic and criteria for the students to avoid unnecessary discussion as well as so that students can achieve the required answer or learning. A mathematics teacher is not a dictator or autocrat, but a friend, philosopher who does not interfere but co-operate.

The teacher needs to be polite and encourage the students. Teachers should not distinguish the students by their intelligence rather, students need to be addressed equally. The teacher needs to monitor the students for accurate learning. Teachers need to be friendly so that students can feel free to ask obscure questions. An

interactive teacher is the one who respects all the pupils, listens to them, and helps them to solve problems by themselves, as well as to mutually exchange good ideas with the way of his/her actions and his/her attitudes (Xhemajli, 2016).

He believed that for the complete teaching or transmission of the knowledge, interaction is the most. In the previous era, it was believed that only the teacher could teach the students. But through the interactive classroom, teachers also can get knowledge from the students. By dividing students into different groups, students can get the life skills like communication skills, working on team and presentations skill even students are able to share the ideas. According to Xhemajli (2016), with interactive teaching, the pupil is positioned in the role of a subject and equal partner of the teacher. Teachers who respect their pupils and the pupils' opinion organize the teaching process in a way in which the pupils acquire knowledge more easily. At the same time, they instigate pleasure and curiosity in them during the implementation of the program contents. Mathematics teacher needs to provide ample freedom, love, and sympathy to students for the classroom interactions.

Chapter Summary

In this chapter, I have discussed the different themes by the narrations of the valuable three research participants who shared their experiences and ideas about the roles of the mathematics teachers for classroom interaction. I have done meaning-making of the different themes with supportive literature.

Bibek stressed the roles of mathematics teachers to connect the contents of mathematics to real-life for the classroom interaction through which students learn mathematics in a meaningful way. He further stated that while mathematics teacher connects the contents of the mathematics to real-life, then the students interact spontaneously without any type of hesitation. He makes the plan for effective

teaching and interactive classroom, which includes the different activities for that he searches the examples and the locally available teaching materials. He believed that through the activities, mathematics teachers could teach the students in an interactive way where all the students can be included. He stated, “The mathematics teacher needs to create a learning environment where the students feel valued, safe, and eager to learn, which triggers the classroom interactions.”

Prakash also stressed connecting the contents of mathematics for classroom interactions where the teacher must borrow the real-life problems to the classroom. Effective planning to conduct the activities increase the learning the mathematics interactively. The planning for activities to teach the students interactively demands the optimum time and labor. Mathematics teachers need to address the demands and challenges of classroom interactions. Students need to be given priority or chance or push to express their thoughts, feelings. Mathematics teachers need to make them share the ideas and encourage them or give the value of their arguments or thoughts, which helps the students to be encouraged. As a consequence, students will get the confidence to participate in classroom activities which helps students to learn interactively.

Sanubabu made plans for connecting the contents to real-life for classroom interactions. He believed that teaching mathematics through making plans can make meaningful where students actively participate the classroom interactions. Students can learn presentation skills, communication skills through classroom interactions. He did not believe in the static role of the mathematics teacher. So, he played different roles while teaching mathematics, according to the contents. Teachers provide opportunities to students during democratic classroom practices to meet democratic values such as freedom of expression and participation, respect for diversity, equality,

and tolerance (Samanci, 2010 & Tammi, 2013 as cited in Murtaza & Akbar,2019, 2019).

CHAPTER VI

REFLECTIONS AND CONCLUSIONS

Chapter Overview

I have brought the reflections of my research process and conclusions of my research based on my findings. I have reflected on the process of my research and presented what I have learned after coming to the conclusion of my research study. This chapter highlights research question-wise findings from the meaning-making of interviews. Then, I have drawn some conclusions as well as some recommendations based on those findings. I have also included my journey of research where I have included my pain and pleasures along with my future plans.

In this chapter, I have presented all the events that occurred during my research study from the beginning to the end. I have also presented how I envisaged my research agenda, how I formed my research problems, a flashback of my theoretical perspective, reflection on my methodological map, how I responded to my research questions, conclusion, implication, and recommendation of my research study.

Envisioning My Research Agenda

I was enrolled in the nearest government school by my parents from where I finished my S.L.C. education. In my school life, I had a bitter experience. I still remember that while my mathematics teacher was checking the home works in the classroom, most of my friends did not do it. Few of my friends, including me, had done the homework. Suddenly he got angry, and he started to beat the students who did not do the home works. One of my friends fainted, and suddenly she was taken to

the hospital. After few days, she was discharged. She did not come to the school for a month. At that time, my sympathy went to my friend. Some of the questions came to my mind. Was that the role of the good teacher? Was that kind of behavior suitable to teach the students? Was he good/bad teacher? Were there alternatives ways to teach?

After passing S.L.C., I used to teach the tuition classes for the students of class 10. Then I got an opportunity to teach in my own school from where I passed my S.L.C. examination. After passing my bachelor's level, I got a chance to the institutional school to teach mathematic as a secondary teacher. From which my professional career as a mathematics teacher was started. In the beginning days, I used to teach mathematics as I was taught. I used to copy the teaching methods of my mathematics teachers. I used to create different boundaries for the students where they were segregated by the chains of the rules. I was familiar and comfortable with lecture-based methods, and I used the same. I had an illusion at that time in teaching mathematics. I did not provide free space to interact with students.

After teaching for nearly 10 years, in 2017 A.D., I was enrolled in mathematics education at Kathmandu University. This was the turning point of my life where I learned so many things which changed my perspective of teaching and learning. It changed my attitude towards teaching mathematics. Professors of KU taught us in interactive ways, which inspired me to do research in this field. I learned that mathematics could be taught interactively where teachers need to play different roles as facilitators for creating environments by using various progressive approaches such as project-based learning, inquiry-based learning, activity-based learning, etc.

In the beginning days of my research work, as a novice researcher I planned to work on the behaviours of the mathematics teachers' and achievement of the students. After several discourses with my supervisor, I made a change on my research agenda.

My eagerness to know about the roles of the mathematics teachers for the classroom interactions was increased after the discourse with my supervisor, then I came to do narrative inquiry of different mathematics teachers. By which the experiences and ideas of the mathematics teachers can be gathered or visualized for the roles of the mathematics teachers for classroom interactions.

Formulation of My Research Problem

The research question guided me to focus on the area of my study. At first, I was in a dilemma as to what would be my research questions. Then I went to my past experiences of learning mathematics at school. My research supervisor provided his quality time to me even he responded to me while I asked my queries at 9 p.m. He suggested to me for the in-depth study of the articles and research papers. I got a certain type of insight, and I was interested in exploring the roles of the mathematics teacher for classroom interactions. As I have bitter experience in learning mathematics due to my mathematics teacher, even there were no two ways conversations between mathematics teacher and the students. As a mathematics teacher, I had the experience of teaching students in an interactive way which helps the learning of the students. Going through these experiences as a student and as a mathematics teacher, I have developed my research question, “What are the possible roles of the mathematics teachers for the classroom interaction?” Then after several discussion with my supervisor, I had changed my research question as “How do the mathematics teachers narrate the roles for the classroom interactions?” After that, I made certain questions that helped me to collect the information from my three research participants in the form of narrative inquiry to obtain the answer to my research question. Then I sent the typed form of the questions to my supervisor. He edited few of the questions and encouraged me to take the interviews as soon as

possible. Then I requested for the interviews with different mathematics teachers. I took the interviews with them. After collecting the information, I converted the narrations of my research participant into the written form. I shared the narratives of three research participants with my supervisor. Then my supervisor suggested me reading more literature to generate the themes. I aimed to explore the roles of the mathematics teacher for the classroom interactions through the research question which I had developed.

Revisiting My Theoretical Perspective

I had read the different theoretical referents to use in my research work. In order to find the appropriate theoretical referents, I went through many theoretical referents and started to analyze which would fit my research. I studied lots of articles, papers searching online, and dissertations. Also, my supervisor provided me lots of papers, articles to me. Then, I discussed it with my supervisor. After discussing with him, I got insight about the theories that helped to my research work, and then I chose the constructive social theory and transformative learning theory as theoretical perspectives. The main aim of my research study was to explore the roles of mathematics teachers in classroom interactions. Vygotsky's social constructivist learning theory and Mezirow's transformative learning theory helped me to explore the roles of the mathematics teachers for classroom interactions. Also, these theories helped me to narrate the experiences, stories, and ideas of my research participants.

Revisiting My Methodological Journey

This is a research study that is based on interpretivism. Previously, I selected four research participants, one from a government school and three from institutional schools. I was not able to join her due to the pandemic situation of COVID-19, then I continued with three institutional schools. I could not visit them in their schools. I

explained to them about my research topic and objectives. I requested them to help me with my research by giving me valuable time for sharing their experiences, ideas and stories followed to be the ethical considerations that I was supposed to follow during the research. All the participants accepted my request to be research participants of my research.

In my research study, I applied narrative inquiry as a research method. I conducted in-depth interviews with my research participants to capture the mathematics teachers' experiences of playing different roles for the classroom interactions. Due to the pandemic situation of COVID-19, it was not possible to visit their schools. So, I informed about the scenario with my supervisor, he gave me permission. Then, I took interviews by using Google meet and phone calls. I did the audio and video recording of their in-depth interviews following ethical considerations.

After conducting the in-depth interviews, I made the typed form of the narrations. I sent all the narrations to my supervisor. He gave me suggestions for the theme generation. Then I went through the narratives of my research participants to develop the themes, which were the most difficult part and challenging task for me. For that, I had discussed with my supervisor for several times, and then he encouraged me to develop the themes so many times. I developed the themes based on the narratives by supporting literature and theories.

Responding to my Research Question

In this section, I have answered my research question based on theoretical perspectives. How do the mathematics teachers narrate the roles for the classroom interactions? During this, I collected the experiences, ideas, and stories of the three research participants from different schools. I transcribed the stories of my research

participants into the narratives. Then, I developed the in to two chapters as per my research question to capture narratives of participants.

Bridging to Connect the Contents of Mathematics to Real Life to Promote the Classroom Interactions

From the sharing of my three research participants (Bibek, Prakash, and Sanubabu), I found that the mathematics teacher is the bridge who joins the contents of the mathematics to the real life of the students. All of them want students to understand the mathematics that they are learning. According to them, they are trying to teach the concepts rather than algorithms. They pursued the students to put their views, opinions of the contents for meaningful interactions in the classroom which promotes the classroom interactions. According to Sarma and Ahmed (2013), mathematics is the only subject among all that we study which is used in every sphere of our lives. They believed that mathematics is not far from our world. Mostly they used to tell the students about the alternates of the solutions and make to find the alternatives of the solutions for the interactive classroom. All of them conducted group activities for the active participation of the students, which helped him in classroom interactions. All of my participants gave priority to the students to express their thoughts, feelings, and ideas. They made students share their ideas about the real-life connections of the contents of mathematics.

Mathematics Teacher as a Planner to Conduct the Activities for Meaningful Interactions

Planning is the key for mathematics teachers to conduct the classroom in interactive ways. They made plans to conduct the activities. Planning for activities helped them to conduct the classes interactively. Students of their classrooms participated enthusiastically, and students were able to learn mathematics in

meaningful ways. They have been realized that lesson plans saved time and it helped to avoid the confusions which may occur while teaching mathematics. They used to make the planning by using digital instruments and search the contents on the internet for meaningful learning. They mostly used the activities according to the topics which they needed to teach. In the planning, they included the materials which are familiar to the students and the activities which eased the learning of the students. They focused on the group activities for the interactive classroom.

Mathematics Teacher as Creator of Learning Environment

The mathematics teacher needs to create a learning environment where the students feel valued, safe, and eager to learn. Three participants of my research study focused on the learning environments. Prakash used to start the classes by the warm-up activities. They made such an environment where students raise questions without hesitation and fear. To ask the obscure things and share the ideas, students must feel free. Students must feel ownership in the learning, for that teacher needs to interact with students with proper languages. Mathematics teachers must think that the classroom is the students' second home, so mathematics teachers must make students feel as comfortable as possible. Besides teachers, the classroom environment also influences the learning and teaching process. A positive classroom environment helps to improve attention and supports for participation in classroom interaction.

Mathematics Teacher as Implementer of Democracy

A teacher needs to be polite and encourage the students. Teachers should not distinguish the students by their intelligence rather, and students need to be addressed equally. A teacher needs to monitor the students for accurate learning. Teachers need to be friendly so that students can feel free to ask obscure questions. An interactive teacher is the one who respects all the pupils, listens to them, and helps them to solve

problems by themselves, as well as to mutually exchange good ideas with the way of his/her actions and his/her attitudes (Xhemajli, 2016). Democratic values like liberty, equality, fraternity justice, the dignity of the individual, co-operation sharing of responsibility, etc., are applied to education to make it more effective and meaningful. My research participants are also applying democratic values like behaving students equally, providing equal opportunities to learn and share. Students are encouraged to participate in classroom interactions. The poor students who had a low level of understanding were provided proper help by them. A mathematics teacher is not a dictator or autocrat, but a friend, philosopher who does not interfere but co-operate. All the research participants are creating situations of learning where every student gets equal chances to participate in the classroom activities and interactions.

Conclusion

During my research study, I collected the stories, experiences, ideas of my research participants through their narratives to understand how they have been playing the roles for the classroom interactions. I analyzed their roles from the lens of socio constructive and transformative learning perspectives. It can be concluded that the roles of mathematics teachers changed from the traditional roles. It is not sufficient to teach the students only solving the problems by using the chalk and talk method. The roles of mathematics teachers for classroom interactions change from traditional to modern. My research participants played various roles in classroom interactions. According to their experiences and ideas, the roles of mathematics teachers are the bridges that connect the contents of mathematics to the real-life for classroom interactions, a planner who plans for the activities according to the chapters or topics which leads the meaningful interactions between mathematics teachers and students, students and students. Mathematics teacher needs to practice democracy

where all the students get equal opportunities to learn. Mathematics teachers provide opportunities to students during democratic classroom practices to meet democratic values such as freedom of expression and participation, respect for diversity, equality, and tolerance.

Mathematics teachers need to create a favorable environment for classroom interactions. Mathematics teachers need to address the students' queries to be polite and courageous to students. Mathematics teachers need to arrange both physical and mental environments for learning interactively.

Implications

I am a mathematics teacher, and I have to teach mathematics to students who came from different parts of the country. While teaching mathematics, I realize that role of mine is not sufficient for them to facilitate. This study explored some important roles of mathematics teachers in classroom interactions. So, this study serves teachers, teacher educators, and experts for the effective roles of the teachers in classroom interactions. This study generally focuses on the mathematics teachers who want to conduct their classes in an interactive way, and it also inspires further research related to the roles of the mathematics teachers for meaningful learning.

Recommendations

While doing this research I have gone through several journals, articles, and research papers on the roles of teachers, mathematics teachers in classroom interactions and analyzed the narratives of my research participants. I would like to recommend the researchers to conduct the research to explore the roles of the mathematics teachers for the meaningful learning mathematics.

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APPENDIXES

Sample of Transcribed Interview

1. Could you please tell me briefly as to how did you enter in this profession?

Answer: I entered teaching field because of the interest on the mathematics. After passing S.L.C., I used to teach the tuition classes to the brother and sisters of the village. Due to this activity, I was encouraged. After giving the examination of I.Sc, I returned to my village and worked for 1or 1 half year as mathematics and Science teacher at Baal Pancha Lower Secondary School. I also worked for a year in a private school which was nearer than previous one. Then I came to Kathmandu, I saw the vacancy science and mathematics then I went there. Most of schools were given the priority for the mathematics and science teachers at that time. So, I was selected for the teacher, then I became the mathematics teacher and my journey of teaching mathematics begun like this.

2. ..... How do you start your class?

Answer: I start class by the refreshment activities. Sometime I use to share the jokes, stories, sing a song. I use to make the routine for the students to share the ideas, facts of the mathematics every day which enables students for concentration. According to the topics I use to conduct the group discussion. For example: To teach the types of the sets in class six, I divided the students in the four groups and assign them four types: Null or empty set, Unit or Singleton set, Finite set and Infinite set. In each group students were engaged to interact with their friends of the group. In each group, some of them were making meaning, some of them were making notes to present and

some of them brought the examples. I asked to each group to present about the type of the group in which they were assigned. They presented very well with an example.

3. How do you plan your daily agendas of the classroom?

Answer: In the beginning days of the teaching, I used to teach the students without any plan. I used to ask the students to take out the books and where they reached yesterday. I used to do any one example of the topic and elaborate about that. Gradually I understood about the qualities of the teacher and knew about the importance of the planning. I used to prepare about the topic and materials a day before. Now, I make the plan for effective teaching and interactive classroom which includes the different activities for that I used to search the examples and the locally available teaching materials. On the basis of the curriculum, I use the daily life examples and materials. I focus on the important questions which were asked in the exams.

4. Could you please elaborate about you planning for making classroom interactive?

Answer: I think mathematics teachers need to make the plan for the interacting classroom. It includes how to bring the issues and why those topics are selected and how the classroom can be managed. The role of the mathematics teacher is major for the interactive classroom. For the interacting classroom, mathematics teacher needs to bring the provoking issues or the issues which are related to the daily life of the students so that students enthusiastically participate in the classroom.

While teaching the circle chapter in class seven or eight, I had made a plan to teach the students about the value of the pie through the activity. I divided the class into a certain number of groups. Each group had to find the value of the pie (π).

Students needed to search the circular objects in the home like Bala (circular material

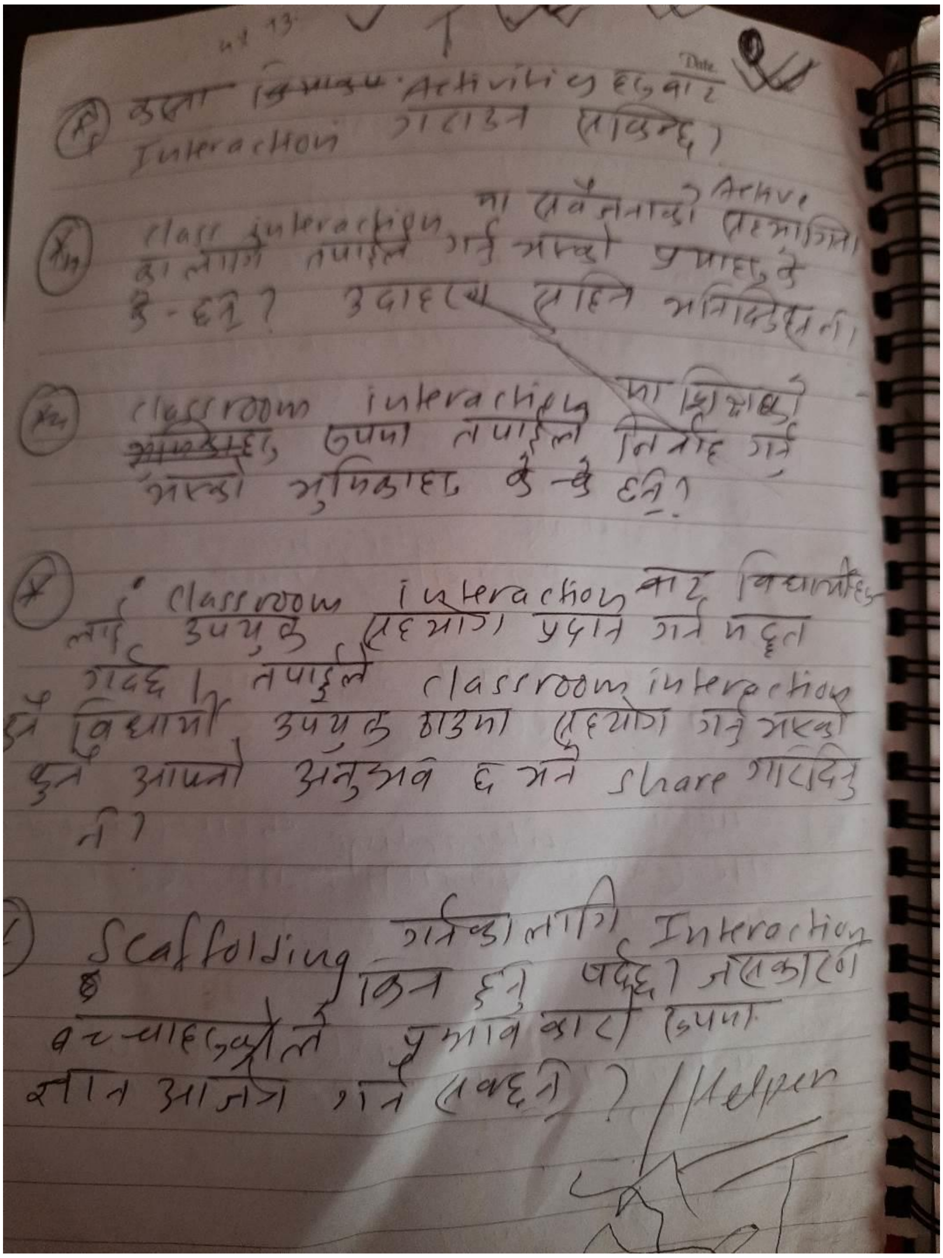
which is worn in the hands), nanglo, etc. Students had to find the center of the circular objects. They needed to find the diameter and circumference of the circular objects which they had at their homes as his instructions. They came to the school in next day with the measurements of diameter and circumference. If possible, they had to bring the circular materials to the school. Students brought the different circular things in the classroom like rings, and bala (circular material which is wore in the hands). I called each group of students to discuss the measurements and objects. I asked the groups of students to find the ratio of the circumference and its diameter ($\frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$). Each group had to present the value of the ratio, and they had presented. They got a certain decimal number, approximately 3.142…. The ratio did not change with respect to the sizes of the circular materials. Then I concluded about the meaning of pie i.e. $\pi = \frac{\text{Circumference of circular object}}{\text{Length of its diameter}}$ and value of the pie $(\pi) = 3.142 \ldots \sim \frac{22}{7}$.

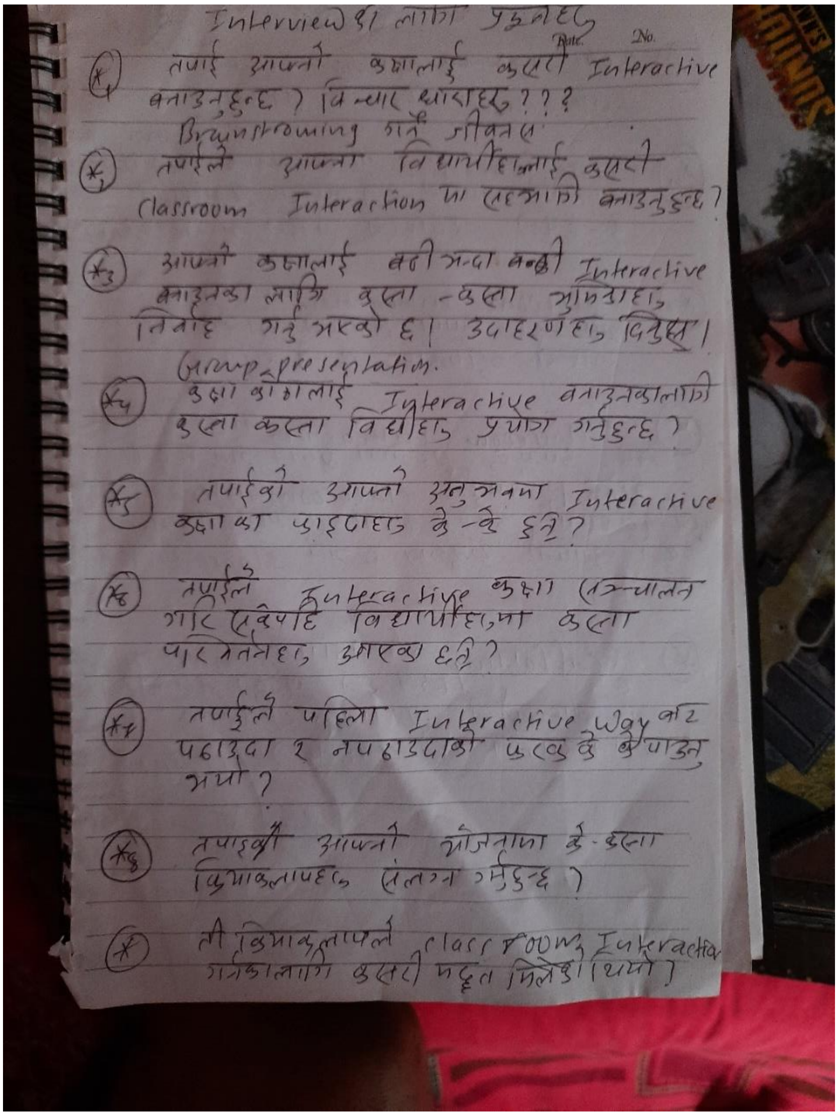
5. ..... How do you make your mathematics class interactive?

Answer: For the interaction there should be two or more are discussing and communicating to each other or expressing their thoughts to each other. Students need to be given priority or chance or push to express their thoughts, feelings. Students sit calm because they have no idea or they do not know. I make them to share the ideas and encourage them or give the value of their arguments or thoughts, it helps to the students to be encouraged and they will get the confidence to participate in the classroom activities. I give the chance to put their thoughts in group as well as individually.

6. Why do you think that the interaction among students and teacher is necessary?

Answer: Learning is not one way. Both teacher and students are the source of the knowledge. Everyone has an experience and we need to listen to them. To draw the attention of the students and to make them enthusiastic learner interaction is necessary. Students know or learn more and understand the more. There are different types of the students from the different background in the classroom. Extrovert students can easily express their voices. We need to address and give the chance for the introvert or multidimensional students through the interaction in mathematics classroom.


(१) कक्षा Activities हरुबाट Interaction गराउने तरिका?
(२) class interaction मा सबैजनाको Active सहभागिता का लागि तपाईले गर्ने गरेको प्रयासहरु के-के हुन्? उदाहरण सहित भन्नुहोस्।
class room interaction मा शिक्षकको भूमिकाहरु, उनमा तपाईले निर्वाह गर्ने गरेको भूमिकाहरु के-के हुन्?
Classroom interaction बाट विद्यार्थीहरूलाई उपयुक्त सहयोग प्रदान गर्न मद्दत गर्दछ। तपाईले classroom interaction बाट विद्यार्थी उपयुक्त ढंगमा सहयोग गर्ने गरेको कुनै आफ्नो अनुभव छ भने share गरिदिनु न?
Scaffolding गर्नको लागि Interaction किन हुनु पर्दछ? जसको कारणले बच्चाहरुको प्रभावकारी रुपमा ज्ञान आर्जन गर्न सक्दछन्?
Helper


Interview का लागि प्रश्नहरु

(*1) तपाई आफ्नो कक्षालाई कसरी Interactive बनाउनुहुन्छ? विस्तार धाराहरु???
Brainstorming गर्ने गीतहरु

(*2) तपाईले आफ्ना विद्यार्थीहरूलाई कसरी classroom Interaction मा सहभागी बनाउनुहुन्छ?

(*3) आफ्नो कक्षालाई बढी भन्दा बढी Interactive बनाउनका लागि कुन-कुन अभियानहरु निर्वाह गर्नु भएको छ। उदाहरणहरु दिनुहोस्।
Group presentation.

(*4) कक्षा कोठालाई Interactive बनाउनकालागि कुन कुन विधीहरु प्रयोग गर्नुहुन्छ?

(*5) तपाईको आफ्नो अनुभवमा Interactive कक्षाका फाइदाहरु के-के हुन्?

(*6) तपाईले Interactive कक्षा सञ्चालन गरिरहँदा विद्यार्थीहरुमा कस्ता परिवर्तनहरु आएका छन्?

(*7) तपाईले पहिला Interactive Way बाट पढाउँदा र नपढाउँदाको फरक के पाउनु भयो?

(*8) तपाईको आफ्नो योजनामा के-कस्ता क्रियाकलापहरु संलग्न गर्नुहुन्छ?

(*) ती क्रियाकलापले classroom Interaction गर्नकालागि कसरी मद्दत मिलेको थियो?