CLASSROOM DISCOURSE OF FEMALE STUDENTS IN CULTURALLY DIVERSE CLASSROOM

A

THESIS

BY

LILA KARKI

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE MASTER DEGREE IN MATHEMATICS EDUCATION

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Letter for Certificate

This is to certify that **Lila Karki**, a student of semester system 2072/2073 with campus Roll Number **396,** Thesis Number **1468**, Exam roll Number **7228314** and TU Registration Number **9-2-280-32-2012** has completed this thesis for the period prescribed by the rules and regulations of Tribhuvan University, Kirtipur Kathmandu, Nepal. This Thesis entitled **Classroom Discourse of Female Students in Culturally Diverse Students** has been prepared based on the results of her investigations. I hereby recommended and forward this thesis for the evaluation as partial requirement to award the degree of Masters in Mathematics education.

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Letter of Approval

This thesis submitted by Mrs. Lila Karki entitled on **Classroom Discourse of Female Students in Culturally Diverse Students** has been approved as for the partial fulfillment for the requirement of Master's Degree in Mathematics Education.

Committee for the Viva-Voce	**Signature**
Assoc. Prof. Laxmi Narayan Yadav (Chairman)	……..
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Recommendation for Acceptance

This is to certify that Mrs. **Lila Karki**, has completed her thesis entitled **Classroom Discourse of Female Students in Culturally Diverse Students** under my supervision during the period prescribed by the rules and regulations of the Tribhuvan University, Nepal. The study embodies the result of investigation conducting during the period of 2018-2019 under the department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward this thesis to the Department of Mathematics Education to organize final viva-voce.

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Defense Date: April, 2019

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 in any institutions. To the best of my knowledge and belief, this thesis contains no material previously published by any authors due acknowledgement has been made.

…….

(Mrs. Lila Karki)

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2019 AD Lila Karki

Abstract

The major focus of this study was classroom discourse of female students in culturally diverse students in mathematics classroom. The objectives of this study were to explore the classroom discourse of female students in mathematics classroom and to explore the ways for making classroom discourse female students friendly from multicultural perspective. This study has addressed the question: How are existing teaching strategies in classroom discourse of cultural diverse female students? And how we make classroom discourse female students friendly?

To answer these research questions I selected the qualitative design with case study approach. The study site of this study is Utperna Women Secondary School, Subidhanagar, Tinkune, Kathmandu. The participants of this study were two mathematics teacher, two mathematics educators, two grade eight students and two grade six students. Altogether eight person were the research participant in my study. I used purposive sampling to select the participants for my study. The collected data were analyzed with help of theories and related literatures.

From the analysis of the data it was found that theoretically, teachers were well known about to prepare lesson plan but practically they was unable to practice. Furthermore, it was also concluded that present scenario of classroom discourse was more teacher centered. Further, it was concluded that though culturally-based pedagogy, using different strategies in teaching-learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, by implementing co-operative learning, through sharing with acculturation and enculturation, through multiple representations making classroom discourse students friendly.

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Abbreviations

Ph. D.	:	Doctor of philosophy
NCTM	:	National Council of Teacher of Mathematics
T_1	:	Teacher participant one
T2	:	Teacher participant two
i.e.	:	That is;
S_1	:	Student participant one
S_2	:	Student participant two
ZPD	:	Zone of proximal development
S_3	:	Student participant three
S_4	:	Student participant four
ICT	:	Information communication technology
E_1	:	Mathematics educator one
E_2	:	Mathematics educator two

Chapter I

Introduction

Background of the Study

Nepal is multi-religious, multicast multicultural, multilingual and diversified country because of diversity in the Nepalese society caste; there are inequalities in culture, socio-economy and education which are based on the caste (Bista, 2004).

The classroom teaching and learning activities is based on the process of interaction between teachers and students. This interaction is performed by classroom discourse. Classroom discourse refers to the language that teachers and students use to communicate with each other in the classroom talking or conversations is the medium through which most teaching takes place. The National Research Council (1989) purposed that students learn mathematics well only when they construct their own mathematical understanding which requires them to examine, represent, transform, solve, apply, prove and communicate. The National Council of Teacher of Mathematics (NCTM) called for instruction that promotes classroom discourse in which students listen to respond and question the teacher and one another, initiate problems and questions, make conjectures and present solutions and rely on mathematical evidences and argument to determine validity (NCTM, 1991). Thus, student's mathematical communications are as a viable proponent of mathematics learning and achievement.

Mathematics has integral part of human life. mathematics taken as backbone of all civilization because it is most useful content of our daily life .so mathematics as a needy subject its importance is increasing day by day because it is most useful subject in every sector like as, engineering, technology, scientific invention and so on.

Simply gender refers to the socially constructed roles and responsibilities of man and woman in a given cultural location. And Nepal as a diverse country it has diversity in many

sector such as geographical ,socio cultural formation as well as deep rooted caste system and mixed ethnicity group along with their own different norms ,values , culture and religion .in regards to mathematics classroom it also effect in the study of mathematics subject ,like some students come from the educated family and some students come from the uneducated family if we compare with this two backgrounds students achievement of mathematics learning we get educated family student can learn faster than uneducated family , so diversity directly and indirectly effects on learning of mathematics.

In the case of girl's participation in learning mathematics is not satisfied. Our society beliefs that mathematics is for only brilliant and talented students as much for boys only. they have not positive response towards in learning mathematics for the girls and also girls have not confidence to learn mathematics. They are frightened from math subject because they taught mathematics is hard subject and this is not fit for girls ,they can't learn easily , also this subject for talented boys by their home , society, as school also .so, the girls participation in learning mathematics is very low in the context of our country , to increase girls participation in learning mathematics ,the role of teacher and parents are very important .they should encourage to active participation in mathematics classroom ,give opportunity to ask question in classroom about the contents which they are not understand and increase confidence in classroom discourse. By the case of frightened in mathematics subject they can't attend mathematics class actively, so that the parent’s role, school’s role as much teacher’s role is most important to increase female participation or discourse in mathematics learning.

Statement of Problem

This study is mainly concern about the culturally diverse female students in mathematics classroom discourse. Why the female participation is low in mathematics classroom discourse? Is the cultural effect in their learning mathematics? How to reduce the

difficulties in learning mathematics? And how to increase the classroom participation of students in mathematics classroom? Mathematics students come from the different society. We have to provide equal opportunities to each culture diverse female students while teaching and learning mathematics. But the different cultural and society students have own experience own ethnographic mathematical knowledge, values, social norms, and learning style. If we have neglected the student's individual needs for generating owns mathematical knowledge and their experiences they were suffered by anxiety and negative attitude towards mathematics.

We should provide the strong support and fruitful opportunities to students as their needs and interests. Perception of females includes the image of mathematics subject in their mind and their felling, their experiences while learning mathematics in their classroom.

Objectives of the Study

- To explore the classroom discourse of female students in mathematics classroom.
- To explore the ways for making classroom discourse female students friendly from multicultural perspective.

Research Questions

A research questions are fundamental core of study. It provides the guidelines of study determines the methodology and analysis and reporting. I have produced research questions which are strongly related to the objectives of my study.

- How are existing teaching-learning strategies in classroom discourse of culturally diverse female student?
- How we make classroom discourse female students friendly?

Significance of the Study

Mathematics is an essential part of school curriculum. So, every student should be study. It has been taught for all pupils as a compulsory subject at school level as well as optional subject. Teaching mathematics is a difficult and challenging because of its nature, course content, social need, students' interest and exploration of new fixed of knowledge. The world now has become a global community. Nepalese community can't live in isolation. We have to hope our challenges and need to stand upon our reality. If we try to meet the challenges, significant changes in education is need. Nepal's education sector suffers from several constraints that affect its efficiency and effectiveness. The educational reforms seemed to be able to convince the public of the benefit of the change and not all the efforts made so far have brought desirable change.

In the content of Nepal, this study can made significant contribution on the school improvement process and building up the model of learning culture in an ineffective school. This study is helpful to get information about the effect of cultural diversity and difficulty in learning mathematics. This study had the following significances'

- Teaching and learning are the art of science so this approach is very helpful for teaching effectively in culturally diverse mathematics classroom.
- It is also helpful to teacher and students how to perceive the mathematics teaching and learning in culturally diverse classroom.
- It would help to develop effective interaction between teacher and students in culturally diverse female student's mathematics classroom.
- It is helpful to make the inclusive classroom.

- The study would help to manage mere appropriate strategy for better achievement in mathematics.
- This study also helpful to know the effect of individual difference in mathematics achievement.
- This study provides the knowledge about the relation between culture and learning mathematics and difficulties in learning mathematics.
- This study would also open the door for the further study about the area of classroom discourse in culturally diverse mathematics classroom.

Delimitation of the Study

This study is delimited to analysis and interpretation of classroom discourse from multicultural perspective of mathematics education. The research design explained only from the basis of qualitative perspectives.

I have decided to delimit my study in Utprena women secondary school, Subidhanagar, Tinkune, Kathmandu. So, the result of this study was not more generalized. This study focused on the culturally diverse female students in mathematics classroom. It is also delimited to basic level mathematics female students.

Definition of Related Terms

Diversity; Diversity means understanding, that each individual is unique and recognizing our individual differences. These can be along the dimensions of gender, sexual orientation, age, ethnicity, race, religious beliefs, socio-economic status, and physical abilities, political beliefs or other ideologies.

Culture; Culture consists of a complex of a shared understanding, which serves as a medium through which individual human minds interacts in communication one another.

Cultural Diversity; Cultural diversity is the existence of a variety of cultural or ethnic groups within a society.

School Culture; School culture reflects the values, beliefs and traditions of the school community delineation, the relation among students, parents, teachers and head teacher.

Multicultural Classroom; Multicultural perspective refers as a class where the students are present from different cultures this means the class which contains students from different society, different cast and different culture.

Mono-culture Practice; It is the strategies in which practice by applying single cultural.

Learning; Learning is the act of acquiring raw or modifying and reinforcing, existing knowledge, behaviors, skills, values, or preferences and may involve synthesizing different types of information.

Teaching-Learning; An activity done inside a classroom for gaining and sharing of knowledge based in a fixed curriculum.

Teaching Strategy; Teaching strategy is generalized plan for a lesson that a teacher displays in the classroom to deliver the subject matter to the students.

Learning Strategy; A learning strategy is a set of one or more procedures that and individual acquires to facilitate the performance on a learning task.

Chapter II

Review of the Related Literature

To conduct an effective research, researchers are required to be familiar with related researches, Theories, reports, articles and education policies and programs that help in conceptualizing the problems, conducting the and interpreting the findings. The main object of literature review is to gain familiarity with the subject matter to get enough knowledge to develop conceptual framework, to gain validity of the concept and to adopt appropriate research methods. Literature works have been studies to analyze the information related to this study. The review also helps researchers to come up with a theoretical framework to guide the study.

Review of Empirical

Several types of related literature were received in this study which helps to make the concept clear for study and also directs to analyze and interpret the data. Some related literature was received as follows.

Acharya(2017) carried out a research entitled “strategies for making mathematics classroom discourse students friendly; An intercultural perspective”. His aim was making classroom discourse students friendly from intercultural perspective. He raised the research questions: How are existing teaching strategies in classroom discourse from multicultural perspective? How can we make the classroom discourse as students friendly? How are the pedagogy used be the teachers? Dealing these questions, he concluded that for making classroom discourse student’s friendly by applying cultural-based pedagogy, using different strategies in teaching-learning mathematics in the classroom, avoiding rote memorization implementing cooperative learning sharing with acculturation and enculturation making multiple representations classroom discourse student culture friendly. So, our classroom discourse should be focused in this direction.

Acharya (2015) carried out the Ph.D. on the topic, Relevance of primary level Mathematics Education in Nepal: A Cultural perspective. He raised the research questions: To what extent are the existing primary schools' mathematics curricular materials student cultures friendly? How are the pedagogy used by the teachers in multicultural classroom culturally relevant? What challenges are faced by teachers and students while teaching learning mathematics in the multicultural classroom? What ideas do mathematics, educators, teachers, educated cultural group people and curriculum planners have for making primary mathematics education culturally relevant? Dealing with questions based on the above themes, he used ethnographic methodology under interpretive paradigm to describe the multiple realities through the methods of observation, documents analysis and interactive ways. The data have been analyzed using a sequential process of transcribing, coding, categorizing, and thermalizing. The phenomena have been visualized from multiple theoretical perspectives and the researcher's own reflections. The found that contents of primary mathematics curriculum were related to the everyday problems of human life to some extent. However, these were not sufficient to solve practical problems related in various dimensions of daily life. Further, the existing pedagogical practices were less appropriate to address the multicultural classroom environment. There was a huge gap between the practice and the theory of culturally responsive teaching learning process. Moreover, the medium of instruction was found to be key challenges in the multicultural classroom teaching- learning process. Del conceptualization of mathematics teaching- learning activities, incompetent teachers in teaching mathematics in multicultural situation, multi-cultural pedagogies, and contents dominated by ideologies of western culture were found challenges of mathematics education.

Also found that the application of fallibility approach rather than absolutistic in teaching learning activities, mother tongue based primary education, in corporation of local

mathematical knowledge on the curriculum, cultural friendly pedagogy and continuous assessment system are the major approaches to make mathematics education culturally relevant in primary level. Likewise, teaching learning mathematics is to be linked with the cultural of students, associating of with the real-life conditions, mitigating the existing dilemma of making culture unfriendly curriculum and promoting multiculturalism as well as culture friendly assessment is to be the other important aspects to make mathematics education culturally relevant.

Moreno (2015) carried out the Ph.D. entitle "Discourse and knowledge in two community college 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 research selected qualitative design with ethnography approach. He used classroom observation and interview guideline with teachers and students were the main tools to collect the information.

The examined regularities in the classroom activity to defined 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 classrooms 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 interaction pattern guide and influence students learning in ways that can improve mathematical goals.

Bohara (2009) studies on "factors affecting on achievement of Dalit students in mathematics at lower secondary level (A case study in Daijee VDC, kanchanpur district)". The main objectives of his study were to be find out the factors affecting on achievement of Dalit girls in mathematics. He had used semi structured face to face interview with mathematics teachers, case respondents with their guardians and classroom observations to collect primary data for only one case school of Kanchanpur district. His study concluded that illiteracy, ignorance, poverty, prior knowledge, motivation for study at home, parental support, quality of teachers, class size, students' teacher's interaction, social belief, traditional thinking, family occupation, childhood marriage, working in supper cast family were the major affecting factors on mathematics achievement of the Dalit students.

Rijal (2008) did a research work on the title "The difficulties in learning mathematics of RanaTharu students at lower secondary level" with objectives to identify the difficulties and cause of difficulties in learning mathematics of RanaTharu students at lower secondary level. The study was qualitative design and descriptive in nature. The researchers gather information from interview, observation and related published and unpublished documents. Only five children of RanaTharu were selected from grade vi students with purposive sampling techniques. Then found that there are two vital factors in mathematics learning one is language dominance and other is cultural difference and discontinuity.

According to Chapern (2005) "the history of research on the issue of women's participation in mathematics provides an interesting case study of the psychology and sociology of research in the social sciences". The further state that, "the study of mathematics or the failure to study mathematics came to be seen as a critical barrier to women's participation in a wide range of high status and remuneration occupations during these surging years of the women's movement".

Acharya (2013) carried out a study entitled "Problem Encountered in teaching-learning mathematics in multicultural classroom". His aim was to explore the problems faced by students in learning mathematics in multicultural classroom at primary grades and to explore the challenges faced by teachers in teaching mathematics in multicultural classroom. He used qualitative research design and ethnography approach. The research tools were interview and observation. He found that the school environment was not suitable for the mathematics learning for culturally diverse students. There was communication problem between teachers and students at mathematics classroom. The teachers were found incompetent in teaching mathematics in multicultural condition as they were not trained for this purpose. Further, the pedagogies they were found mono-cultural using Nepali language. Mathematics has been conceived as a difficult subject and hence this hegemony may have contributed too creating problems in mathematics teaching learning activities in the classroom. He also concluded that the present primary level mathematics curriculum materials should be revised. It should be better to introduce inclusive curriculum for every cultural group. The knowledge of learners is silent receiver of the prepared knowledge. The lessons are not conceptualized so, we must change this scenario of education system of Nepal.

Moore (2000) carried out the Ph.D. on the title, "The Role of Students Discourse in the Mathematics Achievement of African American Male high school Students". He raised 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 of African American male students? The design of this study was qualitative. Classroom observations and interview with student participants provided data on students' discourse and perception of their learning experience in the mathematics classroom context. Research

findings inform pedagogical consideration in improving the mathematics achievement of African American male students. He used Vygotskian theory, social constructivism, and culturally relevant mathematics pedagogy to analyze the information. During the research he found that students discourse as outlined in the Professional Standards for Teaching Mathematics (NCCTM, 1991) played varying roles in the mathematics goal as result of the participants. Although all the participants had passed the state-mandated proficiency test in mathematics, three of the participants were considered high-achievement students based on above average course grade performance. Two of these students identified their mathematical discourse, in and out of the classroom, as a significant component of their academic mathematics success. They exhibited high levels of accuracy and participation in oral classroom discourse. For the third achieving participant, student discourse was not significant factor to his mathematics achievement. Relatives to the other participants, he exhibited the least amount of participation in classroom discourse.

The two remaining participants were taken as low –achievement students due to failing school mathematics activities. They exhibited above average level of accuracy and participation in oral classroom discourse; yet, they were failing in performance on written evaluation assessment. For one of these students, his failure was a recent decline. These findings implied the complexity of factor that affect the mathematics achievement of African American male students. All of the participants perceived themselves responsible for their own mathematics learning. They perceived group work as beneficial to promoting communication and thereby increasing their understanding. They viewed inquiries for understanding as the most appropriate form of students discourse in class, whether teacher-student discourse or student-student discourse. They state that explaining solutions to fellow classmates improved their own understanding of mathematics concept. Findings informed

pedagogy in three areas of consideration, classroom environment curriculum, and influential factors that students bring to the classroom from outside the school context.

Bell (2008) did his Ph.D. on "Cultural Diversity and White Teacher Scaffolding of Students Self-Regulated Learning in Algebra Classes". His study purpose was to determine the ways in which teacher use classroom discourse for teaching and learning mathematics, developing self-regulated learning, and engaging culturally different students, in meaningful classroom discussion. The design of his study was qualitative with case study approach. Three groups participating in the classroom connectivity in promoting mathematics and science achievement research study were selected as cases for in depth research on each case included a white teacher and culturally different students. Information will be collected through videotaped of classroom observations, notes, and demographic data reported by students. Data will analyze to create to descriptive narratives of classroom discussion for each case. Cross case analysis was used to determine the continuities and discontinuities for the purpose of understanding teachers' and students' use of classroom discourse for learning mathematics with understanding and developing strategic learning skills in culturally diverse learning communities.

Then it was revealed that several aspects of teacher-led classroom discourse have potential to support learning mathematics with understanding and developing and developing self- regulated learning skills. First, social and analytic scaffolding helped students know how to participate in discussion and explore the mathematics deeply when the relationship between classroom participation and learning were made explicit. The productive scaffolding observed involved pressing for students' expression of understanding and providing feedback and relating difficulty with problem solving to opportunities to learn with understanding set norms for open discussion and created a safe environment for taking tasks, aspects of learning that are particularly significant for students of color and with fixed-entity theories

intelligence. Explicit instruction in academic discourse supported communication in content of specific registers language and may have increased engagement in dialogic discourse. Additionally, students, individual/cultural social discourse was described as the lubricant that keeps conversion going in the class where students expressed most mathematical reasoning. It has implication for how engaged learning is defined in classroom with culturally diverse learners. At last, the use of technology to help learning, along with the intension of addressing inequalities, has potential to help dialogic discourse. A teacher's philosophy and approach to teaching and learning may be more significant than mere access to technology in addressing issues of equity with incorporation of technology. A teacher's stance on what it means to teach and learn appears to work in correct with incorporating technology to design more equitable learning atmosphere for culturally diverse students.

Acharya (2004) did the study on Democracy, Gender Equality and Women's literacy". The topic of women's literacy in the midst of diverse value and practices, the analysis of the lived values and practices of ethics and caste group of Nepal reflected immense diversity. Among diversity there are some communities as well as which are marriage, is a social and cultural obligation and thus a compulsion, child bearing is the most important part of married women's life is thus compulsion. Child bearing especially giving birth to a son is linked to women's security, respect and family dignity as the sons give continuity to the family lineage, and sons alone are entitled to ancestral property.

Theoretical Literature

The societal conception about women that they are intellectually and physically incapable in comparison to men had influence their participation in education and employment and hence, there was their exclusion from policy and overall development process. Feminists want development theories to address the issues in women's development

and delineate their role in developmental activities. The central thrust of the feminist debate on development is contained in the issue of women's multiple realities.

There are several feminist perspectives, among them: I have applied radical feminism and liberal feminism "Feminist gives the emphasis to understanding of gender inequality in literacy, educations attainment, access to employment and political participation" (Mathur, 2001). Likewise, Feminist theory seeks to speak the experience of women, to understand the reality from the view point of women, to ask questions that relate to women's lives, and to uncover the systematic biased and distortions in male stream knowledge (Abbott & Wallance, 1997). Feminist sociologist have argued that, it is necessary to develop feminist theories: Theories that explain the world from the position of women, theories that enable us to rethink sexual division of labor and to conceptualize reality in a way that reflects women's interest and values, drawing women's on interpretation of their own experience (Abbott & Wallance, 1997).

Gender justice in all spheres is the main thrust of liberal feminists which was the starting point of feminist theories that have taken a long discourse at the present time when it comes to feminism.

Vygotsky's Socio-Cultural Learning Theory. To identify the emerged problems and to encounter the challenges while establishing equitable mathematics classroom having diverse students from cultural variation, Vygotsky's socio-cultural theory provides greater insight to us. So, I used the Vygotsy's socio-cultural learning theory as theoretical framework in my inquiry.

Lev Vygotsky's cultural-historical theory of cognitive development is focused on the role of culture in the development of higher mental functions, such as speech and reasoning the children. His theory is sometimes referred to as having a socio-culture perspective, which means the theory emphasizes the important of society and culture for promoting cognitive

development in an intentional a systematic manner by encouraging them in challenging and meaningful activities. Vyotsky's zone of proximal development (ZPD) has many implications for these in the educational milieu. Zone of proximal development (ZPD) refers to the difference between what a learner can achieve independently and what a learner can achieve with guidance and encouragement from a skilled partner. Vygotsky's (1978) state; "Every function in the child's cultural development appears twice: first, on the social level and later, on the individual level; first between people (inter-psychological) and then inside the child (intra-psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals." (p57).

The second aspect of Vygotsky's learning theory is the idea that the potential for cognitive development depends upon the "zone of proximal development" (ZPD). According to Vygotsky, an essential feature of learning is that it awakens a variety of interacting with people in his environment and in cooperative with his peers (Vygotsky, 2009).

Therefore, when it comes to language learning, a cultural tools language is the prime source of cognitive development. Cultural tools may be adopted by new generation which is known as appropriation

A multicultural classroom that makes the best use of all of its student's ZPD should follow the following guidelines:

Teacher should act as a scaffold, providing the minimum support necessary for a student to succeed. The idea is to assist without denying the student's need to build his or her own foundation. The problems for the teachers, then they are to find the optimal balance between supporting the students and pushing the students to act independently. To effectively scaffold the student, the teacher should stay one step ahead of the student,

always challenging him or her to reach beyond his or her falls outside of the zone, no growth will occur.

To effectively scaffold students within their ZPD, a teacher should also have an awareness of the different roles students and teachers assume throughout the collaborative process. The role roughly resembles the following;

- Teacher modeling behavior for the student
- Student imitating the teacher's behavior
- Teacher fading out instruction
- Student practicing reciprocal teaching until the skill is mastered by all students on the multicultural classroom.

The multicultural classroom should be set up in such a way to foster group work and student collaboration in order to allow students to take on the role of instructor with their peers as the master the skills and head.

Social Constructivist Theory (Jerome Bruner) . Constructivism is a very broad conceptual framework in philosophy and science. Bruner theory represents one particular perspective. A major theme in the theoretical framework of Bruner is that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge. The learner selects and transforms information, constructs hypothesis, and makes decisions, relying on a cognitive structure to do so. Cognitive structure (i.e. schema, mental models) provides meaning and organization to experiences and allows the individual to 'go beyond the information given".

As far as instruction is concerned the instructor should try and encourage students to discover principles by themselves. The instructor and student should engage in an active dialog. The task of the instructor is to translate information to be learned into a format

appropriate to the learner's current state of understanding. Curriculum should be organized in a spiral manner so that the student continually builds upon what they have already learned.

Bruner (1966) states that a theory of instruction should address four major aspects:

- Predisposition towards learning.
- The ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner.
- The most effective sequences in which to present material. and
- The nature and pacing of rewards and punishments. Good methods for structuring knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information.

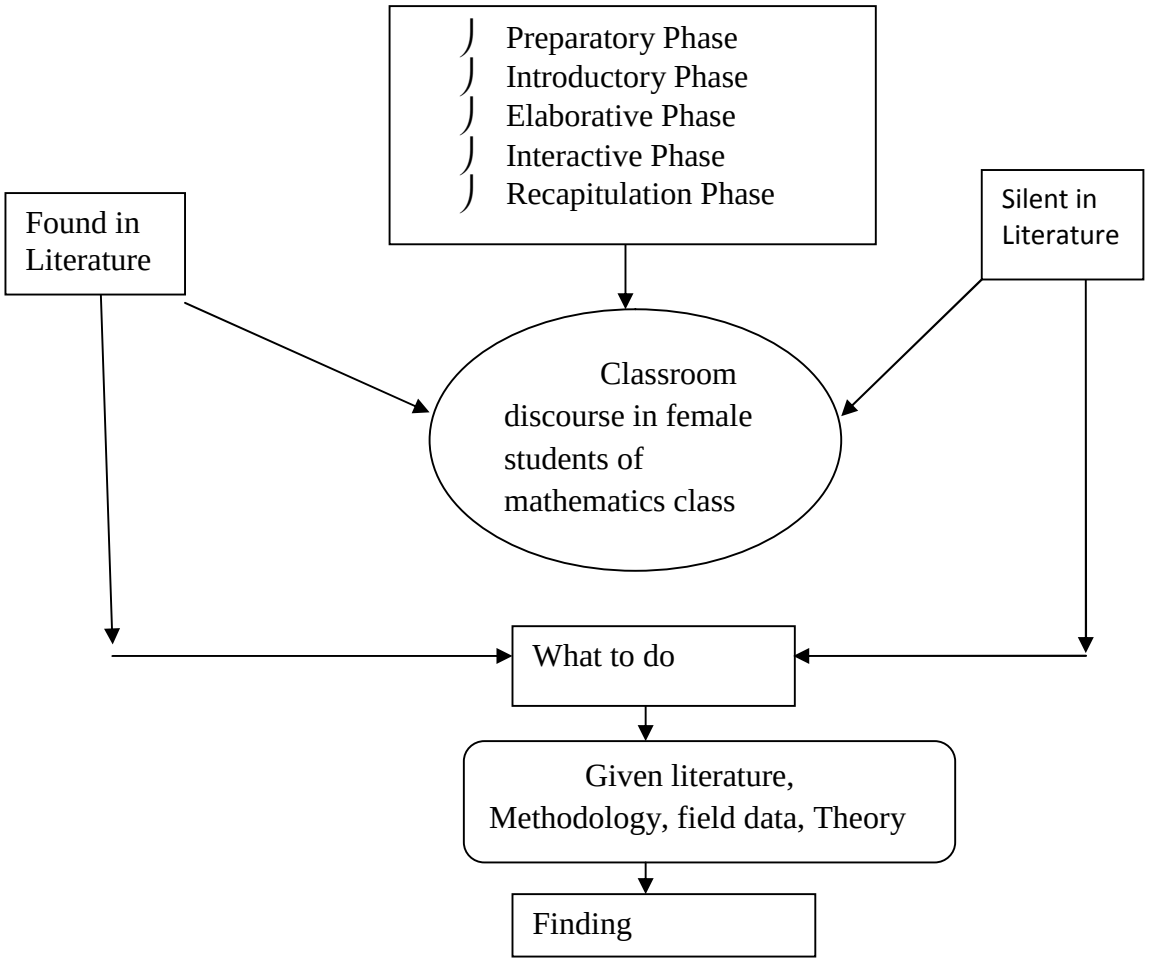
Filling in the Gap

Overall review of related literature, classroom discourse of female students and cultural diversity is the major point of in learning mathematics. Classroom discourse and cultural background is the main pillar of learning. From the above review of literature, how are existing strategies in classroom discourse of culturally diverse female students? And how we make classroom discourse female students friendly? It is important to explore about it. But there was no such research to explore such a classroom discourse of female students in culturally diverse mathematics classroom. There is a gap that the classrooms discourse of female students in culturally diverse mathematics classroom.so, through this research I am motivated to study on this topic. I believe my title for this dissertation is suitable for carrying out a research.

Conceptual Framework

Classroom discourse refers to the language that teachers and students use to communicate with each other in the classroom. It is an interaction process; activities and perception that are reflected in classroom realities: The teaching learning challenges of mathematics are already explained above. The conceptual framework devised through the literature studies facilitated to attain research objectives, get the answer of the research questions (Acharya,2015). Analyzing various literatures in relation mathematical classroom discourse of students in culturally diverse students, I have development a conceptual framework for this study shown in figure below:

Figure: 1 Conceptual framework



Source: (Sinclair and Coulthard, 1975)

In the above diagram, on the top shows the first phase, such as preparatory which was related with the plans of teaching in the classroom, teacher enters in to classroom with or

without lesson plan. A teacher prepares the lesson plan with specific objectives, designs instructional activities to achieve the objectives, collects or prepared teaching materials for classroom use, and sets herself for the delivery of instruction.

In the second introductory phase, the teacher provides outlines for classroom assessment and manages the teaching procedures. In this phase, teacher introduces the topic, organizes activities, reflects the objectives motivates students toward lesson uses appropriate situation, create warm environment in the class, builds up relation in the class by linking student's knowledge with the lesson and provides opportunities to explore the new ideas.

In the third elaborative phase, teacher elaborate the ideas and topic, provide clues for difficult concepts or ideas, give encouragement, makes maximum use of prepared materials for effective teaching, responses to the students reduce the confusing.

In the fourth phase, interactive phase, teacher provides extended to strengthen students' ideas, reward learner's attempts and success, peaks, writes and communicate clearly, engages all students in the classroom activities, links ideas and activists of the lesson, gives response and feedback, creates a pleasant learning environment.

In fifth phase, teacher recapitulates her saying, student's classroom achievement, summarizes the whole lesson assigns students' further task and concludes the lesson systematically. So, I applied this above framework for data collection and analyzed process.

Chapter III

Methods and Producers

This chapter describes how the propose of the study conducted in course to achieve the objectives and answering the research questions. Particularly, this chapter, discuses design, study site, sampling, tools, process of data collection and analysis briefly.

Research Design

Research designs the specification of the methods and procedure. It is also a way of the research that prepares the way for the researchers to achieve the goal of research. This study focused on the classroom discourse of female students in culturally diverse students. The design of this study was qualitative with case study approach. Qualitative research is multi methods involving an interpretive, naturalistic approach to subject matter. This means that qualitative researchers study things in their natural setting, attempting to make sense of or interpreted phenomena in terms of the meanings people bring to them (Denzin&Lincoln, 2005 cited in Acharya, 2017).

Research Paradigm

This is qualitative research so my research paradigm was interpretive and naturalistic. Sometimes I tried to become critical so criticism and interpretive is my research paradigm. So, I believed that there is multiple reality and knowledge is social constructed and subject.

Study Site

Kathmandu is the capital city of Nepal where students from all 77 districts and 14 Zones they have own cultural and learning experiences. The classrooms have now become a community having unity diversity. My study site is Uttprena Women Secondary School, Subidhanagar, Tinkune, Kathmandu.

Selections of Participants

The participants of this study were two mathematics teachers, two mathematics educators, two grade eight students and two grade six students. Altogether eight persons were the research participants in my study. I used purposive sampling to select the participants for my study. Purposive sampling is the of selecting the research place because the researcher's hand picks subjects on the basis of specific characteristics. In purposive sampling one pikes up the case that are judge as typical on the basis of the needs of researcher (Thakur, 1997, cited in Wagle, 2017).

Tools

For my research, data were collected by using classroom observation and interview guidelines. The brief discussion of the tools depicts below;

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). A classroom observation is a formal or informal observation of teaching while it is taking place in a classroom or other learning environment. The kinds of observations available to the research lie on a continuum from unstructured and participants. Observation class observed directly and indirectly. I have also the mathematics teacher in same school when I observe my study sampling. In during the time my class observation of grade eight female students on the basis of now they discourse each other and teacher also. Keeping above understanding in mind, I will develop classroom indicators. That will categorize into five groups as per the need of classroom observation i.e. preparatory, introductory, elaborative, interactive and recapitulative activity. Seen in Appendix IV.

Interview Guidelines of Teachers and students. Interview, guidelines were developed for teachers and students for the selecting school. This guideline encompassed

overall classroom activities including evaluation. The subject teachers were interview with the help of interview guidelines. Seen in Appendix I and IV.

Qualitative research needs natural setting data. Thus, interview stands as one of the prime source of data collection. It gives deep understanding of the problems and identifies key information for the solution. Interview such highly purposeful task that goes beyond more conservation (Anderson,1998, as cited in Wagle, 2017).

Data Collection Procedure. In my research, data collection starts with the help of tools as discussed above. The indicators of classroom discourse developed and validated by the help of the suggetions of experts. I was observe teaching-learning activities in grade VIII and grade VI students and teachers. How teachers and students interact with each other. During my research, I was observing every notable classroom activity of teachers and students. Then I took interviews with, two of mathematics teachers, two students of grade VIII and two students of grade VI with semi-structured interview guidelines.

Data Analysis and Interpretation Procedure

After collecting appropriate data by used interview guidelines and class observation, I was collecting the raw data in field notes and interview transcripts with the consideration of my objectives. I was categorized the raw data according to my research questions and develop the primary and secondary theme to build up the theory. After triangulation, findings were generated.

Quality Standards

After completing the construction of the research tools, it is necessary to maintain quality standards of the research. To maintain the quality standards Guba and Lincoln (1998) suggests the following criteria. So, I followed these criteria to mention the quality standards in my research.

Transferability

Transferability replaces the concept of eternal validity. To maintain transferability i had tried to capture most of scenario by using thick description of observations, interviews and my meaning making.

Credibility

This concept replaces the idea of internal validity, by which researchers seek to establish confidence in the 'truth' of their findings. Guba and Lincoln (1998) recommend several techniques inquirers may use to enhance the credibility of their research: persistent observation, triangulation, peer debriefing, relative case analysis, progressive subjectivity checks and member checking. To maintain credibility of my research I tried to spend as much as time for observation and engaging with different people with their work. After getting information I wrote notes, I asked similar type of questions to other people and tried to find real practices from that information.

Dependability

This concept replaces the idea of reliability. This is the third standards and refers to the 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 observe. I would try to maintain credibility and transferability to ensure dependability standards.

Conformability

A fourth standards is conformability, which refers to the quality of the results produced by an inquiry in terms of how well they are involved in the study and by events that are independent of the inquirer. I am also a part of mathematics student so, to maintain conformability, before concluding information myself several times and sometimes I conform that information to my other students before concluding information as well.

Chapter IV

Analysis and Interpretation

This chapter is mainly focused on the analysis and interpretation of the collected data. In this chapter I have addressed my research questions; how are teaching learning strategies in classroom discourse of culturally diverse female students? How we make classroom discourse female students friendly?

In order to answer research questions and achieve the objectives systematically, the qualitative information was collected for answering the research questions related to teaching learning strategies in classroom discourse of culturally diverse female students. The interpretation of analyzed data was done using different theoretical perspective as explained literature review section. For this, this chapter organized in to two sections. Section I discussed about the discourse of teaching learning strategies in mathematics class and section II discussed knowledge attributes through classroom discourse.

Section I: Discourse of Teaching Learning Strategies in Mathematics Class

This section deals with classroom discourse on teaching-learning strategies in mathematics classroom. Mainly classroom discourse moves through five phases are as preparatory, introductory, elaborative, interactive and recapitulation phases. For this, I observed classroom, took the interview with teachers and students.

Prepare the Lesson Plan with Objectives

It was March 12, 2019 my sample school is Utprena Women Secondary school at Subidhanagar, Tinkune, Kathmandu. I am also the mathematics teacher in same school in morning shift since 2073 B. S. I observed the classroom discourse in day shift. When I meet the head teacher and inform my propose. The head teacher arranged for me grade 8 for

observation that day. The subject teacher had 6- years teaching experience. She graduated with mathematics major.

> *When I entered into teacher T_1 classroom she was teaching mathematics in grade eight. The topic of the lesson was introduced first. She was using lecture method sometimes also using discussion method. The teacher had good relation with students in the class. There is no use of teaching materials.*

From the above classroom observation, it was claimed that the teacher started her class with specific objectives. The teacher tried to motivate the students to learn mathematical subject matter. That means the teacher follows the phase first and second. The teacher elaborates the ideas and topic, provides clues for difficult concepts or ideas, gives encouragement, response to the students and reduces the confusion. But the teacher did not use any teaching materials in classroom teaching and the interactive phase was not follow satisfactory. Teacher recapitulates the lesson summary, gave instruction to the students but she did not do systematically. In this regard, Vygotsky (2009) claims that discussion with each other and teaching learning subject matter will be meaningful.

After classroom teaching the teacher T_1 came out of the classroom and discussed about the classroom activities. I asked her, "Do you have prepared written notes/lesson plan before entering the class? The teacher replied,

> *Actually, I know that as a teacher prepared lesson plan but I prepared note and I am well prepared about my teaching matter.*

This means that teacher was well known to prepare the lesson plan before enter the classroom. Theoretically, the teacher was well known about to prepare lesson plan but practically she was unable to practice in actually classroom teaching.

Students and Teacher Classroom Activities in the Class

It was the day of March 13, 2019; I again went to my sample school. When I reached the school, it was the time 10:00 a.m. I saw the students discussing on some of topic of their subject matters. Then bell rung at 10:15 a.m. All the students enter into the classroom. Mathematics teacher enter into the grade 6 all the students stood and said good morning, the teacher replied good morning class sit down. The teacher stared to teach the topic was Area of triangles.

> *When I observed his classroom activities as a researcher, I found that he was telling or introducing the types of triangles with definition and drawing different types of triangles to encourage and motivate learners to learn mathematics. Then he was started to teach the area of triangles. His smile face and learner's active participation tried to match between his perceptions and classroom activities. At last, the teacher summarized the whole lesson of the day he taught and evaluated the students verbally.*

From the above classroom observation, it was found that the teacher motivated the students to learn and summarize the concept which taught that period. In the above classroom observation, it was showed that, the teacher prepared the dairy notes to teach the students. the teacher evaluates the students work. The effective teaching or teacher characteristics are: lesson clarity, instructional variety, teacher task orientation and engagement in the learning process. It means teachers responsibility play prominent role for effective classroom instruction.

After finished classroom observation I asked my teacher participant T_2 "How you discourse classroom activities in the class?" The teacher said,

> *I try to focus on group work activities within the classroom to make the students interactive and engaging. Sometimes I make different small groups among learners*

> *and make them competitive with each other. It encourages learners to participate actively in instruction. I motivated them in teaching learning activities. I use instructional materials according to the demand of subject matter. As a mathematics subject teacher, I use whiteboard, textbook and other essential materials.*

From the above perception, I sensed that active participation of learners in classroom activities is a good technique of making classroom more productive. According to Vygotsky (1978) an effective teacher would always try to bridge between what is in theory with what takes place within the classroom. Instructional materials also play a vital role in good classroom discourse.

Classroom Iteration between Students and Teacher

It was the day 14 March, 2019; I again went to my sample school. It was my third classroom observation. My observation class was grade 6 of the sampled school. The main propose to observe the classroom was how to deliver the subject matter to the students. That day teacher taught the students on the topic profit and loss.

> *The teacher teaching topic and objective were clear and enough and specific. He frequents encouraged the students for solving the mathematical problems. He was confident his teaching concepts. He evaluated the students after finished the class by giving some problems of profit and loss then concluding the lesson.*

From the above classroom observation, I found that teacher was well prepared about the teaching subject matter. I found that the teacher evaluated the students appropriately. Furthermore, it claims that the teacher concluded the lesson. Having finished that day classroom observation, I communicated the students about the classroom discourse. I asked

my student participant S_1 "Do you enjoy learning situation in the classroom discourse?" The students replied that,

> *Classroom interaction between students and teacher it is alive the class. It developed cooperative learning environment in the classroom.*

From the above interview, it is clear that good classroom discourse held between teacher and students and students and students to deliver the subject matter to the students easily.

Use Appropriate Teaching Method and Strategy

In the day 15, March, 2019; I observed grade 8 students in my sample school. It was my fourth classroom observation. I observed mutually how the teacher discourse the preparatory, introductory phase, elaborative phase, interactive phase, recapitulation phase on the classroom teaching. The observed lesson was simple interest.

> *When the teacher enters the classroom, the students stood up and s good morning sir the teacher replied good morning class and sit down. The teacher started his class with telling story type example with related to simple interest. The students seemed to be motivated toward the lesson and the teacher had good relation with students in the class. However, the method of teaching based on the problem solving and students were motivated to solving related problem. The teacher was shared the new ideas for solving the problems of simple interest. But the teacher did not use any instructional materials for this lesson.*

From the above classroom observation, it was clearly seen that the teacher was aware of preparatory phase and elaborative ideas on the lesson and the interactive phase also satisfactory. Teacher and students, students and students between good communication with each other. The teacher did not use any instructional materials except daily used materials.

The teacher recapitulated the lesson summary but he did not do it systematically meaning that there was no evaluation of the students learning during the class that day.

After finished my classroom observation, I asked the teacher participant T_1 "which are the teaching methods you use in classroom to have good classroom discourse?" He replied that,

> *Theoretically we use the teaching methods are based on problem solving, collaborative, cooperative and constructivist that means we use students centered teaching methods but generally we use the more teacher centered, deductive methods in many cases.*

From the above interview of teacher, it was claimed that the teacher was theoretically aware about students centered methods but practically they less use student centered method in their actual classroom teaching. In this regard, Vygotsky (1978) posited group interaction as one source in the development of mental operations. He suggested that students gradually internalize the talk that occurs in groups. They begin to challenge themselves, ask for reason and in general monitor their own mental work as others do their public speech.

Problem in Selecting Appropriate Instructional Materials and Ways of Communication

It was the day of 17, March, 2019, I observed grade six students in my sample school. It was my sample school. It was the fifth observation. I observed mutually now the teacher discourse the preparatory phase, introductory phase, elaborative phase, inter active phase and recapitulation phase, in the class teaching,

> *When the teacher entered the classroom saying good morning class the students were stood and replying good morning sir, the teacher said sit down please. I also entered the classroom with the permission of the head teacher and mathematics class teacher. The teacher was teaching the lesson 'construction of triangle' of grade six. The*

teacher did not use the teaching materials except daily use teaching materials but he gave opportunity to discuss with each other.

As a researcher, I found that the teacher in solving the exercise adopted the discussion method. Besides this, it seems reasonable to conclude that discussion method was adopted in group and lecture method in the presentation of the lesson. Some students did not give attention to the teacher, it seems that those students did not understand what the teacher taught in the classroom or they could not understand the language spoken by the teacher. Mathematics teacher may not be able to describe gender, individual and cultural perspectives that from school's curriculum and teaching and learning activities, the students from diverse racial, ethics and social class group will experience educational equality.

To find the opinion of student about classroom discourse, I asked my student participant S_2 "Do you find two-way communications as in classroom discourse?" she replied that,

Yes, our teacher sometimes gives opportunity to discuss the subject matter to the friends. Sometimes we two way communicate with teacher but most of the time teacher did himself.

From the above information of my student participant S_2 it was claimed that in the classroom discourse the teacher provide the opportunity to communicate each other and teacher too. Most of the time teacher did solve the problem himself some time we did also.

Teaching Learning Process (Product Oriented or Process Oriented)

It was day of 18, March, 2019; I observed grade 8 students in my sample school. It was my 6^{th} classroom observation. It observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase and recapitulation

phase in the classroom teaching. The observed lesson was unitary methods of grade 8 students.

> *That day the teacher had planned the lesson with specific objectives. But there was inadequate preparation for classroom assessment and management. The teacher started teaching of types of variation by asking questions to the students without introducing the topic. The students seemed to be excited for learning as they were kept interested for learning. The class taking seemed to be focusing the delivery to make it as elaborative as possible. The teacher was mostly descriptive for keeping the students engaged in the subject matter. The students were given time for exploring ideas in the class. Some of the students were interested but majority of them remained inattentive in the classroom despite the teacher provided a lot of information to the students by trying to create a pleasant learning climate. She had given opportunity to the students for their concern. At last, the teacher summarizes the lesson toward the end of the class.*

From the above classroom observation, I found that teacher wants to manage the phases of classroom discourse. The teacher's focus of her teaching was elaborative phase. However, the teacher tries to manage preparatory phase, introductory phase, elaborative phase, interactive phase and recapitulation phase in the classroom teaching.

To find the opinion of student about classroom discourse, I asked my students participant S_3, what types of activities your teacher used to conduct classroom discourse in your class?" she replied,

> "*In our classroom teaching, most of the time our mathematics teacher delivers the subject matter herself. After teaching, the teacher asks questions if there is any confusion. Sometimes our mam gives the opportunity to discuss with each other."*

From the above information of the students S_3, it concluded that the activities used by Mathematics teacher focused on delivery of subject matter that means the teaching process is product oriented rather than process oriented. This means that her teaching disagreed Bruner theory of learning which claims that teaching learning is process oriented not product oriented.

Pre-requisites Knowledge of Students and Motivation in Mathematics Classroom

It was 19, March, 2019, I observed grade 8 students in my sample school Utprena Women Secondary School, Subidhanagar, Tinkune, Kathmandu. This was my 7th class observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase and recapitulation phase in the classroom teaching. The observed lesson was percentage of grade 8 students.

> *When the teacher enters the classroom all the students stood up and greeted. The teacher replied, good morning class and sit down. The teacher tested the student's pre-knowledge of the subject matter and she checked homework of two students. After that the teacher thought the topics of percentage. The teacher gave the one example of the problems of percentage and gave one question of percentage. Most of the students solve it. At the end of the period the teacher tried to summarize the lesson.*

From the above classroom observation, it was concluded that the teacher started the class pre-knowledge of students. It means her introductory part was motivating the students. Her teaching was more focusing on elaborative way rather than interactive phase at the end of the class the teacher summaries the lesson and gave some problems of percentage. It was also found that the teacher frequently encouraged the students for solve the problem. After classroom observation, I asked my student participant S_4. "Are you satisfied from the classroom discourse? Why?" the student S_4 replied that,

"Yes, our teacher started the lesson by motivating the students. Her appearance was good. Our teacher some time participated to learn ours. She did not use ICT based instruction; it is better to use ICT in our mathematics teaching."

From the above information of my student participant S4, it concludes that the teacher motivated the students to learn mathematics and the first impression of the teacher was good. The better to use the ICT added pedagogy. In this issue, Acharya (2017) claims that the effective use of ICT resource enhance creativity, problem solving, high order thinking skills and reasoning.

Section II: Making Mathematics Classroom Discourse as Female Students Friendly

In this section, I tried to deal for making classroom discourse students friendly. For this, I took the interview with mathematics educators and school mathematics teachers linking their view with theories. I had generated the themes for making mathematics classroom discourse as students' friendly. These are as follow;

Cultural- Based Pedagogy

Teachers most incorporate a variety of teaching strategies that appeal to and consider all of the learners in their classrooms. Students who were not of the dominant culture have suffered because they were not given a fair opportunity to adapt to the norms of the classroom. In this regard, my research participant mathematics educator E_1 said that,

to *make mathematics classroom discourse student friendly, our teaching- learning activities links with students' daily life activities. Likewise, teachers can use teaching strategies that acculturate and their social norms of the students in their classroom.*

From the above views of mathematics educator, it was claimed that for making mathematics classroom students friendly, we have to teach our mathematics classroom discourse based on student's daily life activities sharing their cultural norms in our daily

learning process. In this regard, teachers need to rethink traditional approaches and provide their diverse classroom community with opportunities for deeper mathematics learning. By NCTM (2000), it would be irresponsible for educators to disregard the needs of diverse learners. Students all are come from different culture and different society and they have own social norms, values, learning experiences and ethno mathematical knowledge that ensures that they will understand mathematics. Teachers can use teaching- learning strategies that acculturate and enculturation of the students in their classroom teaching- learning process. In the same issue my other participant school mathematics teacher T_1 opinioned her view as,

> *to make the classroom discourse students friendly, we have to use the teaching-learning activities links with students' social norms, values and their culture in mathematics classroom.*

From the above view of mathematics teacher, I concluded that making mathematics classroom discourse students' friendly, teaching- learning process should be links with students' daily life activities and gives the place of their learning experiences and mathematical knowledge. In these perspectives, Ladson – Billings (1994) uses the term culturally relevant pedagogy to denote a type of teaching that incorporates student culture in order to preserve it and overcome obstacles that may arise due to the weight of dominant culture.

Using Different Strategies in Teaching – learning Mathematics in the Classroom

Students may come into the classroom with notions formed from their cultural and individual experiences; teachers can be sensitive to these differences and incorporate into the classroom community and achieve academic success. In this regard, my participant mathematics educator E_2 said,

> *Teacher may try to create their own mathematics classroom practices based on the students need and experiences in the class, the pre-set curriculum, state or national*

educational regulations will in some instances limit the types of classroom practices that teachers will be able to utilize. By exposing students to different strategies, teachers may help students become familiar to the practices preformed in any given school and community. Then mathematics classroom will be discourse students friendly.

From the above information it is found that, conducting the classroom discourse, teacher may try to create their own mathematics classroom practices based on the students need and experiences in classroom teaching. While students have the different capacity of learning styles, so the teacher should be use different teaching methods and techniques in class, then the classroom discourse make students friendly. in this regard, to meet the standards NCTM (2000), teachers must incorporate a variety of teaching strategies that appeal to and consider all of the learners in their classrooms (Gay, 2000). In the same issue my other participant school mathematics teacher T_2 share his view as,

We apply different teaching- learning strategies in the mathematics classroom to delivery of the subject matter to the students by creating student friendly environment for making classroom discourse students friendly.

From the above information of school mathematics teacher T_2 it was found that, while conducting the classroom discourse in mathematics classroom in delivery of subject matter the teacher applied the multiple approach according to the nature of subject matter. Not only use single monolithic teaching approach. Then the classroom discourse becomes students friendly. In these senses, Gay (2000), suggests that teacher must incorporate a variety of teaching- learning strategies that appeal to and consider all of the learners in their classroom involvement in learning mathematics.

By Replication of Communication of Practices in the Classroom

Classroom is the replication of the society. Students must be active participations in the classroom community for the group to obtain benefits. In this view my participant E_1 share his view as,

> *if students do not fell the classroom is part of community, they will likely not be able to learn. The context of mathematical knowledge is properly and intimately defined by the culture in which it develops and in which it is included. If given the opportunity, students can be creating an appropriate mathematics culture in the classroom. if teachers allow students to be active participants in the classroom, those students will make the shapes of mathematics culture in ways best suited to their learning needs.*

From the above view of mathematics educator E_1, our classrooms are becoming more diverse the teachers can use strategies that encourage acculturation and enculturation i.e. teachers can remain true to the necessary constraints of the schooling institution and still provide an inclusive classroom teaching and learning experiences for their students it is unreasonable for teacher to demand that all students adopt the social norms set by traditional viewpoints. In this view, Cobb, Wood & Yackel (1993) suggest that teachers need to socialize students into the norms and practices of the mathematics classroom then the classroom discourse become students friendly.

Avoiding Rote Memorization

In the context of Nepal, while mathematics teaching-learning still popular to through rote memorization. The Western classes have turned away from this method of learning. This changing approach has much to do with cultural beliefs regarding how students learn best and what each culture values in its students. In my concern for making classroom discourse

students friendly, my informant mathematics educator E_2 expressed his view as,

> *without understanding the subject matter, the only use rote learning it destroyed the student's critical thinking. It kills the creativity of the learners. So, the primary concern of the teacher is respecting the student's creativity and enhances their enjoying learning the subject matter. Teachers are how incorporating more problem-solving and investigation activities to replace the traditional skill and drill exercise that were previously used in our schools then ultimately classroom discourse student friendly.*

From the above view of my participant, it was found that without understanding the subject matter, the only rote memorization is meaningless to learn mathematics. Therefore, the primary concern of the teacher is for the students to acquire the content through understanding the subject matter. In this view the students-centered, modern, Western classroom, society views education to be positive experiences in which students should enjoy pleasurable learning experiences.

By Implementing Cooperative Learning

Cooperative learning is the instructional use of small heterogeneous groups of students who work together to maximize their own and each other's learning. The instructional processes used in cooperative learning can range from simple to complex. Many researchers have studied and continue to study the use of cooperative learning in the classroom and variety of strategies and tactics available for teachers to apply in the classroom. For making classroom discourse students friendly in this issue my participant E_1 shares his views as,

cooperative learning allows for discussion and reflection, for students of needing to come up with a quick response as required by some other teaching strategies. In this approach, every learner can learn mathematics by sharing their ideas. So, if the teachers use

this type of teaching method then our classroom discourse will become students friendly.

From the above information, I conclude that the cooperative learning is best way of making classroom discourse student friendly. For this method the students are provided the opportunity to communicate with every students and teacher also. The NCTM standards (2000) suggest that teachers create instructional programs in which students can communicate their mathematical thinking clearly to others thereby solidifying a role for cooperative leaning in the mathematics classroom. Similarly, Vygotsky (1978) states that adults, teacher or parents or a child's peers can help student development and that teacher can use cooperative learning to increasing the understanding of mathematics by students of all backgrounds. In this context, my other teacher participant T_2 gave his view as, follows;

> *Cooperative learning, using multiple representations gives all students opportunities for discussion in the classroom for mathematical understanding. Students can also practice and develop their communication skills.*

From above views of mathematics teacher T_2 it was claimed that through the cooperative teaching approach the students provide to communicate friendly environment in the classroom through this practice it is overcome the challenge the communicative skills of the students. in this regard, the zone of proximal development is revisited and students will improve their mathematical understanding through exposure to other. Teachers can facilitate the scaffolding of more complex representation forms of allow students to discuss the representational from and their and corresponding mathematical understandings that they bring with them to the group.

Through Sharing with Acculturation and Enculturation

The process of acculturation is to ask students to adapt to dominant classroom norms. For these teachers need to socialize students into the norms and practices of mathematics

classroom. Likewise, through enculturation teacher also needs to adopt the student's culture in mathematics classroom teaching. In this issue, my research participant E_2 shares his view as;

> *the inclusion of students cultural and linguistic backgrounds can be a significant source for students' motivation in the mathematics learning. So that students will fell personal connection to the concepts being taught and will be more motivated to learn mathematics.*

The mathematics teacher T_2 has the similar view in this issue. From the above information of mathematics educator and teacher, it was claimed that through sharing with students' culture and classroom culture make mathematics learning productive and classroom discourse student's culture friendly.

Through Multiple Representations

The use of various representations forms which help students make connections and communicate their mathematical understanding in multiple representations forms, is another effective strategy of classroom discourse. In this issue my respondent mathematics educators E_1 suggests as;

when students use various forms, they have more opportunities to communicate their thinking. Once a student is able to represent concept in different ways and can explain how each of the representation forms relates to the others, it can be said that they truly understand the concept of subject matter.

From above views of mathematics educator E_1, it was concluded that the multiple representation of the single concept helps understand the mathematical concepts easily. By pursuing this type of classroom discourse, mathematics classroom becomes students' culture friendly. In this regard, my other teacher participant T_1 claims that,

similar to cooperative learning, using multiple representations gives all students' opportunities for discussion to deeper their mathematical understanding. Students can also practice and develop their communication skills through the classroom discourse.

From the above views of mathematics teacher T_1 it was found that the good classroom discourse can be carried out through multiple representations, all students should be granted equal opportunity for discussion about the mathematics subject matter and develop the communication skills. As the community of practice begins to include all of these different tools, students will reach a certain comfort level with different approaches and different tools in the classroom.

Chapter V

Findings, Conclusion and Implications

In this chapter, I will draw the findings, conclusion and implications through collected data.

Findings

Findings are the information/conclusions reached after investigation. After the rigorous analysis and interpretation of collected data, the findings of the study have been derived. The followings were the findings of the study:

Findings Related with Existing Classroom Discourse

In this section, I tried to dig out the perception of mathematics teachers and their teaching-learning strategies and students' participation on mathematics teaching –learning activities. Classroom discourse helps to provide the students centered method to the mathematics classroom teaching and learning. It gives interaction between teacher and students. Thus, the findings of this section deducted through classroom observations, interview Guidelines of teachers and students, data collection procedure are as follows;

- The teachers were theoretically well known about to prepare lesson plan but practically they were unable to practice in actual classroom teaching.
- Having good technique of making classroom more productive.
- Theoretically the teachers were aware about students centered methods that we have to use but practically they didn't use in their actual classroom teaching.
- No having ability/knowledge for selecting appropriate teaching materials. And the teachers used monoculture practice in multicultural classroom situation.
- In the collaborative methods of teaching there is opportunity of good classroom discourse but practice was seen less in the Nepalese school.

- Classroom discourse helps to make product-oriented teaching learning process in mathematics classroom.
- Teaching was more focused on elaborative and recapitulation phase but iterative phase was less use in mathematics classroom teaching.

Findings Related with Making Classroom Discourse Female Students Friendly

- Culturally – based pedagogy
- Using different strategies in teaching- learning mathematics in the classroom
- By replication of communities of practice in the classroom
- By implementing cooperative learning
- Avoiding rote memorization
- Through multiple representations

Conclusion

From the above findings, I concluded that teaching- learning strategies make the classroom discourse students friendly. In the context of Nepal, the existing classroom discourse in mathematics classes' main focus on elaborative and recapitulation phase so we can follow the preparatory phase, introductory phase and iterative phase also. It was concluded that present situation of classroom discourse was basically more teacher centered it should be making students centered. Further, it was concluded that for making classroom discourse students friendly by applying cultural- based pedagogy, using different strategies in teaching- learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, implementing cooperative learning, sharing with acculturation and enculturation, making multiple representations classroom discourse student culture friendly. So, our classroom discourse should be focused in this direction.

Implications

This research will be significant to makes the mathematics classroom student friendly in culturally diverse students. And it is also be helpful for making cultural- based pedagogy.

This research may be helpful to makes the mathematics classroom more students centered including preparatory phase, introductory phase and iterative phase for the better achievement of students in mathematics.

Pedagogical and Educational Implications

When any researcher conducts research, it aims to be useful and beneficial for the persons related to topic. Since my research on classroom discourse of female students in culturally diverse students related with teachers, students and curriculum planner. So, it has some pedagogical and educational implication. These are presented as follows;

- This research focuses the classroom discourse in mathematics classroom. So, that it helpful for mathematics teachers, textbook writer and curriculum planner to develop their professional field.
- It is helpful for teachers, students, researchers, institutions, educationist and policy makers.
- It is helpful for every teacher to understand cultural diversity in classroom and to apply culturally relevant teaching learning activities.
- The teacher should be culturally responsive to accommodate students from culturally and linguistically diverse classroom.
- It is helpful to enhance co-operative teaching- learning mathematics in culturally diverse classroom.
- To develop the curriculum by thinking about multicultural classroom.

Theoretical Implementations

This research is based on the mathematics classroom discourse in culturally diverse students. so, it is also be useful to theoretical implementations. Which are present as follows;

- This study conducted using small sample thus the findings of the study could not be generalized in the broad sense. Thus, it would be more valuable in the study would be done with covering broad areas.
- This research opened the door for more researchers to study the culturally diverse female students and their mathematics classroom interaction with teachers and friends.
- The ideational and communicative concept can be applied in classroom discourse because classroom is a ground for materializing our concepts and cultural reflection.
- This research also be helpful to make classroom discourse students culture friendly.
- This report could be a good learning resource for teachers, students and researchers as well.

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Appendix I

Interview Guideline for the teachers

In order to collect the real data, I conducted the semi- structured interview with two mathematics teachers in Utperna Women Secondary School, Subidhanagar, Tinkune, Kathamandu. Here I had included interview guidelines used for teachers, which I used to ask questions for digging out my desired data. Used interview guidelines are as follows:

- Do you have prepared written lesson plan/proper notes before teaching the class?
- Do you prepare plans of activities and questions to ask students get more output of teaching learning situation in the classroom discourse?
- Which are the teaching methods you use in classroom to have good classroom discourse?
- Do you satisfy from classroom discourse? Why?
- Do you use one way, two ways or multiple ways of communications skill in your classroom?
- How to make mathematics classroom discourse students friendly?

Appendix II

Interview Guideline of Students

In order to collect data, I had conducted semi- structured interview on the basis of interview guideline. Interview guidelines for students are given as below;

- Do you enjoy learning situation in the classroom discourse?
- Which are the teaching methods you like the most? Why?
- Are you satisfied from the classroom discourse? Why?
- Do you find two ways communications as in classroom discourse?
- What activities you suggest to conduct classroom discourse more effectively?
- Do you have enough chances to raise questions in the classroom? How is it responded?
- Are you happy with the day to day classroom discourse? Why?

Appendix III

Interview Guideline of Mathematics Educators

- Ways to make classroom discourse student friendly
- Enough chances to raise questions in the classroom discourse
- Ways to maintain culturally- based pedagogy
- Ways of communities of practice in the classroom
- Ways to avoiding rote memorization
- Ways to classroom discourse through multiple representations

Appendix IV

Indicators of Classroom Discourse/Classroom Observations Guideline

Preparatory phase
Prepare the lesson plans with objectives
Plans instructional activities to achieve objectives
Manage the appropriate teaching materials
Prepare the materials for classroom use selectively
Prepare the outline for classroom assessment
Introductory phase(indicators)
Introduces the topic
Organizes ideas to meet the objectives
Motivates students towards the lesson
Uses appropriate teaching methods
Creates warmth and builds up relation in the class
Links the students pre-requites knowledge with lesson
Initiates students talk
Elaborates phase
Elaborates topics and ideas as the need
Follows classroom rules and regulations
Provides clues for difficult concepts
Maximum use of prepared materials
Reduces confusion
Builds on new ideas
Provides new ideas for difficult concept for encouragement
Interactive phase
Uses questions to elicit (bring out) learning response
Provides extended activities to strengthen builds ideas
Rewards learners attempts and success
Speaks, writes and communicates clearly
Engages all students in the class
Show clarity in giving directions
Links ideas and activities of the lesson
Gives prompt response and feedback
Creates a pleasant learning climate
Uses intrinsic and extrinsic rewards appropriately
Rephrases subject matter appropriately
Recapitulation phase
Evaluates achievement during the class
Summarizes the whole lesson
Assigns students task
Provides room for the further learning
Concludes the lesson systematically