

**Classroom Discourse Practised by Female Teacher in Mathematics Classroom**

**A**

**Thesis**

**By**

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**In the Partial Fulfillment of the Requirements for the  
Degree of Master of Education**

**Submitted To**

**Department of mathematics Education**

**Central Department of Education**

**Tribhuvan University**

**Kirtipur, Nepal**

**2020**

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This is to certify that Mrs. Sumita Lamichhane, has completed her thesis entitled **Classroom Discourse Practiced by Female teachers in mathematics Classroom** under my supervision during the period prescribed by the rules and regulations of the Tribhuvan University, Nepal. The study embodies the result of investigation conducted during the period of 2019-2020 under the department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward this to the Department of Mathematics Education to organize final viva-voce.

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### Letter of Certificate

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This thesis submitted by Mrs. Sumita Lamichhane entitled on **Classroom Discourse Practiced by Female teachers in mathematics Classroom** has been approved as for the partial fulfillment for the requirement of Master's Degree in mathematics Education.

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**Declaration**

I hereby declare that this thesis is my original work. It contains no material which has been accepted for the award of other degree institutions. To the best of my knowledge and belief, this thesis contains no materials previously published by any authors due acknowledgement has been made.

.....

Mrs. SumitaLamichhane

## Acknowledgement

There are so many people who have encouraged, inspired and supported me throughout the research journey. First of all I would like to express my heartfelt gratitude and huge appreciation to all those supporters altogether. Writing this dissertation have been some of the most rewarding experiences in my life with the kind support and help of many individuals.

I would like to express my deepest gratitude to my supervisor Dr. Bed Raj Acharya, Head Department of Mathematics Education, Central Department of Education, Tribhuvan University, Kirtipur, Kathmandu, for his support, expert guidance, encouraging words, and great suggestions throughout my research. I am thankful to his academic and professional support as well as for his incredible patience and confidence towards my work.

Similarly, I would like to take this opportunity to express my immense appreciation to my external supervisor Prof. Uma Nath Panday for his encouragement, comprehensive advices, and invaluable suggestions to finish this dissertation.

I am grateful to my respected teacher Mr. Krishna Bhatta for his precious comments, guidance, and invaluable support to bring this research into present form.

I would like to extend my gratitude to mathematics teacher of Shivapuri Secondary School, Bhoj Bahadur Budathoki for helping me to find out school location and providing some useful advices to accomplish this research.

I would like to thank all the participants for accepting to take part in my research and for their cooperative response to all the research questions solicited. My research would not have been completed without their continuous support and contribution.

Finally, I would like to express my sincere appreciation to my husband Dinesh Dhungana for his unconditional support throughout this research. At last, I am sincerely thankful to all the supporters who helped and supported me directly and indirectly to accomplish this study.

### **Abstract**

The main focus of the study was to explore classroom discourse practiced by female teachers in mathematics classroom in basic level. The objectives of the study were to explore emerged classroom discourse practiced by female teachers in mathematics classroom and to explore the ways of making classroom discourse student friendly. To fulfill these objectives, the study has listed research questions: How is classroom discourse practiced by female teachers in mathematics classroom? How can female teachers make classroom discourse student friendly? And how teacher scaffold students to solve mathematical problems?

To investigate these research questions I selected qualitative research design with case study approach. The study sites of the research were Samundara Secondary School, Shivapuri and Shivapuri Secondary School, Maharajgunj. The participants of the study were 6 including 2 mathematics teachers and 4 students. I utilized purposive sampling method to select participants and observe classroom as well as conduct interview for data collection. The collected data were analyzed with the help of Vygotsky's learning theory and reviewed literatures.

The main finding of the research was female teachers were well known about lesson plan and practically using it before going to class. They know how to treat students according to situation and how to interact with them politely. I also discovered that head teacher's supervision and positive feedbacks encourage teachers to teach using appropriate classroom discourse. Furthermore, on the spot assessment in the class and homework encourage students to be active, responsible and hard working. The study also concluded that female teachers can make classroom discourse student friendly by using encouraging words and warm tones, through multiple representations and by applying collaborative learning. Likewise, teachers scaffold students by preparing to move forward recalling prior knowledge, giving them time to talk or interact with each other and providing guidance to solve problems in mathematics class.



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### Abbreviations

CA :	Chartered Accountant
Etc. :	Et cetera
Dr. :	Doctor
NCTM:	National Council of Teacher of mathematics
T.U. :	Tribhuvan University
Ph. D :	Doctor of Philosophy
ZPD :	Zone of Proximal Development
UNESCO :	United Nations Educational, Scientific and Cultural Organization
MKO :	More Knowledgeable Other
CDA :	Critical Discourse Analysis
Opt. :	Optional
T <sub>1</sub> :	Teacher Participant One
T <sub>2</sub> :	Teacher Participant Two
S <sub>1</sub> :	Student Participant One
S <sub>2</sub> :	Student Participant Two

## Chapter I

### INTRODUCTION

#### Background of the Study

Classroom discourse simply refers to the language that teachers and students use to communicate and interact with each other in the classroom. We can say classroom discourse is the process of face to face classroom teaching and interaction between students and teachers. Perhaps, language plays a more important role in mathematics teaching and learning than most of the people think. Students often unknowingly use mathematical language inappropriately. Classroom discourse indicates to the art of teaching using appropriate language (Nuthall, Graesser, Person).

The earliest systematic study of classroom discourse was reported in 1910 and used stenographers to make a continuous record of teacher and student talk in high school classroom(Christie, 2007). The first use of audiotape recorders in classroom was reported in the 1930s and during the 1960s there was a rapid growth in the number of studies based on analysis of transcript of classroom discourse (Christie, 2007). There was no clear concept and practice of classroom discourse before 1960. Since 1970s, many other studies such as linguistic, ethnographic studies that loosely seem to be educational in character have been offered among others (Lemke, 1998 & Hicks, 1995). Over the years, the concern about the discourse general and those of classroom discourse in particular, have changed. There have been two distinct approaches to explaining how classroom discourse relates to what students learn. Since 1960s large numbers of studies have been students verbal behaviours and interaction patterns such as asking higher-order questions, providing structuring information, praising students answers have been correlated with students achievement.

For many students, math class is a place where a teacher talks and students listen, responding only when called upon to answer a question. But by creating an environment in which rich classroom discourse can take place, Teachers help support student learning. Rich classroom discourse offers students a way to express their ideas, reasoning, and thinking in easy way. Classroom discourse can be a central element of acquiring mathematical knowledge and understanding the nature of mathematics. Regarding mathematics classroom teaching, the National Council of

Teachers of Mathematics (NCTM, 2000) has advocated an inquiry-based learning environment within which students are not only encouraged to explore, conjecture and solve problems but also facilitated to discuss and communicate their own ideas and thinking process. Thus students have opportunities to construct their understanding within the learning community. Furthermore, NCTM (2008) has confirmed that mathematics classroom teaching should provide students the opportunities to make meaning through discourse. This notion is reinforced in mathematics education literatures by stressing that “Mathematics learning as a social endeavor that is achieved through discourse (i.e. communication and interaction) in the classroom between teacher and students and among students” (Ball, 1993; Cobb, Wood, & Yackel, 1992, as cited by Griffin et.al., 2013, p. 9). In order to realize the importance of communication and interaction in mathematics classroom, Walshaw and Anthony (2008) categorized four discourse activities; to clarify the communication way between students and teacher in the class ; to scaffold student’s thinking to escalate forward; to fine-tune mathematical thinking through communications; and to shape mathematical argumentation and justification which delineate the general figure of mathematics classroom teaching with emphasize upon discourse (Mukhopadhyay, 2009).

Every teacher has a crucial role in front of students in teaching students with patience, giving them care affection and behave friendly. Here I am only talking about mathematics female teachers who are very less in number comparing to the male teachers. Analyzing the importance of female as mathematics teachers can reveal a lot of facts and help determine their influence on education, especially girls’ education. Irrespective of the percentage female teachers in the school education system, we must necessarily value their role as educators. When we succeed in provide female teachers an excellent working condition, they can contribute to the development of student’s education and the community as a whole. The success of students and the effectiveness of education largely depend on the job satisfaction of the teachers. When the female teachers are encouraged, given ideal working conditions and recognized morally and economically, they can perform their best in the classroom. More than this, professional training is highly essential for female teachers so that they are made capable to perform well as successful teachers. Also they can use

classroom discourse in a proper way and make students easy to understand mathematical knowledge.

In this regard, I explored about classroom discourse performed by female teachers in mathematics classroom for effective learning in the context of Nepal. The indepth study of classroom discourse adopted by female teacher is carried within community school. The focus of the thesis is based on only mathematics subject.

### **Statement of the Problem**

The classroom environment, mostly in teaching and learning efforts of recent years, would suggest that this is becoming a natural framework for a new balance and distribution of roles between the center and periphery, the teacher and students. (Dhakal, 2014). As education moulds and builds a new and better society that can face challenges of life with courage and conscience (Ruhela, 2000), the national/international community needs a proper methods of teaching as well as classroom discourses in aspects of everyday life for the betterment and justifiable reasons to the learners.

It is universally accepted that teachers are the backbone of teaching learning process along with students. If teachers communicate politely with students then students also become active and responsible towards learning. In the context of Nepal, female teachers are very low in number comparing to the male teacher who teaches mathematics subject. As person females are known as soft spoken, lovely, caring and kind hearted by nature. And which are essential qualities for Teachers along with good knowledge of content. So simply we can say females have natural qualities to be a good teacher if they have adequate knowledge of related content. It is a topic of concern that how female teacher communicate and interact in the mathematics class. As we know most of the students take mathematics as difficult subject. So my main concern of the study is how female teachers practice discourse in the classroom, to make difficult subject easy to understand and solve problems easily. Also I tried to find out the ways of making classroom discourse student friendly and sharing knowledge with good achievement.

## **Objectives of the Study**

We can't meet at the destination without any objectives. We should make specific objectives for completing every task or research thesis etc. So I defined some specific objectives to complete my thesis. Which are given as follow;

1. To explore mathematics classroom discourse practiced by female teachers in basic level mathematics classroom.
2. To explore the ways of making classroom discourse student friendly.

## **Research Question**

A research question is an answerable inquiry into a specific concern or issue. It is an active step in the research project or thesis writing. It helps the researcher to formulate and identify important aspects of their topic. A good research question is essential to guide our research paper, project or thesis. It pinpoints exactly what we want to find out and give our work a clear focus and purpose. Choosing research question is an essential element for both qualitative and quantitative research. So I declared following research questions of my study.

1. How is classroom discourse practiced by female teachers in mathematics classroom?
2. How can female teachers make classroom discourse student friendly?
3. How teacher scaffold students to solve mathematical problems?

## **Rationale of the Study**

In school curriculum mathematics subject is compulsory for all students. As well as it is very useful knowledge for our everyday life. Teaching mathematics is a difficult and challenges because of its abstract nature, course content, social need, student's interest and exploration of new fixed of knowledge. But it is fundamental base for those students who want to study science, management, hotel management, engineering, CA etc. Every field is incomplete without mathematics. Female as mathematics teacher in school level is a challenging job to do. Number of female mathematics teacher is very less comparing to male teachers. This study tried to find out how female mathematics teachers interact and communicate with students in the classroom. In the context of Nepal, this study can be more significant to those female teachers who are confused about classroom discourse as well as it provides some



useful ways to create students friendly classroom and how to interact face to face with students. The present study on the title ‘classroom discourse practiced by female teachers in mathematics classroom has following rationale:

- ) Teaching and learning strategies are the art of science so this approach is very useful for effective teaching.
- ) It also creates a strong relationship between teacher and students.
- ) The study would help to manage more appropriate strategies for better achievement in mathematics.
- ) The study provides the ideas how to minimize the learning difficulties in mathematics teaching.
- ) It provides an appropriate guideline to female teachers to make classroom student friendly.
- ) It helps to provide equal opportunity regarding gender equality.
- ) It helps to grown up positive attitude of students towards mathematics subject.
- ) It encourages female teachers to teach mathematics in appropriate way.
- ) This study would also open the gateway for the further study about the area of classroom discourse of female teachers.

### **Delimitations of the Study**

Delimitation describes the boundaries that we have set for the study. There are many variables that are out of the control of researcher. So it is a process of controlling those variables to limit the scope of the data included in our investigation.

This study is delimited to analyze and explore about classroom discourse used by female teachers in mathematics classroom. The research design is described only on the basis of qualitative perspective. To make my study as specific as possible I have listed out some delimitation of the study. Which are given below:

- ) This study is related to classroom discourse adopted by only female teacher.
- ) I have decided to delimit my study in Kathmandu and Nuwakot district only.
- ) This study conducted in 2 schools of Kathmandu and Nuwakot district where female teacher teaches mathematics.

- ) I explored about classroom discourse by female teachers with the help of classroom observation and interview.
- ) This study will concern only those teachers who are teaching mathematics in basic level.

### **Definition of Related Terms**

**Classroom Discourse.** It simply refers to the language that teacher and student used to communicate and interact face to face with each other in the classroom.

**Students.** In this study students refers to those student who are taught by female teacher

**Female Teacher.** Female teacher who involving in teaching mathematics in secondary level.

**Student Friendly.** Student friendly means suitable for student and designed with the needs and interests of students in mind.

**Teaching Learning.** Teaching learning an activity done inside a classroom for gaining and sharing of knowledge based in a fixed curriculum.

**Learning strategies.** Learning strategies are set of one or more procedures that individual acquires to facilitate the performance in a learning task.

**Scaffolding.** Instructional scaffolding is the support given to the student by an instructor or teacher throughout the learning process.

**Collaborative Learning.** Collaborative learning is a situation where two or more students learn or attempt to learn something together.

## **Chapter II**

### **REVIEW OF RELATED LITERATURE**

A literature review is a survey of scholarly sources (such as books, journal, articles, and thesis) on a particular topic. It gives an overview of key findings, concepts and developments in relation to a research problem or question. A good literature review doesn't just summarize sources, it also aims to analyze, interpret and critically evaluate the literature (Wikipedia). It is crucial for thesis writing because it describes how to propose research is related to prior research in statistics. It shows the originality and relevance of our research problem and specifically our research is different from other statisticians. To conduct an effective research, researcher are required to be familiar with related researches, theories, reports, articles, and education policies and programs that held in conceptualizing the problems, conducting and interpreting the findings.

#### **Empirical Review**

Various types of topic related literature were found in this study which helped me to clear concepts regarding topic and gained much knowledge for further plans. Some related literatures are as follows:

A journal carried out by Acharya (2017) entitled "strategies for making mathematics classroom discourse student friendly; an intercultural perspective" aimed to make student friendly classroom discourse from intercultural perspective and mentioned that to make mathematics classroom discourse student friendly, our teaching-learning activities should link with students daily life activities. Likewise, teachers can use teaching strategies that acculturate and enculturation of the students in their classroom. He also concluded that we can make classroom discourse student friendly by using different strategies in teaching learning mathematics in the classroom, avoiding rote memorization and implementing cooperative learning. In the context of Nepal, the existing classroom discourse in mathematics classes were basically teacher-centered which should be made student-centered.

Another research by Hem Raj Dhakal (2014) entitled "Classroom discourse in Nepalese schools: A cultural perspective" in which the researcher did inquiry for following research questions; how is classroom discourse practiced? How does the

classroom culture affect the discourse? The researcher also revealed that from the observation of opt.mathematics classroom. However, the method of teaching was traditional and the teacher did not seem to enable students to explore new ideas on the topic of the presentation, the students seemed to be motivated towards the lesson and the teacher had good relation with students in the classroom. The interactive phase of the lesson was not that much satisfactory though the teacher rewarded student's attempts and success. There was clarity in giving direction, linking ideas and activities with the lesson providing prompt response and feedback, using intrinsic and extrinsic rewards and rephrasing subject matter appropriately. He also concluded that classroom should be marked by the active presence of both teachers and students. Interestingly, the interactive, communicative and ideational mode of discourse was visible to a limited to a limited extent only indicating the more mechanical nature of our classroom situation. Given this situation, classroom discourse is therefore expected to be more vibrant and interactive. This is still desired to happen to bear the true meaning of a rewarding classroom discourse.

Moreno (2015) carried out the Ph.D. entitled "Discourse and knowledge in two community colleges developing mathematics classroom". He raised the research questions: What are the patterns of participation on a developmental mathematics classroom? What are the norms for classroom discourse reflected by these patterns? How do these norms relate to a discursive focus on conceptual vs. procedural knowledge? To address these research questions the researcher selected qualitative design with ethnography approach. He used classroom observation and interview guide with teachers and students were the main tools to collect the information.

The examined regularities in the classroom activity to define pattern of participation that framed the social and socio-mathematical norms fostered in each classroom. Classroom norms depended the understanding of how teachers invited students to participate in classroom discourse and the roles teachers and students played. Supported by the teacher known answer questions, monologue discourse in one of the classroom was focused on role memorization of mathematical procedures, where as a less monologue discourse in the other focused on understanding these procedures. Then he concluded that classroom discourse and normative pattern guide influence students learning in ways that can improve mathematical goals.

Moore (2000) carried out the Ph. D. research on the title, “The role of students discourse in mathematics achievement of African American male high school students”. He searched the research questions; what effect, if any, does students discourse have on the mathematics achievement of African American male high school students? How do students discourse and perception inform pedagogical consideration in improving the mathematics achievement? He used Vygotskian social constructivism to analyze the information. He concluded that discourse as outlined in the Professional Standards for Teaching Mathematics (NCCTM, 1991) played varying roles in the mathematics goal as result of the participants.

A research prepared by Xiong Wang (2015) entitled “Reflection on mathematics classroom discourse: The perspective of critical pedagogy concluded that critical pedagogy advocating removal of the hegemonic barriers from the classroom provides us with a critical perspective of reflecting upon the dominant discourse from teachers, In particular, about the cost of exclusive discourse, in the mathematics classroom teaching. In fact, teacher intended to encourage students to participate in discourse as much as possible. For example, Pimm (1984) explored that we were so often involved in the mathematics classroom teaching to build a learning community. The presentation of interactive discourse and the indication of exclusive discourse provided here are expected to be regarded as a trigger for further consideration into the dominant discourse in mathematics classroom teaching.

Jeff Todd (2018) carried out the research entitled “How to improve mathematical discourse in your classroom” has stated that we should practice discourse step by step in mathematics classroom.

Step 1: Review the importance of mathematics discourse.

To promote quality mathematics discussions, students need to understand why discourse is important. Student need to be reminded the communication is helpful for understanding mathematical concepts.

Step 2: Establish a community.

Establishing a learning environment that welcomes student involvement is the key to engaging students in discourse. If students know the classroom is a safe space to

communicate in, they will be more willing to discuss math with their peers during discourse.

### Step 3: Facilitate Student Interaction.

Simply posing a question that encourages discussion does not guarantee successful math talk. Mathematical discourse begins with student interaction. The ability for all students to reach high levels of reasoning for all students is greatly enhanced by training students to have good peer and class discussions.

To improve mathematics classroom discourse we need to promote interaction when students work in pairs. One thing we can do when we want to help students to have better interactions in pairs is to provide sentence frames or scripts for their conversations. Especially if students have little experience in discussing math with partners in the classroom, Teacher might give them a simple script for comparing their answers on last night's homework.

A case study on the topic "Mathematical classroom discourse in a fifth grade classroom" revealed that students in general were exposed to instructional activities that may potentially foster their procedural thinking. But conceptual thinking was not the focus of instruction in most of the lessons. Also, students were rarely given opportunity to solve non-routine problems demanding high level cognitive thinking skills, develop multiple solution methods and justify their solution. The mathematics classroom is expected to be a community where the teacher fosters critical thinking, sharing, agreeing and disagreeing. These essential features are expected to enhance the quality of mathematical discourse in classroom. This study also concluded that traditional teaching methods still dominate mathematics classroom. Mathematics teachers play a crucial role in process and content of classroom discourse. Observational data from the study showed that teacher should be active as well as students to orchestrate the class effectively, to encourage children to involve in discourse community and to create a learning environment parallel with curriculum goals. They need to be aware of the necessity of improving their own content knowledge and pedagogy. To support this improvement, it is inevitable to follow and learn changes and new approaches that have developed in the field of education.

A dissertation written by Lila Karki (2019) entitled, “ Classroom discourse of female students in culturally diverse students” declared objectives; to explore the classroom discourse of female students in mathematics classroom and explore the ways for making classroom discourse female students friendly from multicultural perspective. She also produced the research question: How are existing teaching-learning strategies in classroom? How we make classroom discourse female students friendly? Dealing with these questions she concluded that variety in teaching learning strategies make classroom discourse student friendly. In the context of Nepal, existing classroom discourses are more teacher centered and only focus on elaborative and recapitulation phase.

### **Gap between empirical review and research**

I reviewed some articles, case study, journals, and dissertations related to my thesis topic. From those resources, I found out that existing teaching methods for teaching mathematics are mostly teacher centered and those methods were effective only in some cases. I didn't find discourses relevant to student friendly method, thus I tried to explore newly adopted classroom discourse by female teachers in mathematics classroom.

### **Theoretical Literature Review**

Theoretical review help establish what theories already exist, the relationships between them and to develop new hypothesis to be tested. Often this form is used to help establish a lack of appropriate theories or reveal that current theories are inadequate for explaining new or emerging research problems.

### **Discourse Theory**

The word discourse means conversation or discussion. Discourse can encompass all form of communication. Discourses are more than ways of thinking and producing meaning. However, to scholars discourse is far more than this. They constitute the nature of the body conscious and unconscious mind and emotional life of subjects they set to govern (Weedon, 1987). Discourse denotes written and spoken communication. It is a conceptual generalization of conversation within each modality and context of communication (Wikipedia).

According to Cambridge Delta, any connected piece of speaking or writing is discourse. In general, discourse theory is concerned with human expression, often in the form of language. It highlights how such expressions are linked to human knowledge. A shared argument is that the things people say or write draw from a pool of generally accepted knowledge in a society, which at the same time feeding back into society to shape or reinforce such knowledge (Schneider, 2013).

Discourse proposes that in our daily activities, the way we speak and write is shaped by the structure of power in our society, and that because our society is defined by struggle and conflict our discourses reflect and create conflicts (Foucault, 1972).

Halliday (1975) studied his own child & concluded that the development of formal linguistic devices grows out of the interpersonal uses to which language is put. In other words, discourse theory is concerned with questions of power, and often with questions of institutional hierarchies. Within discourse theory, one can distinguish between at least three strands: post-structuralist, normative–deliberative and critical–realist discourse theories. Post-structuralist discourse theory usually insists on the constitutive role of language and communication for what counts as real in a given society. Thus, if the ‘speaking subject’ is seen as an effect of discursive practices, discourse not only describes but to a certain degree also constitutes the social. Rather than as a closed container, the social is perceived as an open, dynamic and heterogeneous terrain of relationships. Post-structuralist discourse theory adopts a resolutely antiessentialist stance which emphasizes the contingent character of reality and nature constructed through practices involving both power and knowledge. For normative–deliberative theories, “Discourse designates the negotiation of an agreement between participants who enter discourse in order to overcome a conflict while pursuing certain interests and objectives. Discourse in this sense usually involves free deliberation in the public sphere over what can be considered good and acceptable for all” (Angermaller).

According to this perception, the discourse participants need to come to terms with clashing norms in discourse. For the ‘strong’ program of normative–deliberative discourse theory, spelled out by third-generation critical theorists such as Jürgen Habermas (1985), certain communicative laws and normative standards are inherent



in discourse which makes certain claims more true, rational, and acceptable, whatever the social or political resources of those who make them (Angermaller, *International Encyclopedia of the Social & Behavioral Sciences*, 2015). In this way, critical realist discourse theorists point to the objective social constraints in which discursive practices are embedded. Through discourse, unequal relationships are produced and reproduced between larger social groups, classes, or communities. Critical realist discourse theories usually have an affinity with macro-sociological theories of social and cultural inequality, ranging from the Marxist critique of ideology to Pierre Bourdieu's work on symbolic domination. In drawing from critical realist discourse theory, linguists have become interested in social problems in critical discourse analysis (CDA), while Marxist sociologists (Sum and Jessop, 2013) have discovered discourse to be a constitutive dimension in the dynamics of social power.

Discourse theory emerged in the late 1970s as an intellectual response to the problematization of mainstream theory in the wake of May 1968, the critique of the structuralist theories of language, culture and society, and the crisis of Marxism in the face of the emerging neoliberal and neoconservative hegemony. Discourse theory did not, however, attempt to provide a new theoretical apparatus, consisting of a set of core assumptions, some clearly defined concepts and taxonomies, and a series of readymade arguments disclosing the mechanisms of a rapidly changing society (Torfing, 2005). Instead, it offered a new analytical perspective which focused on the rules and meanings that condition the construction of social, political, and cultural identity. The open, contingent, and theoretically polyvalent character of the new theories of discourse attracted a great number of scholars who, in discourse theory, found an undogmatic framework for exploring new intellectual avenues based on post-structuralist and postmodernist insights. Over the years, many excellent books have been published, which aim to develop different theoretical and philosophical aspects of discourse theory (Torfing, 2005).

Discourse theory denotes broadly the study of aspects of language and communication distinct from linguistic structure. Most theories of discourse nonetheless examine the relation of language to structure. In fact, during the 20th century, many debates in anthropology, and the social and human sciences more generally, centered on the relation between the discursive and structural aspects of social life. Through these debates, and especially through the scholarship that

critiqued structural anthropology and linguistics, post-structural approaches to discourse have taken root in anthropological theory and methodology.

Poststructuralist approaches continue to influence the trajectories of anthropological thinking about discourse. This entry first describes the structuralist account of signs, associated especially with Ferdinand de Saussure, and then recaps some poststructuralist critiques (I.Paz, 2013).

### **Foucault's Discourse Theory**

The father of discourse theory is the French philosopher and sociologist Michel Foucault. He defined discourse theory as ways of constituting knowledge, together with the social practices, forms of subjectivity, and power relations which inhere in such knowledge and relations between them. Discourses are more than way of thinking and producing meaning. They constitute the 'nature' of body, unconscious and conscious mind and emotional life of the subjects they seek to govern (Weedon, 1987). Foucault's work is inspired by an attention to history, not in the traditional sense of the words but in attending to what he has variously termed the 'archaeology' or 'genealogy' of knowledge production. His main focus is on questions of how to shape some discourses and create meaning systems which gained the status and currency of 'truth' and how we define and manage ourselves and our social world both. He has looked at the social construction of madness, punishment and sexuality. He has developed the concept of the 'discursive field' as part of his attempt to understand the relationship between language social institution, subjectivity and power (Weedon, 1987).

Foucault adopted the term 'discourse' to denote a historically contingent social system that produces knowledge and meaning. Discourse is a way of organizing knowledge that structures the constitution of social and progressively global relations through the collective understanding of the discursive logic and the acceptance of discourse as social fact. According to Foucault, logic produced by a discourse is structurally related to the broader structure of knowledge of the historical period in which it arises. "In every society the production of discourse is at once controlled, selected, organized and redistributed by a certain number of procedures whose role is to ward off its powers and dangers, to gain mastery over its chance events to evade its ponderous, formidable materiality" (Adams).

Foucault's theory of discourses emerged within a context of ongoing scholarship related to discourse, policy and educational ideologies. Idea about discourse theory can be drawn from the fields of linguistic, philosophy, psychology, anthropology, history, literary criticism and political science (Jane, 2000). Discourse can be used in various patterns and forms. Firstly it is used within the analysis of speech and conversation to bring out the dynamics and rules governing particular social situation such as classroom. Secondly, it is used as an object of general speculation about the relation of language to the possible positions of the human subject in language. This is a general consideration of subjectivity from the point of view of language. Thirdly, and related to this but governed by Marxist theories of the social totality. The term discourse has been used to extend the theory of ideology that part of the ideological instance in which subjects represent the imaginary relationship of individuals to their real conditions of existence in speech or in writing. Fourth and quite different major use of the term is more philosophical and has appeared in arguments against the possibility of theoretical reasoning being decisively resolved by the use of epistemological categories. This line of usage draws a distinction between the discursive and non-discursive which is a theoretical distinction between objects of knowledge and the presumed status of the reference of those objects (M Cousins & ALussian).

Foucault's concern is not to produce a general theory of discourse. His use of the term discourse may be thought of as an attempt to avoid treating knowledge in terms of ideas. Michel Foucault's work is not alien to the field of educational management. As noted by (Deacon, 2006), his detailed studies of madness, punishment, sexuality, and the human sciences have provide educational theorists with a whole new array of concepts, analytical techniques and arguments (Letseka, Moeketsi). Foucault's work also offers nuanced understandings of the manifestations, functioning and effects of contemporary educational institutions and practices and specifically in classroom managements.

Michel Foucault's discourses theory has been an important ground on educational field. Much of Foucault's thinking drew on elements in French Anthropological thought from Durkheim and Mauss to Callois and Bataille about sacred collective representations as structural predictions of cultural reproduction (Harrington 2006: p. 39). His works have far-reaching influence. Interestingly,

Foucault's theory of discourse occupies a place of comparative stability, especially when compared with the work of other controversial post-structuralists such as Jacques Derrida's Theories of 'deconstruction'.

Discourses exist both in written and oral forms and in the social practices of everyday life (Weedon, 1997: p. 108) and are intensive in the very physical layout of our institutions such as schools, churches, law courts and homes. According to Foucault, language plays the powerful role in reproducing and transforming power relation along various aspects of classroom. The task for the educator is to discover the patterns and distributions of power that influence the way in which a society selects, classifies, transmits, and evaluates the knowledge it considers to be public. Thus, discourse ultimately serves to control not just what but how subjects are constructed language, thoughts and desire are regulated, policed and managed through discourse. As Foucault (1972) states every educational system is a means of maintaining or modifying the appropriateness of discourses with the knowledge and power they bring with them. Every education system is a political means of maintaining or of modifying the appropriation of discourse, with the knowledge and the powers it carries with it (Foucault, 1972).

### **Feminist Theory**

Feminist theory is the extension of feminism into theoretical, fictional or philosophical discourse. It aims to understand the nature of gender inequality. It examines women's and men's social roles, experiences, interests, chores, and feminist politics in a variety of fields, such as anthropology and sociology, communication, media studies, psychoanalysis, home economics, literature, education and philosophy. Feminism is theory that men and women should be equal politically, economically and socially. This is the core of all feminism theories. Sometimes this definition is also referred to as "core feminism" or "core feminist theory." Notice that this theory does not subscribe to differences between men and women or similarities between men and women, nor does it refer to excluding men or only furthering women's causes. Most other branches of feminism do (Unknown). Feminist theory aims to understand the mechanisms and roots of gender inequality in education, as well as their societal repercussions. Like many other institutions of society, educational systems are characterized by unequal

treatment and opportunity for women. Almost two-thirds of the world's 862 million illiterate people are women, and the illiteracy rate among women is expected to increase in many regions, especially in several African and Asian countries (UNESCO 2005, World Bank 2007).

Feminist psychology is a form of psychology centered on societal structures and gender. Feminist psychology critiques the fact that historically psychological research has been done from a male perspective with the view that males are the norm. Feminist psychology is oriented on the values and principles of feminism. Feminist theory aims to understand gender inequality and focuses on gender politics, power relations and sexuality. While providing a critique of these social and political relations, much of feminist theory focuses on the promotion of women's rights and interests (Wikipedia).

Throughout most of Western history, women were confined to the domestic sphere, while public life was reserved for men. In medieval Europe, women were denied the right to own property, to study, or to participate in public life. At the end of the 19th century in France, they were still compelled to cover their heads in public, and, in parts of Germany, a husband still had the right to sell his wife. Even as late as the early 20th century, women could neither vote nor hold elective office in Europe and in most of the United States (where several territories and states granted women's suffrage long before the federal government did so). Women were prevented from conducting business without a male representative, be it father, brother, husband, legal agent, or even son. Married women could not exercise control over their own children without the permission of their husbands. Moreover, women had little or no access to education and were barred from most professions. In some parts of the world, such restrictions on women continue today. For most of recorded history, only isolated voices spoke out against the inferior status of women, presaging the arguments to come. In late 14th- and early 15th-century France, the first feminist philosopher, Christine de Pisan, challenged prevailing attitudes toward women with a bold call for female education. Her mantle was taken up later in the century by Laura Cereta, a 15th-century Venetian woman who published *Epistolae familiares* (1488; "Personal Letters"; Eng. trans. *Collected Letters of a Renaissance Feminist*), a volume of letters dealing with a panoply of women's complaints, from denial of education and marital oppression to the frivolity of women's attire (Burkhet & Brunell).

Feminist theory encompasses a range of diverse ideas, all of which originate with the beliefs such as society is patriarchal, structured by and favoring men, traditional way of thinking. Feminist theory influences all institutions: medical, legal, academic, and social. The diversity of thought within feminist theory lies in the fact that women across the world differ from each other in many ways, including race, ethnicity, nationality, class, sexual orientation, educational background and all. When women face limited opportunities for education, their capacity to achieve equal rights, including financial independence, are limited. Feminist theory seeks to promote women's rights to equal education and its resultant benefits across the world (Tong, 2001).

Feminist pedagogy is a pedagogical framework grounded in feminist theory, which is directly related to teaching strategies, approaches to content, classroom practices and teacher- student relationships (Encyclopedia).

The purpose of feminist pedagogy is to create a new standard in the classroom or possibly even take away the standards classrooms hold. Feminist pedagogy naturally creates a new method of teaching, where its skills and knowledge is not just limited to classroom but rather society as a whole. Applying feminist pedagogy, a type of progressive and/or liberal pedagogy, to the teaching and learning of mathematics is a relatively new idea (Tong, 2001).

### **Radical Feminism**

Radical feminism is the breeding ground for many of the ideas arising from feminism. Radical feminism was the cutting edge of feminist theory from approximately 1967-1975. It is no longer as universally accepted as it was then, and no longer serves to solely define the term, "feminism." This group views the oppression of women as the most fundamental form of oppression, one that cuts across boundaries of race, culture, and economic class. This is a movement intent on social change, change of rather revolutionary proportions. Radical feminism questions why women must adopt certain roles based on their biology, just as it questions why men adopt certain other roles based on gender. Radical feminism attempts to draw lines between biologically-determined behavior and culturally-determined behavior in order to free both men and women as much as possible from their previous narrow gender roles (Unknown).

Radical feminists in education have concentrated mainly on the male monopolization of knowledge and culture and on sexual politics in schools. Strategies involve putting women's and girls' concerns first, through separate-sex groups when necessary (Acker, 1987).

### **Inclusive Education**

The concept of inclusion in education often termed as inclusive education and viewed as an approach, to secure to right to education of children by promoting the educational system. The aim of inclusive education is to reduce exclusion in education through ensuring participation of excluded children. In the field of education, inclusion came to international practice with the UNESCO Salamanca statement. Recently, inclusive education is recognized as a basic human right and foundation of equal society (European agency for development in special needs education, 2012).

There is no single and universally accepted definition of inclusive education because of its different view of society and context. Inclusive education is described basically an ideological shift of international educational discourse that underpins multiple disciplines. Although, inclusive education has been conceptualized in many different ways the idea of inclusion within the educational framework is frequently attached to the concepts of mainstreaming diversity management, learning environments, school, cultures and educational opportunities (Westwood, 2013).

Inclusion in education refers to a model wherein students with special needs spend most or all of their time with non-special needs students (Wikipedia). As stated by Regmi (2017) all of the students with their strengths and weakness in any area, need to be the part of a community. The inclusion model benefits both students with special needs and normal students in the classroom. Inclusiveness in education means equipping children with disabilities with basic academic and sufficient life skills in a free, fair and caring environment. Disabled students may have some potential which can blossom by providing educational opportunities in an unbiased context. A research by Regmi (2017) entitled “Inclusive education in Nepal: from theory to practice” stated that inclusive education in Nepal is grounded on the human right perspective. Although the government has made different provisions of inclusive

education at policy level, the practice of inclusive pedagogy in classroom was found less effective.

Stofile (2008) noted that, inclusive education is a paradigm shift that focused on management of student's deficiency through the creation of more inclusive classroom environments that respond constructively to class, poverty, gender, disability and education for a multi-cultural society. Farrell (2004) described inclusive education as strategy of mainstreaming. UNESCO (2009) defined inclusive education as a process of strengthening the capacity of the education system to reach out to all learners. UNESCO has developed a framework of inclusive education on the basis of fundamental principles of inclusion which is very relevant to develop inclusive education system.

According to Regmi (2017) classroom observation revealed that teacher only adopted lecture method in diverse classroom. Also teachers have lack of positive thought towards disability and diversity, as well as skills to communicate and coordinate with other staff of the school and community. Because of gap between policy and practice regarding policy implementation of inclusion in education has resulted many problems rather than progress. Inclusive education is concerned with the education and accommodation of all children in society, regardless of their physical, intellectual, social or linguistic deficits. Inclusion should also include children from disadvantaged groups, of all races and cultures as well as the gifted and the disabled. Truly inclusive schools understand the uniqueness of every child that all children can learn and that all children have different gifts, strengths learning styles and needs (UNESCO, 2003).

On the basis of these explanations, inclusive education is summarized as an ideal discourse of education which is grounded on human right perspective that enhances access and participation in education as well as improves learning achievement of every child. It can be described as means to promote equity and social justice and has significant contribution to the development of inclusive community (Armstrong, 2011).

### **Vygotsky's Socio-Cultural Learning Theory**

To identify the emerged problems and to encounter the challenges while adopting discourse in mathematics classroom by female teacher. Vygotsky's learning



theories can be useful for theoretical framework for my thesis topic. So, I reviewed Vygotsky's learning theories in different aspects.

Lev Vygotsky was a seminal Russian psychologist who is best known for his socio-cultural theory. He believed that social interaction plays a critical role in children's learning. According to Vygotsky cognitive processes denote language, thought, reasoning and which are developed through social interaction. He focused on the connections between people and the sociocultural context in which they act and interact in shared experiences. Humans use tools that develop from a culture, such as speech and writing to mediate their social environments. Initially children develop these tools to serve solely as social functions, ways to communicate needs. There are 3 major themes in Vygotsky's learning theory; social interaction, the more knowledgeable other (MKO) and zone of proximal development (ZPD).

Vygotsky states "Every function in the child's cultural development appears twice. Firstly, on the social level (interpsychological), and second on the individual level (intrapyschological). A second aspect of Vygotsky's theory is the idea that potential for cognitive development is limited to ZPD. This is an important concept that relates to the difference between what a child can achieve independently and what a child can achieve with guidance and encouragement from a skilled partner. Vygotsky see the ZPD as the area where the most sensitive instruction or guidance should be given, allowing the child to develop skills they will then use on their own, developing higher mental functions.

**Figure of ZPD**



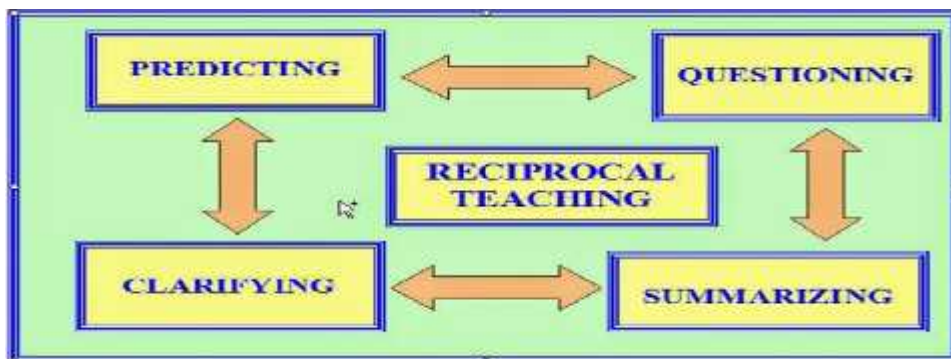
MKO refers to someone who has a better understanding or a higher ability level than the learners, with respect to a particular task, process or concept. For example: teachers, other adults, advanced students, and sometimes even computer.

ZPD is the area of learning that MKO assists the students in developing a higher level of learning. Vygotsky believes that young children are curious and actively involved in their own learning and the discovery and development of new understanding.

Vygotsky defined scaffolding instruction as the “role of teachers and others in supporting the learner development and providing support structures to get to that next stage or level”(Raymond, 2000).

Teacher provides scaffolds so that the learners can accomplish certain tasks they would otherwise not be able to accomplish on their one (Bransford, Brown, Cocking, 2000). Scaffolding can be done with real world objects and interactions. Reciprocal teaching is an instructional activity that takes the forms of a dialogue between teachers and students regarding segments of text for the purpose of constructing the meaning of text (Wikipedia). Reciprocal Teaching is used to improve a student’s ability to learn from text through the practice of four skills: predicting, questioning clarifying, and summarizing.

**Figure of Reciprocal Teaching**



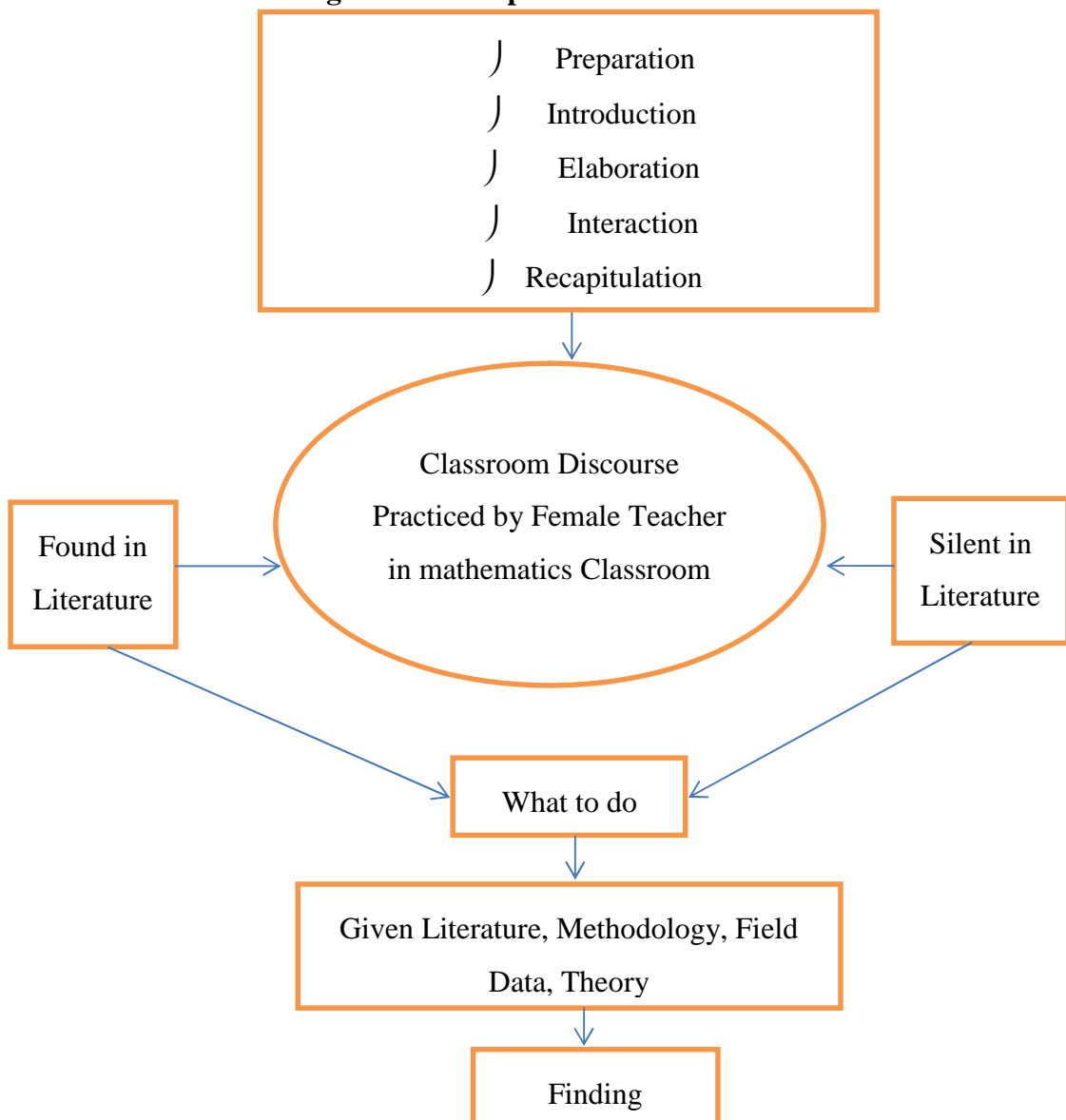
The zone of ZPD is the area of exploration for which the students is cognitively prepare but requires help and social interaction to fully develop (Briner, 1999). A teacher or more experienced peer is able to provide the learner with “scaffolding” to support the student’s evolving understanding of knowledge domains or development of complex skills. Collaborative learning, discourse, modeling and scaffolding are strategies for supporting the intellectual knowledge and skills of learners and facilitating intentional learning. The sociocultural theory of Vygotsky included a relationship between the teacher and student based on social interaction. A research by Lila Karki (2019) describes that to effectively scaffold within their ZPD, a teacher should also have an awareness of the different roles students and teacher

assume throughout the collaborative process. The role of teacher should be as a role model for students.

**Conceptual Framework**

A conceptual framework is a bit like a recipe or a blueprint. It provides an outline of how we plan to conduct research for our thesis, but it goes further than that by also positioning our work within the larger field of research. Preparing a conceptual framework can not only help to guide our thesis to ensure that our research stays on track, but it also help to guide fellow researchers or advisors who are analyzing my thesis. I have developed the conceptual framework as shown in figure:

**Figure of Conceptual Framework**



Source: (Sinclair & Coulthard, 1975)

In the diagram, on the top preparation part is shown. This phase is related to the plans for teaching activities in the classroom. Teachers should make plan before they go to classroom for teaching. A teacher prepares the lesson plan with specific objectives, designs instructional activities to achieve those objectives, prepares teaching material related to the topic and lesson plan and be ready for presentation and delivery in classroom. In the second phase there is introduction phase. In this phase teacher introduces the topic according to lesson plan and provides the outlines for classroom assessment and manages teaching procedures.

In the elaborative phase, teacher provides topic related knowledge, shows prepared materials and explains them, give encouragement and feedback to the students and all. This is very important phase in teaching learning process.

4<sup>th</sup> phase is interactive phase, where teacher and student's interaction over the topic is main activity. Teacher provides extended activities to straighten student's ideas, success and rewards, communication, engagement in learning activities, gives prompt response and feedback, and creates pleasant learning environment. This phase also entails activities that are carried out in elaborative phase.

In 5<sup>th</sup> phase teacher recapitulates her saying, evaluates students' achievements, summarizes whole lesson, give assignments and open the door for further learning.

This framework presents each phases are like layers of an onion and connected with each other to produce effective classroom discourse. Classroom discourse is the reflection of these elements.

### **Implication of the Review for the Research**

I have done both theoretical review and empirical review on related documents with my thesis topic "Classroom Discourse practiced by female teacher in mathematics classroom". First of all I reviewed on discourse theory and Foucault's discourse theory. These theories stated that student and teacher's interaction is crucial for teaching learning process in the classroom. Foucault's main focus is how to shape some discourses in the field of education, philosophy, linguistic, psychology and anthropology. His theory mainly focused on the activities like speech, conversation, language delivery, social interaction and all. Because of these activities discourse

theory can be more applicable for my research and I need to know about discourse to explore my objectives of topic.

Inclusive education policy in education brings children with and without disabilities under the same umbrella of education. This policy helped to behave equally to all of the students in classroom. Inclusive education can be summarized as an ideal classroom discourse in education. As I included before my main objective is to explore classroom discourse adopted by female teachers, so this document could help on my research.

As I reviewed Vygotsky's learning theory, I found this theory could be applicable for my second objective such as to explore the way of making student friendly classroom discourse. The major themes in this theory are social interaction, MKO, ZPD, reciprocal learning and collaborative learning. These factors are necessary in teaching learning process in classroom, especially in mathematics classroom. I also reviewed a lot of researches, case study and journals related to my topic, they really guided me to walk in a right path for my research and to fulfill my goals.

## **Chapter III**

### **RESEARCH METHODOLOGY**

This chapter includes research methodology of dissertation. In this chapter I outlined the research design, strategy, research methods, research approach, the tools and methods of data collection, analysis of data and ethical considerations of the project. So, this chapter describes the design of the plan and the procedures of the whole study, which are able to carry out a valid result and conclusion following objectives. Research is a systematic method of finding true solution of the problems whereas research methodology indicates to the various sequential steps to adopt by a researcher in studying problem with certain objectives in view.

#### **Research Design**

Research design is the way or path of the research that guides the researcher to reach the goal of the research or thesis. It is the set of methods and procedures used in collecting and analyzing measures of variables specified in the problem research. We should apply appropriate research design regarding our thesis topic. So, as a research design I followed qualitative research design with case study approach. Qualitative research accepts that people know themselves best and describe, interpret and share about their own experience (Patton, 1990 as cited in Mahatara, 2019). Sociologists draw on a variety of both qualitative and quantitative research methods, including experiments, survey research, participant observation, and secondary data.

Exploring classroom discourse and analyzing will be my purpose. I therefore, tried to understand and explore the classroom as focal event.

#### **Study Site**

My study is related to classroom discourse of female teacher in mathematics classroom. This is a qualitative research with case study approach. Female mathematics teachers are available many districts in Nepal. But, as a capital of Nepal and being developed district, most of female teachers are in Kathmandu district. So I preferred Kathmandu for my study site, and I selected Samundara Secondary School, Shivaapuri, Nuwakot and Shivapuri Higher Secondary School, Maharajgunj, Kathmandu to compare between two of them.

## **Respondents of the Study**

Respondents are related with selection of a subset of individuals from within a population. The main advantage of sampling is faster data collection and low in cost. By sample, we understand a group of objects that is selected from the general population and is considered a representative of the true population for that specific study. The sample size is an important feature of any empirical study of research or thesis in which the goal is to make inferences about a population from a sample. Reason to accurately calculate the required sample size include achieving both clinically and statically significant result.

The respondents of my study were small and specified. The participants were two mathematics female teachers and 2 students each of their class. As a whole, the total sample size was 6. That means 6 persons were participated in my research study. I used purposive sampling method to select sample size or participants for my study. Purposive sampling is a method of selecting the specified character for study. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest.

## **Selection of Participants**

In my research I preferred to select two types of participants: female mathematics teachers and students. The participants were selected from the two schools of Kathmandu and Nuwakot district, the name of schools are Samundara Secondary School and Shivapuri Secondary School. I chose two female teachers and 2 students from each class. Overall, I selected 6 participants by using purposive sampling method. In the selection of my participation, I tried to make more inclusive as far as possible. The real names of all participants are not given for ethical concern.

## **Data Collection Tools**

One of the most important sections of study is data collection. Data collection tools refer to the devices used to collect data, such as a paper questionnaire or computer-assisted interviewing system. There are many tools for qualitative research. I preferred to select interview and classroom observation. The brief descriptions of those tools are given below:

**Interview Guideline.**An interview is essentially a structured conversation where one participant asks questions, and the other provides answers. In common sense, the word "interview" refers to a one-on-one conversation between an interviewer and an interviewee. Here, the interview was prepared for female teacher those are teaching mathematics. Interview guideline is a process which is most commonly used to collect data for research. So the researcher used to this tool as required to the 2 female mathematics teachers and 4 students for interview guideline.

**Classroom Observation.** The concept of observation indicates that data should enable the researcher to enter and understand the situation that is being described (Patton, 1999. As cited in Wagle, 2017). While classroom observations are conducted for a wide variety of purposes, they are perhaps most commonly associated with job-performance evaluations conducted by school administrators or by some researcher also. Observation is a purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place.

The observation is also adequate for fulfilling my objectives. So, I used observation form to collect necessary information and to find out the discourse they used in mathematics classroom.

### **Quality Standards**

Validity is one of the strengths of qualitative research, and it is based on determining whether the findings are accurate from the perspective of the researcher, the participants or the readers of an account (Creswell & Miller, 2000, cited as Acharya, 2015). If the research is not reliable and valid, it is worthless. The most important instrument in qualitative research is the researcher, rather than research tools (Cohen, Manion and Morrison, 2000, cited as Acharya, 2015). Keeping this in mind, as a researcher, I made the best efforts to maintain reliability and validity at every stage of this research. I took care on the validity and reliability right from the developing of the study. To establish quality standard as qualitative researcher I followed following approaches:

### **Credibility**

This concept replaces the ideas of internal validity, by which researchers seek to establish confidence in the truth of their findings. To maintain credibility of my



research I tried to spend as much time at the observation needed and engaged with their work. After getting information I wrote notes, I asked similar types of questions to other people and tried to find real practices from those information.

### **Transferability**

Transferability replaces the concept of external validity. This criterion refers to the applicability of findings are context to other contexts or setting. To maintain transferability I had explained mathematical classroom discourse found in different community school briefly. I had tried to capture most of scenario by using thick description of observation and interview.

### **Dependability**

This concept replaces the idea of reliability. This is the third standards and refers to stability or consistency of the inquiry processes used over time. To maintain it, I had presented the logic used for selecting people and events to observation and interview. I would try to maintain credibility and transferability to ensure dependability standard.

### **Conformability**

A fourth standard is conformability which refers to the quality of the results produced by inquiry in terms of how well they are supported by informants who are involved the study and by events that are independent of the inquiry. I was also the part of students. Therefore, to maintain conformability before concluding information, I reviewed all the information myself several times so that results could contain conformability.

### **Data Collection Procedure**

One of the important and essential phases of research is data collection procedure. Data collection is the process of collecting information from all relevant sources to find answers of research problems, test hypothesis, and evaluate the outcomes. The primary and secondary both data are adequate for reliable and valid results.

After selecting sample and study site and determining data collection tools, researcher visited to the selected field of study with tools to collect data. Then I met and negotiate with head teacher and explain my purpose to come there. I already had

done contact with interviewees before. After getting head teacher's permission for my study I entered in the classroom where female teacher was teaching mathematics. I observed class, interact and record the necessary data according to observation form. After then interview was conducted with teacher and students selecting from the class turn by turn. The indicators of classroom discourse were developed and validated by the help of experts. I observed teaching learning activities in grade VI and VII in mathematics classroom. I was noting every useful activity for my research. Then I conducted interview with teacher participant and student participants separately with semi- structured interview guidelines.

### **Data Analysis**

Data analysis is the process of inspecting, cleaning, transforming, interpreting and modeling collected data with the goal of discovering useful information, discussing conclusion and supporting decision making. The data analysis included creation of the field text consisting of field notes.

The information collected from both primary and secondary sources are analyzed and interpreted qualitatively by applying 5 classroom indicators of the study. Efforts made to derive information and triangulate from classroom observation and interview arrive at conclusions. The initial work for analyzing information was started by analyzing discourse indicators as five phases. Each indicator of mathematics classroom teaching were discussed and concluded under teaching learning strategies. The classroom discourse practiced by female teachers explored and analyzed. The theories approaches of Foucault's (1980) power, knowledge and truth, Vygotsky's learning theory as MKO, ZPD and reciprocal learning and inclusive education for all students with and without disability are used to interpret the field of findings and conclusions.

### **Ethical Consideration**

Ethical consideration can be specified as one of the most crucial part of the research. Dissertation may even be doomed to failure if this part is missing. When I began my work on the thesis I was always focused on my research. However, once I began to make my way through research, I realized that research ethics is a core aspect of the research work and the foundation of research design. Various organizations agree that ethics is not an afterthought or side note to the research study.

It is an integral aspect of research that needs to remain at the forefront of our work. Ethical consideration really provides us helpful guidelines for study on the topic.

This study is related to the classroom discourse and female teacher is intended for the student friendly classroom discourse in mathematics classroom. I requested for principal's approval before starting my study and giving him an overview of how I intend to conduct the research. I asked for their open and true support to be communicated to the school community, i.e. an insertion that goes to pupils and teachers. I as the researcher requested to report back to teacher and students. All discussion to do with each student's thoughts and output held in the strictest confidence. The chosen participants got to see the interview writer view write-up and have the opportunity to request changes to correct any factual information or communication errors. During the field study ethical guidelines and code of conducts are followed especially for the protection of research participants' interest. Being a researcher, I made sure to the participants that my research is just fulfillment of academic degree and not for any other purpose (Acharya, 2015).

I gave respect the right of all research participants and kept all the data confidential without giving any personal information of the participants as interpreter. I didn't violate the norms of the researchers who considered the ethics in research to maintain its value. I believe that the relationship between the research participants is vital in my research. I was much aware of the Elmes (1985) basic ethical considerations that apply to the treatment of the participants. More so, following Elmes (1985) I have maintain the following three major ethical concerns:

- ) Informed consent: I moved ahead with the consent of the participants in the research area. Similarly, role of my supervisor of getting consent on the themes and ideas are valuable to lead the research. It will be important that no participants will be hurt and dishonored by any sort of activities and intentions.
- ) No deception: I showed whatever I found from the field interacting with my all participants such as student participants, teacher participants. I will share to all the information to my participant whatever I get from the field.

) Confidentiality: I hope to have maintained the confidentiality regarding any information about the participants. I keep trying to this confident led towards the ethics of care and compassion.

## **Chapter IV**

### **DATA ANALYSIS AND INTERPRETATION**

This chapter deals with classroom discourse practiced by female teachers in basic level guided by the research questions and objectives of this study. This study explored about the classroom activities, language, reinforcement process, scaffolding and all which are used in mathematics classroom by female teachers. In this chapter classroom discourse is analyzed with mathematics subject that were observed in selected schools and presents about the data derived from the classroom observation of those schools and interview with subject teachers and some randomly selected students. The researcher has done observation in two schools of Kathmandu district and explored the classroom discourse adopted in mathematics classroom. I got to know from the observation and interview I conducted that each school has its unique and different features and some stuffs to improve. The researcher used classroom discourse indicators to identify targeted classroom discourse behaviors expected by teachers and conducted semi-structured interview with teachers and students individually. This chapter is organized by the evidences collected from each of the data collection tools according to research questions. Classroom discourse is a two way process between teachers and students; they teach and learn within classroom guided by the prescribed formal curriculum and textbooks.

Classroom discourse usually develops through five phases which are presented below in the table.

*Table: Phase wise classroom discourse indicators*

<b>Phases</b>	<b>Indicators</b>
Preparatory	Plan lesson with instructional activities, use of materials, classroom management and outline of assessment.
Introductory	Introduces topic, organizes ideas to meet objectives, initiates student's talk, motivates students, creates warm relation in the class, links student's knowledge with lesson and opportunities to explore new knowledge to students.
Elaborative	Elaborates ideas and topics, follows classroom rules and routines, gives clues for difficult concepts, stresses ideas of apparent importance, uses instructional materials, responds to students, reduces confusion and builds new ideas.
Interactive	Uses questions to elicit ideas, provides extended activities to strengthen ideas, provides rewards, communicates ideas and directions, links ideas and activities, prompts response and feedback, gives pleasant climate for learning uses intrinsic and extrinsic rewards and rephrases subject matter appropriately.
Recapitulation	Utilizes time, evaluates achievement during teaching learning, summarizes lesson, assigns students task, provide door for further learning and concludes lesson systematically.

(For details, see Appendix I)

In the context of the five phased indicators, it is observed that most of these are used in the classroom with longer time given to preparatory phase and interactive phase. Introductory phase and elaborative phase are also used in the classroom with the short use of recapitulation phase. The discourse indicators have been helpful in analyzing the classroom situation in an objective way. Similarly, they can be used to predict the outcome of a classroom vibrant with interactive activities.

## **Section I: Classroom Discourse in Mathematics Subject**

As I constructed research questions, I explored emerged classroom discourses practiced by female mathematics teachers in basic level in this section. I addressed first research question, 'What are emerged classroom discourses practiced by female teachers in mathematics classroom? For this I immensely studied a lot of documents related to the topic and observed mathematics class taught by female teachers in selected schools. I have tried to explore as much classroom discourses as adopted in the mathematics classroom.

### **Preparing Lesson Plan with Specific Objectives and Materials**

According to my plan I went to the targeted school on 29<sup>th</sup> December, 2019 in the morning, which is situated in Shivapuri. First of all I directly went to office to meet and negotiate with principle and to grant permission for observing class. After knowing about my purpose principle provided me that opportunity easily and he also helped me a lot to collect data. Then I entered in the classroom preparing all my observation materials and observed class appropriately according to observations form as shown above. I was given first period in class 7 to observe where a female teacher was teaching mathematics. The classroom environment was suitable for teaching learning. Similarly, I went to my next sample school and I asked for head teacher to observe class. After explaining my purpose of the study he understood and managed class 6 to observe.

*I entered in the classroom to observe whether my participant teacher  $T_1$  use to prepare lesson plan or not. She began her class with specific objectives that she was going to teach about circle and its important parts. She presented coins, bangle and clock as teaching materials to elaborate concepts of circle.*

From the above observation I came to know that she prepares lesson plan and manages teaching materials suitable with lesson before going to classroom. She was using available materials in the class that means she knows how to use local materials in appropriate way. In the beginning, she started her class by informing about specific objectives of that day and asked to students about their homework and health. She collected all three teaching materials and started explaining about their shape. She completely accomplished first phase of classroom discourse. In this

regards, Vygotsky(1978) claimed that instructional materials play a vital role in good classroom discourse.

After observing classroom I interviewed teacher participant T<sub>1</sub> using prepared interview guidelines. Regarding to topic she shared her view as:

*I always prepare lesson note rather than preparing lesson plan before going to classroom because I have 10 years experiences in teaching mathematics and some components of lesson plan was unnecessary for me. So I use to make lesson note including necessary components. Sometimes I use teaching materials in classroom but each day it is not possible for using materials. Some lessons are really challenging to use teaching materials and some materials are not available in school.*

From the above statements I came to know that she was well known about lesson plan and teaching materials. She was experienced about which components are important for effective teaching and which materials should be used. Theoretically, she was well prepared about first phase of classroom discourse. According to Vygotsky (1978) an effective teacher would always try to make bridge between what is in theory with what takes place within classroom.

### **Organize and Elaborate Ideas to Meet Objectives**

I observed about how she organizes activities and elaborates ideas to meet objectives. The subject teacher had 10 years experiences of teaching mathematics. She was graduated from Tribhuvan University with mathematics major. She had been participated before in some training programs provided by government also. She was looking quite confidence and satisfied with her presentation and profession. There were 40 students in the class and they were participating actively in teaching learning activities.

*In introductory phase, she was teaching about circle and she started her class with general example of circle using coin, bangles and clock. She had friendly relation with students and students were looking comfortable with teacher as well as me. They were doing interaction with teachers and friends about the topic. She was using interaction, discussion and demonstration methods. She elaborated about circle and its parts showing in the figure. She individually described each and every part of circle clearly and students were giving response as they are able to understand. As*



*well as she was concerned about time because she was looking at watch sometimes. Some students were raising some doubts and she was kindly responding their questions and reducing confusion in every possible way.*

From the above observation I came to understand that she used materials in proper way and she was motivating students with warm tone. Moreover, students were friendly with teacher so they were excitingly participating in activities and exploring other examples of circle. She clearly elaborated the lesson with encouraging words that made students clear about topic. Even though some students were not able to understand whole lesson perhaps they were seeking for extra care. This shows teacher is responsible for organizing activities and explain ideas and it plays a prominent role to motivate students in learning.

### **Classroom Interaction Between Teacher and Students**

I observed how teacher interacts with students and how students engage in learning activities, how teacher gives rewards for student's attempt and success in this parts. My observation explored following statements regarding to topic.

*She asked some questions to students randomly. Students were giving answer correctly but she was praising them by saying 'very good'. Some of them had still confusion about diameter and radius and she was trying to clear their confusion continuously by giving some feedbacks and encouragements. She was also giving other more examples to discuss with students and students were participating actively in the task. On the other side she was looking little conscious with me but she didn't show any wrong steps apparently. One of the students told me that this lesson was already taught by teacher sometimes ago and she was repeating this topic, although she was on the right track.*

From the above observation I came to know that teacher was not much conscious about rewards but she was giving continuously feedbacks. That means teacher was known about rewards and feedback but there was lack of using rewards for students.

In this regards, my teacher participant T<sub>2</sub> shared her thoughts as;

*I use to give feedback to students frequently in the mathematics classroom. Sometimes I feel lazy in giving rewards. Our head teacher periodically supervises classroom activities and he gives us useful feedbacks that help me to promote knowledge and teach effectively.*

From the above information I came to know that sometimes teachers can feel hesitation but head teacher can motivate teachers to use appropriate methods for teaching. Teachers also need supervision for refreshing mind and knowledge.

### **Assessment of Students Achievements in the Classroom**

I observed sample class of mathematics taught by female teacher T<sub>1</sub>. The main purpose of observing this class was to explore how female teacher evaluate students achievements in classroom activities.

*During classroom period she was suffering from fever although she was performing well and trying to evaluate achievement of student performance. Then she concluded the lesson in short form and asked to students whether they understand or not. Most of the students replied that they understood the lesson. In the last, she gave them homework from book and ended up the class saying this much for today and students also thanked her for teaching them.*

From the above observation I came to know that female teacher evaluates achievement of student performance and summarizes the whole class lesson. Giving student homework and providing clues for it can unlock the door for further learning and students will be engaged with lesson in the home. Teacher also gives homework from the exam point of view. In this regard, one student participant S<sub>1</sub> expressed his opinion as follows:

*When our teacher gives us homework we can do more practice in home and we keep memorize what we learnt in school. We need to do a lot of practice to understand mathematical problems. Teacher also evaluates our performance and gives us positive feedback that helps us to enhance our knowledge.*

From the above information I got to know that students have positive attitude regarding homework and classwork evaluation, which can foster learning ability of student and receive knowledge for further learning. Homework encourages student accountability and responsibility. Regarding this, Vygotsky (1962) claimed that

giving instructions precedes development of student in cognitive and constructive approach. Adult-child interactions enable the child to achieve more than they could alone.

### **Emerged Discourse Adopted by Female Teachers in Mathematics Classroom**

Classroom discourse is integrated from teaching learning strategies and language using to interact with students by teacher. In mathematics class discourse should build on and honor to students with opportunities to share ideas, clarify understandings, develop convincing arguments, and advance the mathematical learning of the entire classroom (Smith, Steele, and Raith, 2017). Mathematics teachers must analyze the standards to determine what content to teach and identify which tasks embody the desired content and skills because different tasks promote different kinds of thinking. Teaching learning activities should be systematic and goal oriented. Female as a mathematics teacher, can adopt various strategies to teach and gain fruitful results.

My concern of doing this research was to explore mathematical classroom discourse adopted by female teachers. As I observed the various classes, I got to know about different classroom discourse adopting currently by females. An experienced teacher with B.Ed. degree was trying to become a successful in creating a pleasant classroom environment and linking the ideas to the topic and making classroom student friendly. She was using discussion method and interaction method frequently. The behaviors towards students were commendable that she was treating her students like her own children. Another teacher from another school with master degree in mathematics had also 15 years of teaching experience though she was quite nervous in front of me. She was only using discussion method and interacting with students rarely.

All the students were interactive, attentive and enthusiastic in the class from the beginning till the end. Time for a particular question was given more than it actually required and more questions were asked for clarification and knowledge. The teachers were, however, good in terms of fulfilling their duties. My observation is that classroom teaching learning environment is more related to topic and student's physical and mental situation that the students hold toward their mathematics teachers who usually are looked as better teachers by the students, the reason for it:

mathematics being the difficult subject. Mathematics as a useful practical subject of daily application was treated as an important teaching subject by both the students and the teacher. This felt necessity is perceived as a base to make the classroom teaching a difficult yet but a necessary experience.

The emerged discourse in mathematics classroom can be viewed to have been more a book centered activity than an activity led participation. Classroom discussions and questions were more guided by examination than by the needs of the students to connect them with their daily life application. Illustrations, exercises or examples used in the classroom were based more on the textbooks and theoretical knowledge of mathematics merely some examples were related to classroom and student's daily activities. Mathematics teachers were expected to draw issues and link them with social realities in order to make its application a worthwhile experience to the students. Most of the teaching methods were teacher centered but used effectively and only few methods were used to make students active in learning. Actually my first teacher participant T<sub>1</sub> was very focused to complete her responsibility and she had used collaborative learning approach, interaction with students, using little trick to motivate students, active participation in learning and discussion as well as problem solving method. Moreover, second participant T<sub>2</sub> used only textbook to teach and maximum use of whiteboard for various purposes. Some other discourses practiced by her were questions to the students, giving homework, giving classwork in group or individual etc. According to student participants, mathematics teachers generally use to practice discourses as using materials, organizing mathematics exhibition once in a year, behaving as parents etc.

## **Section II: Strategies for Making Classroom Discourse Students Friendly**

In this section, I presented some strategies for making classroom discourse student friendly especially in mathematics teaching. I observed some selected classes and conducted interview with teachers and selected students then found out some useful strategies or activities practiced by female teachers in the classroom.

### **Teacher's Encouraging Words and Warm Tones**

The tone of voice has a significant role in the data samples. The tone illustrates clearly the teacher's attitude towards the students. If the tone is distant and uncaring, one cannot expect the students to feel themselves eager to learn. As has

been mentioned before, negativity affects the students more than positivity (Hadfield, 1992), since it can easily cause reluctance towards studying. In addition to the tone, the content of the speech is important in classroom discourses. Disparaging speech does not encourage students to learn and pay attention to the teacher. The teacher who speaks with encouraging words and warm tones to the students has more voluntary classroom discourses than the teacher who sounds cold and harsh. The teachers should manage to maintain the academic atmosphere in their classrooms and this should not have any negative impact on the students. Teachers should encourage the students to form and keep up their own study group, if they do not discover the idea themselves. Teachers could try different kinds of study groups by choosing the peer tutor or by letting the students choose their own groups and tutors. The style of communication is also very dependent on the teacher, as he or she can change widely the tone and the contents of the speech used in the classroom discourse. Therefore the teachers should pay attention to the discourses occurring in and even outside the classroom, since they do affect the eagerness of learning. One teacher participant from the sample expressed her opinions about teacher's encouraging words and warm tone for student friendly classroom discourse as follows:

*A teacher should be polite, humble and calm with warm tone. If they try to teach with their monotonous voice and dominating as well as discriminating words, students could not be able to learn properly. They may have negative attitude towards teachers due to teacher's harsh tone and discouraging words. Similarly another teacher participant T<sub>2</sub> also told the same thoughts about this. She clearly revealed that sometime she used to become rude and angry to students and they could not learn anything because of fear and stress. Then she diminished this behavior while teaching.*

These thoughts of participants declared that Teacher's warm tone and encouraging words can encourage students to learn mathematics being active in classroom. Student in basic level are about to teenage and they need love, care and attention so, encouraging words of teacher stimulate student's confidence and concentration towards learning.

## Implementing Collaborative Learning

Collaborative learning is an educational approach to teaching and learning that involves groups of students working together to solve a problem, complete a task, or create a product. Collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by students or students and teachers together. Usually, students are working in groups of two or more, mutually searching for understanding, solutions or creating a product. Collaborative learning activities vary widely, but most center on students' exploration or application of the course material, not simply the teacher's presentation or explication of it. Collaborative learning represents a significant shift away from the typical teachercentered or lecture-centered milieu in college classrooms. In collaborative classrooms, the lecturing, listening, note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material. Teachers who use collaborative learning approaches tend to think of themselves less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences for students-as coaches or mid-wives of a more emergent learning process.

In this regard, one of my teacher participant S<sub>2</sub> expressed her thoughts as follows:

*Collaborative learning can be beneficial for developing self-management, leadership quality and higher level of thinking of students. It may be problematic in beginning but it is a powerful strategy for making students active and gregarious in teaching learning process. She used to implement this method in the mathematics classroom then she was able to achieve fruitful results from it. First, she often faced challenges while structuring collaborative activities because of individual difference of students, lack of monitoring quality, lack of relevant materials and teamwork beliefs. But, at the end she was succeed to implement collaborative teaching method in her classroom.*

From the above statements it is stated that collaborative learning is effective strategy for student friendly learning process. Students can be friendly with their friends as well as teachers. This approach is very useful for solving verbal problems of mathematics even though teacher should face some challenges to apply this

method. Teachers can facilitate the scaffolding of more complex representation forms of allow students to discuss the representational from their and corresponding mathematical understandings that they carry with them to the group. It's important to remember that effective collaborative learning does not necessarily come easy. Making a move to new strategy is not a quick fix but as we go further, we can access refine approach that can define how effective is this in our school. It may not be suitable for every situation that's why teachers should implement collaborative approach in the right circumstances for their students and curriculum. In this regard, Vygotsky (1978) states that adults, teachers or parents or a child's peer can help student development and that teacher can use collaborative learning to increase the understanding of mathematics by students of all backgrounds. Learning always occurs from a social context and collaborative work can enhance instructional strategies, deeper knowledge construction as well as combination of whole class leadership.

### **Through Multiple Representations**

Multiple representations mean that a concept is repeatedly represented by different types of characterizations such as verbal, graphical, mathematical representation and that students exposed to the same concept several time (Prain&Waldrip, 2006). Multiple representation theory is one of the beneficial classroom discourses in teaching mathematics. Integrating multiple representations potently in mathematics teaching provides opportunity to conceptualize, express and observe mathematical concepts in different ways. Dealing with multiple representations and their connections play a key role for learners to build up conceptual knowledge in the mathematics classroom. This theory is not much eminent in teaching may be due to inconvenience of curriculum. But using various representations such as diagrams, graphs, symbols, verbal are keys to solve and understand problems that teachers and students do in mathematics classroom. It can also foster collaborative learning in classroom that provides the opportunities for students to show what they know about solving problems and how each of these solutions are equivalent and linked.

One teacher participant T<sub>1</sub> expressed her feelings about multiple representations as:

*I used different types of representations according to the nature of problems. I mostly used verbal representation and in some cases she used diagram, algebraic and graph representations.*

Another teacher participant T<sub>2</sub> from the sample stated that

*I use numerical and verbal method for teaching arithmetic portion; graph, verbal, diagram representations for algebra; table, graph, verbal and numerical representation for statistics and diagram, verbal, numerical for geometry part.*

From the above information it can be claimed that the most used representation to teach mathematics is verbal. Moreover, diagram, table, algebraic expression, numerical expression are common representation for making classroom student friendly. Multiple representations of problems can build way to understand and interpret and determine the correct solution. In this process, massive interactions become between teacher and students then students can be familiar with teacher. At the end there is created student friendly classroom discourse.

### **Section III: Analysis of Scaffolding in Mathematics Classroom**

The purpose of Scaffolding Instruction is to provide students who have learning problems a teacher supported transition from primarily seeing and hearing the teacher demonstrate & model a particular math concept to performing the skill independently. Scaffolding means providing support which can be a very effective teaching method for mathematics. Thinking scaffolding as a ladder, students have a lot of support at the bottom, but as they climb higher and higher they get less support. Like as when introducing a new concept of mathematics, teachers need to provide a lot of support to their students. As they build an understanding, they require less and less help from teacher. Holton and Clarke (2006) define scaffolding as “an act of teaching that supports the immediate construction of knowledge by the learner and provides the basis for the future independent learning of the individual. Students can improve their problem solving skills with an increased focus on conceptual knowledge by scaffolding. It helps students to become independent and self-regulating learner or problem solver. Besides that it facilitates student’s ability to build on prior knowledge and helps them to internalize new information. Each and every student is encouraged to participate actively in learning and given opportunity to progress faster in scaffolding.



### **Preparing to Move Forward Recalling Prior Knowledge**

I had gone to observe how female teacher scaffolds students for problem solving. It was 29th January, 2020, I visited the school at 9:30 and met with head teacher. I informed him about my research topic, objectives and research questions. As my purpose I only wanted to observe the class of female teacher, he managed me to observe in class 6 in the first period. I introduced with subject teacher and requested to be comfortable with me. At 10:30 I entered in the class with teacher then students greeted us formally and teacher said to sit down to them. She asked me to tell about my intention to visit there because students were quite curious about me. Initially, I shared my research project and sat down on the last bench of class.

*When the students were working in group and teacher's role was as guide. She was asking them priorknowledge about the topic also she was giving useful instruction individually for slow-learner students. She was teaching arithmetic mean and first of all she reviewed lesson of previous day to connect in that day's topic. Then she started explaining about lesson giving example of age of students. Students were engaging with classroom activities.*

From the above observation I came to know that preparing for the learning is important strategy of scaffolding students to solve mathematical problems. Teacher needs to understand what students know about the lesson first after that she can begin teaching a new concept. Asking question about previous knowledge to students can be effective ways of scaffolding.

In this regard, my participant T<sub>2</sub> shared her view as:

*I used scaffolding as a strategy for making classroom discourse student friendly and to encourage them to participate actively in classroom. I use to give mini lessons that help them to understand concept of problem deeply. Sometime I describes single concept by multiple representations or giving funny examples related to classroom or daily life.*

Her statements revealed that she is known about scaffolding and uses in the classroom teaching learning activities. Teacher scaffolds students for getting active participation from students. Giving mini lesson about topic should help students to understand mathematical problems deeply as well as connect to prior knowledge.

Vygotsky (1978) stated regarding this, scaffolding is a process through which a teacher or more competent peer gives aid to the student in her/his ZPD as necessary and tapers off this aid as it becomes unnecessary, much as a scaffold is removed from a building during construction.

### **Give Time to Talk**

All learners need time to process new ideas and information. I went to classroom for exploring scaffolding strategies used by female teachers. Mathematical problems are more complicated than other so I wished to take a look how they provide time to talk students to scaffold. For this I observed in class 7 on 30<sup>th</sup> January, 2020.

*When I entered in the classroom she was teaching verbal problems of fraction. Students were curious about lesson and some students were feeling difficult. She told all students to communicate each other and talk about the topic what they know and what they need to know to solve problems. Students were trying to find out solution of problem by interacting with each other and with teacher also. Some students explored the way to solve problem very quickly and some were trying to find ways. Talent students were helping other students having difficulties in concept.*

From the above observation I came to know that communicating with the person who is experienced and familiar with same topic enhances slow learner's learning ability. Structured discussion really works best with students regardless of their level of maturation. It can develop collaborative skills in students as they can adjust in group. According to Vygotsky (1978), scaffolding consists of the activities provided by the educator, or more competent peer, to support the student as he or she is led through the zone of proximal development.

### **Providing Guidance to Solve Problems**

I observed sample class in class 6 to explore how teacher provide guidance in scaffolding process. There were 35 students in the class, they were looking so humble and disciplined. She was teaching there since 15 years and she has been selected as permanent teacher 5 years ago. The environment of classroom was appropriate for teaching such as the class had adequate light and window in the both sides and enough desk-benches for students.

*She was giving some clues for finding out arithmetic mean from the given data. She wrote formula for this and explained how to use. Then she showed one example for help after that she asked to do another problem like same way. Students become success to solve that problem.*

From the above observation, I came to know that giving useful guidance promote students to solve related problems as shown in guidance. This strategy can make student active in instructional activities.

Regarding this, a student participant S<sub>2</sub> from the sample revealed her feelings in the interview as:

*My teacher scaffolds me by demonstrating teaching materials related to their topic that can be guide for me. Most of the time she solves one example related to lesson and gives us another problem as same as example. She does interact with each student reaching on their seat and helps us to reduce confusions.*

From the above information I got to know about the topic that students feel comfortable to solving problem when teacher gives them some clues and guidance. This strategy scaffolds students to feel confident in completing task. Reaching all students helps to know who can catch on quickly and which student wants more guidance. In this regard, Vygotsky (1978) stated that two children might have the same level of actual development, but given the appropriate help from an adult, one might be able to solve many more problems than the other. Scaffolding must target both the level of actual development and the level of potential development.

Sometimes she divides the whole class into small groups and gives them time to interact and formulate concepts themselves. At the end, she asks for sharing their ideas in the classroom and these activities help them to be friendly with teachers and friends. This declared that scaffolding can be an effective strategy for student friendly classroom discourse and it fosters student's level of thinking and self -confident.

## Chapter V

### FINDINGS, CONCLUSIONS AND IMPLICATIONS

In this chapter, I have presented conclusions of the study and implications of the study in various aspects. After concluding my study I believe that it is worth every teacher's efforts to try to improve the amount and variation of classroom discourse in mathematics teaching. I grew up learning math in very traditional classroom which was quite challenging for me and that was too difficult to overcome the situations. I concluded that there are vast differences between traditional classroom discourse and happening classroom discourse. I also foster some implications for student friendly classroom in basic level.

#### **Findings**

Findings are principal outcomes of a research project; what the project suggested, revealed or indicated. This usually refers to the totality of outcomes rather than the conclusions or recommendations drawn from them. After the rigorous analysis and interpretation of collected data, following findings of the study have been derived.

#### **Finding Related to Emerged Discourses in Mathematics Classroom**

My concern in this section was to explore mathematical classroom discourse adopted by female teachers. As I observed the various classes, I got to know about different classroom discourse adopting currently by females. An experienced teacher with B.Ed. degree was trying to become a successful in creating a pleasant classroom environment and linking the ideas to the topic and making classroom student friendly. She was using discussion method and interaction method frequently. The behaviors towards students were commendable that she was treating her students.

- ) The teachers were well known about lesson plan or lesson note and they used to prepare before going classroom.
- ) Teachers were known about student centered teaching strategies and most of the time they had used interaction and discussion methods.
- ) They had knowledge about teaching materials but rarely used in the classroom.
- ) Students had positive attitude towards female mathematics teachers.

- ) Female teachers motivate students using warm tone and encouraging words.
- ) Head teacher's supervision and positive feedbacks encourage teachers for refreshing knowledge.
- ) Assessment on the spot can foster student's confidence and participation in learning activities.
- ) Homework encourages accountability and responsibility of students.

### **Findings Related to Making Classroom Discourse Student Friendly**

- ) Teacher's encouraging words and warm tones
- ) Implementing collaborative learning approach
- ) Through multiple representations

### **Findings Related to strategies of scaffolding to solve mathematics problems**

- ) Preparing to Move Forward Recalling Prior Knowledge
- ) Providing Guidance to Solve Problems
- ) Give time to talk

### **Conclusions**

The main concern of this study was to explore emerged discourses adopted or practiced by female teachers in mathematics classroom at basic level. In the wider sense, my research tried to investigate how female teachers teach mathematics in a positive sense, how they scaffold students to stimulate student to solve mathematical problems and what types of strategies they use to make classroom discourse student friendly. Moreover, the intention of the study was to inspire female teachers in mathematics teaching using multiple types of classroom discourses.

The results were quite unexpected as I thought that it is very challenging job to teach mathematics subject by female teacher. When I reviewed plenty of theoretical and empirical documents I was very disappointed because there were not much researches about female mathematics teacher and their classroom discourses. But the research found out female teachers also can teach mathematics using various types of classroom discourses and different strategies related to topic and content. In Nepalese society, female are still living under pressure from society and culture. I felt more than happy getting the evidence of progress of females. I explored some classroom discourses used by female teachers which are discussion method, interacting with

teacher or student-student, interpretation of concepts, demonstrating teaching materials, treating students as own family, question/answer segment in the class and so on. Teachers create appropriate learning environment understanding student's physical and mental ability. Each and every student has his/her different ability. Teachers should burst out those inherent ability and foster seen ability of all types of students. There should adopt student centered teaching strategies rather than teacher centered. In this technological world, there should be available technology in every school and teachers need to renovate their knowledge relative to time for worthwhile teaching. I revealed some useful strategies for making classroom discourse student friendly that will be really helpful to those female teachers are facing challenges in teaching mathematics. In the context of Nepal, the existing classroom discourse in mathematics classes have more focus on preparatory, elaborative and interactive phase and less focus on recapitulation and introductory phase. Knowing that recapitulation phase is crucial though teachers does not apply in teaching learning activity.

Moreover, collaborative learning in classroom makes class united by group work. Students who obtained lower level of achievement can improve working in group. Decomposing problems in small parts can save time and teacher can work as guider rather than being instructor. A teacher also can make classroom student friendly by implementing multiple representation approach. Scaffolding is a contingent interactive process between the teacher and students. The teacher interprets student's needs for support and fades out its amount and intensity as student's action and competence allow. Teacher uses scaffolding to stimulate students for active learning. Collaborative learning and scaffolding process can use together for better achievement and active participation in learning. It can be helpful for increasing student's level of critical thinking and self-confidence then promote working ability with different groups in different situation.

## **Implications**

This research will be remarkable for all mathematics teachers especially female mathematics teachers to make classroom discourse students friendly as well as some strategies of scaffolding process. This will be helpful to improve classroom discourses in more creative way than before using all five phases of discourse. As a result of my study I will make sure to implement those results in my teaching carrier too. When I plan my lesson will always be looking for appropriate places to incorporate opportunities for students to improve their ability in mathematics. I will try to use five phases of classroom discourse systematically for making student friendly environment and always speak in warm tone and motivating speech for all students. I want to suggest for other teachers to implicate strategies for effective teaching.

## **Instructional Implications**

I concluded collaborative learning and group study enhance student friendly classroom discourse. I conducted research in a way that would be beneficial for the people related to the topic. Person related to my topic were female mathematics teachers, students and person who want to be qualified mathematics teacher. In reality, I found some useful implications in the sector of education. Which are presented as follows:

- ) The study is mainly focused on teaching learning strategies so it will be helpful for mathematics teachers.
- ) It would be guidance for making objectives, selecting teaching materials and appropriate teaching method related to the topic.
- ) It is helpful for conducting student friendly classroom discourse in mathematics class.
- ) It can be pilot for teaching through multiple representations of content and topic.
- ) It would be cooperative to finding effective strategies for scaffolding students.
- ) It would be beneficent to use collaborative approach in teaching mathematics on basic level.
- ) It would be supportive for adopting student center teaching method in mathematics classroom.

- ) It can motivate all the teachers to use warm tone and polite and encouraging words with students.

### **Policy Implications**

The research is based on classroom discourse and teaching strategies for student friendly discourse in mathematics class. So, it can be beneficial for some theoretical purpose. Which are listed below:

- ) This research conducted for only small sample size hence results of the study could not be generalized in the wider form. So, it would be more significant that study could be done including broad area and large number of sample.
- ) This research has unlocked the gate for further researchers who want to do research in classroom discourse.
- ) The finding of the study would be good learning resource for teachers, students, and researchers as well.
- ) The ideational and communicative concepts can be applied in classroom discourse for the reason that classroom is ground for investigating our concepts.

In summary, classroom discourses practiced by female teachers are as same as male teachers. There is no vast difference in adopted classroom discourses in mathematics teaching by female teachers than other teachers. But according to students, female teachers are more polite, caring and loving in the classroom. Female teacher's this kind of nature can be plus point for being successful mathematics teachers and helpful for conducting required classroom discourse in a positive way.



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## Appendix I

### Indicators of Classroom Discourse

<b>School:</b>	<b>Class: Subject:</b>
<b>Preparatory phase</b>	<b>Remarks</b>
Plans the lesson with objectives	
Plans instructional activities to achieve objectives	
Collects/Prepares teaching materials	
Readies the materials for classroom use selectively	
Prepares an outline for classroom assessment	
Prepares an outline for classroom management	
<b>Introductory phase</b>	
Introduces the topic	
Organizes ideas to meet the objectives	
Initiates student talk	
Motivates students towards the lesson	
Uses methods of teaching according to situation	
Creates warmth and builds up relation in the class	
Provides/creates opportunities to explore new ideas	
<b>Elaborative Phase</b>	
Elaborates ideas and topics as per the need	
Follows classroom rules and routines	
Provides clues for difficult concepts as encouragement	
Stresses ideas of apparent importance	
Makes maximum use of prepared materials	
Models appropriate behavioral/ responses to the students	
Reduces confusion	

Builds on new ideas	
<b>Interactive Phase</b>	
Uses question to bring out learning response	
Provides extended activities to strengthen builds ideas	
Rewards learner's attempt and success	
Speaks, writes and communicates clearly	
Engages all students in the class	
Shows clarity in giving directions	
Links ideas and activities of the lesson	
Gives prompts response and feedback	
Creates a pleasant learning climate	
Rephrases subject matter appropriately	
<b>Recapitulation Phase</b>	
Makes full utilization of the time available	
Evaluates achievements during class	
Summarizes the whole lesson	
Assigns students for task	
Provides door for further learning	
Concludes the lesson systematically	
<b>Observer's signature:</b>	<b>Date:</b>

## Appendix II

### Interview Guidelines for Teachers

In order to collect data I had conducted semi-structured interview on the basis of interview guidelines. The following questions were asked in the interview with female teachers.

- ) Do you have prepared the lesson plans/notes before you go to classroom?
- ) Do you use teaching materials?
- ) Do you prepare plans of teaching activities and questions to ask for students to get more output of learning process in classroom?
- ) Which factors are more effective to you to conduct the class smoothly in an interesting way?
- ) Which are the teaching methods you use to have good classroom discourse?
- ) Are you satisfied with the classroom discourse you have used?
- ) What are the differences between today's and previous classroom discourse?
- ) Do you use one-way, two-ways or multiple ways of communications skills in your classroom?
- ) What reinforcement process is used in classroom for students?
- ) Do you have regular training program in school or your school sends teachers for further trainings?
- ) Do you teach in the classroom according to the salary you paid?
- ) Does your head teacher supervise your classroom teaching activities?
- ) What do you think about multiple representations in teaching mathematics?
- ) How you implement collaborative learning in classroom?
- ) How do you scaffold students to solve mathematical problems?
- ) Any other comments?

### Appendix III

#### Interview guidelines for students

In order to collect data I had conducted semi-structured interview on the basis of interview guidelines. The following questions were asked in the interview.

- ) Do you enjoy learning situation in the classroom discourse?
- ) Which factors are more effective to you to be active participants in the classroom discourse?
- ) Which are the teaching methods you like the most? Why?
- ) Are you satisfied from the classroom discourse which your teacher uses to teach?
- ) Do you find two way communications in the classroom?
- ) What are the differences between today's and previous classroom discourse?
- ) List out the activities that you like the most during the classroom discourse.
- ) Do you have enough chances to raise questions in the classroom? How is it responded?
- ) Do you find any difficulties on the content delivery in the classroom discourse?
- ) Are you feeling happy and motivated in the day-by-day classroom discourse? Why?
- ) What is the reinforcement process applied in the classroom?
- ) Does your teacher give you homework? How does it give you benefits?