

**CLASSROOM DISCOURSE OF STUDENTS IN MATHEMATICS
LEARNING**

**A
THESIS
BY
GAGAN ACHARYA**

**FOR THE PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE
DEGREE OF MASTER OF EDUCATION**

**SUBMITTED
TO
DEPARTMENT OF MATHEMATICS EDUCATION
CENTRAL DEPARTMENT OF EDUCATION
UNIVERSITY CAMPUS, KIRTIPUR
TRIBHUVAN UNIVERSITY
KATHMANDU, NEPAL**

2023



त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग

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This thesis entitled "**Classroom Discourse of Students in Mathematics Learning**" submitted by **Mr. Gagan Acharya** to partial fulfilment of the requirement for the degree of master of Education has been approved.

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This is to certify that **Mr. Gagan Acharya** has completed his thesis entitled "**Classroom Discourse of Students in Mathematics Learning**" under my supervision during the period prescribed by the rules and regulations of Tribhuvan University Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the department of Mathematics Education to evaluate in the final viva voice.

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Prof. Dr. Bed Raj Acharya

(Supervisor)

Date:

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Dedication

Honestly dedicated

To

My parents

Declaration

This thesis contains no material that has been submitted for the award of another degree in any institution. To the best of my knowledge and belief, this thesis contains no previously published materials by any authors, unless due acknowledgment has been made.

.....

Gagan Acharya

Acknowledgement

I would like to thank the Department of Mathematics Education, Central Department of Education T.U. Kirtipur for providing me support and opportunity to carry out the research work. I would like to gratitude my supervisor Prof. Dr. Bed Raj Acharya for his advisory and mentoring roles throughout the research journey. It would not be possible for me to bring the study in this form without his quality, time, positive encouragement and support.

It is my great pleasure to express my heartfelt gratitude to respected teacher Mr. Abtar Subedi, Head of Department of Mathematics Education, Asst. Prof. Krishna Prasad Adhikari, Asst. Prof. Krishna Prasad Bhatta for their valuable suggestions to bring this research into present form.

Special thanks to Shree Nuwakot Secondary School, Bhumikasthan-7 Arghakhanchi for their kind cooperation and providing the opportunity for the collecting data. Finally, I would like to express my gratitude to all family members of my family and my all friends for their support and enthusiasm to complete this thesis.

Gagan Acharya

Abstract

This research focuses on classroom discourse of students in mathematics learning. This study has addressed the questions: How teacher's and student's discourse in mathematics classroom? And how do teachers make the classroom discourse student friendly? To answer these research questions, I have selected the qualitative research design with ethnography approach. The study site of this study was Shree Nuwakot Secondary School, Nuwakot, Arghakhanchi. The participants of this study were two mathematics teachers and five students from grade nine and ten. Altogether, seven people were the research participants in this study. I used purposive sampling to select the participants for this study.

Classroom observation guideline, interview guidelines and focus group discussion guideline were the main tools of this study. I analysed the information by using different theories to produce the information and draw the conclusion of this study. Through the analysis of the data, it was found that theoretically, teachers were aware about student centre methods that we have to use but practically they were not using in actual classroom and the teachers were not well prepared to practice lesson plan in actual classroom. Despite being well-known about to prepare, teachers use mono-cultural practice in multicultural classroom situation. Further, it was also concluded that present scenario of classroom discourse was more teacher centred. It was also concluded that by applying-cultural based pedagogy, using various strategies in teaching-learning activities in mathematics classroom, by avoiding rote memorization, by implementing co-operative learning and through multiple representations making classroom discourse students friendly.

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Chapter I

INTRODUCTION

Background of the Study

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

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

Mathematics is integral part of human life. Mathematics is most useful content of our daily life that's why it is taken as backbone of all civilization. Mathematics is essential subject and its importance is increasing day by day because it is useful in various sector like as, business, engineering, technology, scientific invention and so on.

In the context of Nepalese society, mathematics is hard subject and only gifted students can study, very few students can study optional mathematics in school level and higher level too. These are the example of traditional thinking and Nepali culture towards mathematics. People also believe that mathematics is only for teaching occupation it can't be used in other sectors. So, this is the main obstacle in learning mathematics due to negative thinking of people towards mathematics. By this discussion we can say that gender belief towards mathematics, approach towards the mathematical literature, religious and cultural approach to study mathematics and relevance language, learning mathematics and its future are the cultural diversity in mathematics education.

Nepal is diverse country in many sector such as geographical, socio-cultural formation as well as caste system and mixed ethnicity group along with their different norms, values, culture and religion. Which also effect in the study of mathematics subject. All students are not come from same cultural background. Some students come from educated, positive conception towards mathematics and economically able family and some students come from low economic condition, narrow conception towards mathematics and uneducated family, if we compare with these backgrounds student's achievement of mathematics learning we get educated family's student can learn faster than uneducated family, so diversity directly and indirectly effects on learning of mathematics (Wagle, 2017).

In case of student's participation in learning mathematics is not satisfied. Our society believes that mathematics is difficult subject; it is only for brilliant and talent students particularly for boys (Acharya, 2015). They do not have positive response for the average students including girls about learning mathematics. Therefore, student participation in learning is very low. This scenario has raised big question about the

reason behind it. This situation can be explained from different perspectives, such as teaching learning perspective, cultural perspective, and classroom discourse perspective. To query the reasons of the above stated situation I was motivated to carry out this research on the topic "Classroom Discourse of Students in Mathematics Classroom"

Statement of the Problem

This study mainly concerns about the discourse of students in mathematics learning. Why the students' participation is low in mathematics classroom discourse? Is the cultural effect in their learning mathematics? How to reduce the difficulties in learning mathematics? How can we increase the student's participation and interaction in mathematics classroom? Since these questions have come to my mind, I have been motivated to do research to find out the answers to these questions. Students come from different society, So We should provide equal opportunities and accesses to each culturally diverse student while teaching and learning mathematics. However, different culture and societies students have own experience, own ethnographic mathematical knowledge, values, and norms and learning style. If we neglect the students' individual needs for generating owns mathematical knowledge and their experiences, they have been suffered by anxiety and negative attitude towards mathematics.

Objectives of the Study

The main objectives of the study are given below:

- To explore the teachers and students discourse in mathematics classroom.
- To explore the ways for making classroom discourse students friendly.

Research Questions

The research questions of this study were as follows;

- How do teachers and students discourse in mathematics classroom?
- How do teachers make the classroom discourse students friendly?

Rationale of the Study

Teaching mathematics is difficult and challenging because of its nature, social need, course content, student interests etc. Mathematics is essential part of school curriculum so every student should study. It is also compulsory as well as optional subject at school level. Now the world has become a global community. Nepalese community can't live in isolation from it. We need to hope our challenges and need to stand upon our reality. If we try to meet the challenges in education, significant changes need to occur. Nepal education sector is suffers from various constraints that affect in efficiency and effectiveness. In school level, failure and dropout are still in large number but there is not enough efforts have been made for it so far (Wagle, 2017).

In this context, this study can make significant contribution on the school improvement process and building up the model of learning culture in school. This study is helpful to get information about the effect of cultural diversity and difficulty in learning mathematics. This study has the following aspects;

Teaching is an art and science so this approach is very helpful for teaching effectively in culturally diverse classroom. This study is helpful to find out the reasons of students difficulties in learning mathematics of culturally diverse classroom. This study help to the teacher, parents and other common people to create better environment and awareness to provide positive attitude towards learning

mathematics. This study also help to teacher and students how to perceive the mathematics teaching and learning effectively in culturally diverse classroom.

This study helps to develop effective interaction between teacher and students. This study is helpful to make the inclusive classroom teaching. This study would be helpful the integrated learning mathematics. This study provides the knowledge about the relation between culture and learning mathematics and difficulties in learning mathematics. This study also opens the door for further study about the classroom discourse in culturally diverse mathematics classroom.

Delimitation of the Study

According to khalal (2019) delimitation is the process by which a researcher determines the scope of his/her study area and what kind of tools she/he wants to study based on the available resource and time.

I have decided to delimit my study in only government school of Arghakhanchi district. This study has used qualitative research method. This study is bounded on Shree Nuwakot secondary school Bhumikasthan-7 Arghakhanchi district. This research was included the responses of two mathematics teachers and five students. Interview guideline, classroom observation and FGD were used as the tools of data collection.

Operational Definition of Related Terms

Classroom discourse. It means that the teachers and students use to communicate with each other in the classroom. Talking or conversation is the medium through which mostly takes place in teaching learning mathematics. So the classroom discourse is the process of face to face teaching and interaction in classroom.

Culture. Culture means the distinctive patterns of ideas, beliefs and norms that characterize the way of life and relation of group within a society.

Discourse. Discourse means, you have a range of statement that provide a language with the way of talking about something. It provides a language with a way of representing knowledge about a particular subject matter at a particular given historical juncture.

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

Multicultural perspective. Multicultural perspective means where the students are present from different culture. This means the class which contains students from different cast, culture and different society.

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

Chapter II

REVIEW OF RELATED LITERATURE

This chapter deals with the review of related literature study and framework for the study. The review of related literature is systematic identification and analysis of documents containing information related to research problem (Niure, 2018).

Review of related literature give the researcher knowledge of what has been studied or researched so far and what has not been attempted. Review of related literature is the essential part of the research for the researcher which helps and guides the researcher to meet the motto of research. Review of related literature also helps researcher to find the research gap and to develop the theoretical and conceptual framework.). So, I have collected some journal, books, articles, researches which are related to classroom discourse in mathematics classroom: a multicultural perspective. So I am going to review the related literature as follows.

Empirical Literature Review

Khanal (2015) completed the Ph. D entitled " Learning Strategies of Mathematics Students". His aim was to explore students learning strategies in mathematics, to analyse the differences in students, learning strategies by gender, ability group, location and school types, to identify the most effective learning strategies for better achievement in mathematics, to examine classroom practices as learning strategy promotion activities, and to determine the factor contributing to the formation of learning strategies. He raised the research questions: What are the learning strategies of students in mathematics? What learning strategies do secondary level students adopt the most to solve the mathematical problem? What is the problem between boys and girls students in their preferred learning strategies? How are the classroom practices promoting learning strategies? He used mixed method research

design to deal above research questions. The research tools was questionnaire, observation and open ended interview. He found that the students created and used different learning strategies while learning mathematics like: peer learning, rehearsal, elaboration, help seeking, effort management, time and study management, organization and critical thinking. The mismatches existed between teachers teaching strategies and students learning strategies. The quality teacher was an extremely good classroom manager. If the classroom is poorly managed then effective teaching and learning can't take place. He also concluded that student attempt to memorize material by repeating over and over. Similarly, they even elaborate by summarizing and putting the materials in their own words. They are also involved in deeper processing through the use of various tactics such as drawing, note taking, diagrams, listening, developing concept map or organizing materials in some manner. Student even use critical thinking strategies to learn mathematics. Student do certain planning, summing and setting up goals as promoted by metacognition strategies. In the addition they performed to seek assistance from their peers, teachers and elders. Asking for help is good strategy as it allows students to learn from other when they cannot deal with the problem alone. They learn in different ways like: by doing, hearing, acting and reflecting, reasoning logically and intuitively, analysing and visualizing steadily. The action of various students produce various strategies in learning. However, peer learning, elaboration, help seeking and effort management are the learning strategies mostly used by mathematics students. Teachers teaching strategies have a significant role in promoting learning strategies. Classroom practice play significant role in promoting learning strategies.

Moreno (2015) Carried out the study entitle " Discourse and Knowledge in two community college developing mathematics classroom". He raised the research

questions: What are the patterns of participation on a development mathematics classroom? What are the norms for classroom discourse reflected by these patterns? How does these norms relate to discursive focus on conceptual vs. procedural knowledge? To address these research questions the researcher selected a qualitative research 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 formed the social and socio-mathematical norms fostered in each classroom. Classroom norms depended the understanding of how teacher invited students to participate in classroom discourse and the roles teachers and student played. Supported by the teacher known answer questions, monologue discourse in one of the classroom was focused on role memorization of mathematical procedure, where as a less monologue discourse in other understanding these procedures. Then he concluded that classroom discourse and normative interaction pattern guide and influence students learning in the ways that can improve mathematical goals.

Wagle (2017) conducted the research study entitled "Classroom discourse in Mathematics: A multicultural perspective." She used questionnaire for students and teacher. Such as how are existing teaching strategies in classroom discourse from multicultural perspective? And how are existing teaching strategies in classroom discourse as student's culture friendly. She used qualitative research design with case study approach. In this research, altogether 8 persons were involved according to purposive sampling techniques. Classroom observation form and interview guideline were main tools of this study. She used various theories to produce information and draw conclusion o this study. From the analysis of the data, she has found that

theoretically teacher were well known about preparation of lesson plan but practically they were unable to practice in actual classroom teaching. She was also concluded that for making classroom discourse students friendly through culturally based pedagogy by using various strategies in teaching learning mathematics in the classroom, by replication of communities of practice in the classroom, by avoiding rote memorization by implementing co-operative learning.

Acharya (2015) carried out the study entitled, *Relevancy of Primary Level Mathematics Education in Nepal: A cultural Perspective*. He raised the research questions: To what extent are the existing primary school mathematics curricular materials student cultures friendly. How are the pedagogy used by teachers in multicultural classroom culturally relevant. What challenges/problems are faced teachers and students while teaching learning mathematics in multi-cultural classroom? What vision do mathematics educators, mathematics teachers, educated cultural group people and curriculum planners have for making primary mathematics education culture relevant? In dealing with the research questions based on above themes, he used ethnographic methodology under interpretive paradigm to explore the multiple realities through the observation method, document analysis and an interactive manner. The data have been analysed using a sequential process of coding, transcribing and categorizing. The phenomena have been visualized from multiple theoretical perspective and researchers own reflections. He found that content of primary mathematics curriculum were related to daily life problem of human life to some extent. However, these content were not sufficient to practical problems related in different dimensions of daily life. Also, the existing pedagogical practices were not sufficient appropriate to address the multicultural classroom. There was huge gap between practice and theory of culturally responsive teaching learning process.

Moreover, the medium of instruction was found to be key challenge in the multicultural classroom teaching learning process.

In his research he also found that the application of fallibility approach rather than absolutistic one in teaching learning activities, mother tongue based primary education, incorporation of local mathematical knowledge in the curriculum; culture friendly pedagogy and continuous assessment system are the major approach to make mathematics education culturally relevant in primary level. Teaching learning mathematics is to be linked with the culture of students, associating it with the real life situation.

Shrestha (2016) carried out his study entitled "Cultural Diversity and Difficulty in Learning Mathematics." The main aim of this study was to identify the difficulties in learning mathematics of culturally diverse classroom at school and explore the relation between learning mathematics and culture. In this research the researchers raised questionnaire for teachers and students both. Selection of the research design was qualitative and ethnography approach. He conclude that culture and learning mathematics has mutual relationship. Lack of culture friendly curricular materials, student's anxiety in mathematics, traditional teaching learning activities, family environment and their socio-economic status and discrimination in classroom were the difficulties in learning mathematics in culturally diverse classroom. The researcher has also found that mathematics teaching and learning ways from the school was not good. Existing school mathematics teaching learning practice seem to have been failing to address social and culture needs of the students.

Adhikari (2006) carried out the study entitled "Cultural discontinuity and Learning difficulties in Mathematics: A case study of primary dalit children." The researcher was determined the objectives to identify the cause of difficulties in

learning mathematics of dalit children and to identify the impact of home environment of the dalit children in learning mathematics. The researcher used case study under qualitative research design. The researcher limited his study on two public school in Kaski district by using purposive sampling. He was selected participation observation and in-depth interview for data collection. He was concluded that caste system in Nepal appeared to be a focal point that has affected the everyday lives of people. Caste system influencing factor for thinking towards other people. In every field like as in school or community, they have to be dominated, humiliated and oppressed due to their culture and poor language. So the culture discontinuity is one of the main cause of difficulties in learning mathematics. He concluded that due to the negative home environment, low income of the family, uneducated family environment and excessive household chores are the main factors of difficulty in learning mathematics for dalit children.

Acharya (2017) write an article entitled "Strategies for Making Mathematics Classroom Discourse Student Friendly: An Intercultural Perspective". The main objective of this article was to investigate existing mathematics classroom discourse in basic level students and explore the ways of making classroom discourse students friendly from intercultural perspective. The research design was qualitative with case study approach. The main tools used for this article were classroom observation and interview guidelines. This has been analysed by connection theories. Finding from this study were existing classroom discourse in mathematics class that focus on elaborate and recapitulation phase and also concluded that though culturally-based pedagogy, using various strategies in teaching learning mathematics in classroom, by replication of communities of practice in the classroom, avoiding rote memorization

by implementing co-operative learning , through multiple representation making classroom discourse students culture friendly.

Rijal (2008) did a research entitled" The Learning Difficulties in Learning Mathematics of Rana Tharu students at lower secondary level", with objectives to identify the difficulties and cause of difficulties in learning of Rana Tharu. He used qualitative research design and descriptive in nature. The used interview, observation and related published and unpublished documents for gathering the information. Only five children of Rana Tharu were selected from grade VI with purposive sampling technique. He conclude that there are two vital factors in mathematics learning, one is language dominance and other is culture difference and discontinuity.

Acharya (2013) carried out the research on the topic" Problem Encountered in Teaching-Learning Mathematics in Multicultural classroom". The main objectives of this study was to explore the problems faced by students in learning mathematics in multicultural classroom at secondary level and to explore the challenges faced by teachers in teaching mathematics in culturally multicultural classroom. He used qualitative research approach and ethnography research design for this study. The researcher selected a public school in Kavreplanchowk district and also he selected three mathematics teachers, five students and two parents by using purposive sampling. He used interview and observation as research tools. The researcher found that the environment of school was not suitable for culturally diverse students. He also found that there is communication problem between students and teacher leadership may have to creating problems in teaching and learning activities in mathematics classroom. I also concluded that the present curriculum of mathematics should be revised. It should be better to include the contextualize problem in mathematics

curriculum. The knowledge of learners is not given priority in our curriculum and lessons are not contextualized. So we need to change the education system of Nepal.

Moore (2000) carried out the PhD on the topic "The Role of Students Discourse in Mathematics Achievement of African American Male High School Students". He raised the research questions, what effect if any, does student discourse have on the mathematics achievement of African American male high school students? How do students discourse and participations inform pedagogical considerations in improving the achievement of African American male students in mathematics? The researcher used the qualitative research design for this study. Classroom observation and interviews with the participated students provided data on students' discourse and perceptions of their learning experiences in the mathematics classroom context. Research findings inform pedagogical considerations in improving the mathematics achievement of African American male students in high school level. The researcher used Vigotski theory, Social constructivism and culturally relevant mathematics pedagogy to analyse the information. Finding of this study indicated that students discourse as outlined in the Professional Standards for Teaching Mathematics (NCTM, 1991) played various role in the mathematics achievement outcomes of the participations. Although all the participants had passed the state-mandated proficiency test in mathematics, three of the participants were considered high-achieving students based on above average course grade performance. Among them two students identified their mathematical discourse in and out of the classroom, as a significant component of their academic mathematics success. They exhibited high level of accuracy and participant, students discourse was not a significant factor to his mathematics achievement. Relative to other participants, he exhibited the least amount of participation in classroom discourse. The two remaining participants were

considered low-achieving students due to falling school mathematics performance. They exhibited above average level of accuracy and participation in oral mathematics classroom discourse; yet, they were failing in performance on written evaluation assessment. For one of these students, his failure was a recent decline. These finding implied the complexity of factors that affect the mathematics achievement of African American male students. All participants preserved themselves responsible for their own mathematics learning. Those students preserved group work as beneficial to promoting communication and thereby increasing their understanding. They stated that explaining solutions to fellow classmates improved their own understanding of mathematics concepts. Finding informed pedagogy in three area of consideration, classroom environment, curriculum and influential factors that students bring to classroom from outside the school context.

Research Gap

Overall review of related literature shows classroom discourse of students is the major focus of learning mathematics. Classroom discourse and cultural background of students are the main pillar of learning. I studied many previous research work, I got some research about this issue but I found that they have not been enough discussed in this area especially in Nepalese mathematics classroom. There was very few research to explore the discourse of students in mathematics classroom. Thus to fulfil this gap I am motivated to study in this topic. So I believe this topic for this dissertation is suitable for carrying out a research.

Theoretical Literature Review

There are many learning and sociological theories which can be used for the analysis and interpretation of data such as social learning theory, Vygotsky's socio-

cultural theory, discourse theory, discourse theory and cultural difference/discontinuity theory and so on.

Vygotsky's social-cultural theory. According to socio-cultural theory, knowledge is the best constructed when learners collaborate each other. Students supports one another and encourages new ways to form, construct and reflect on new materials. To develop knowledge, social interactions and participation play the vital role. Vygotsky believed that parents, peers and society all have an important role in forming higher level of functioning. Vygotsky's socio-cultural theory describe learning as a social process and the origination of human intelligence in society or cultural. The main theme of Vygotsky's theory is that social interaction plays a fundamental role in the cognitive development. Vygotsky believed that everything is learned on two levels. First, through interaction with others and then integrated into the individuals mental structure, every function in the child's cultural development appears twice; first, on the social level, and later on the individual level; first, between people and then inside the child. This applies equally to voluntary attention, to logical memory and the formation of concept. All the higher functions originate as actual relationships between individuals. (Vygotsky, 1978). A second aspect of Vygotsky's theory is the potential for cognitive development is limited to a " zone of proximal development"(ZDP). Teacher or more experienced peer is able to provide the learner with" scaffolding" to support students involving understanding of knowledge domains or development of complex skills. The strategies for supporting the intellectual knowledge and skills of learners and facilitating intentional learning are the collaborating learning, discourse, modelling and scaffolding. Vygotsky's zone of proximal development, the distance between the actual development level as

determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance.

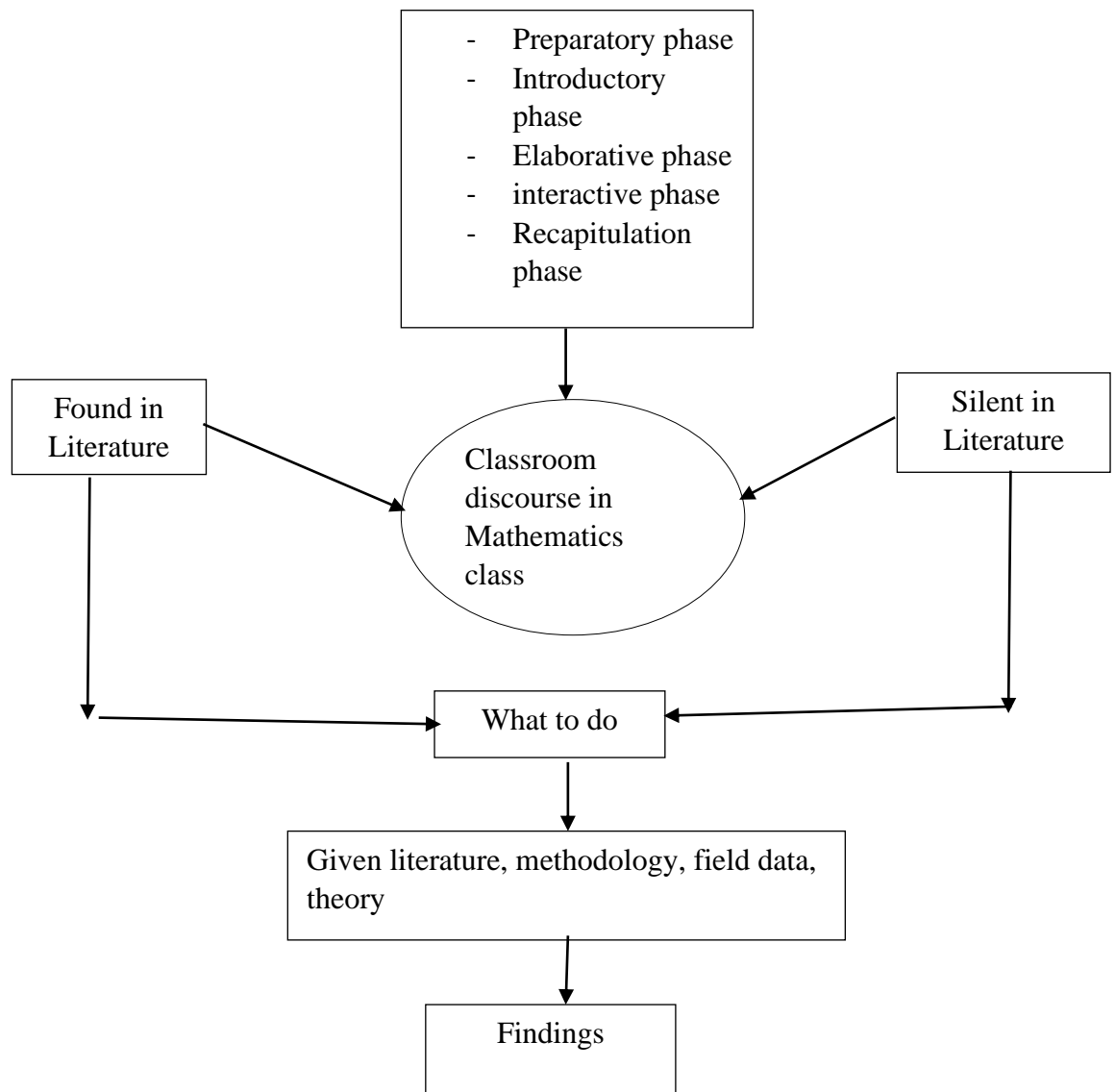
Ausubel's theory of meaning verbal learning. Ausubel has developed a theory of meaningful verbal learning that contains a rationale of expository teaching and shows how lecture- type's session can be made more meaningful in any discipline. According to Ausubel, if a student has positive attitude to learn certain task, he/she is likely to learn the task in meaningful way. Therefore, for meaningful learning, the learners should employ positive learning set and the material they learn should be meaningful to them. The same type of learning can be meaningful depending entirely on the process. (Bell, 1918)

Discourse theory. Michel Foucault introduced discourse theory from Foucauldian analysis. Discourse theory indicates the study of aspects of language and communication 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, the social and human science more generally and centred on the relation between the discourse and structural aspects of social life. Through these debates that reviewed 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 structuralism account of signs, associated especially with Ferdinand de Saussure, and then recaps some poststructuralist critiques. The critiques are review from influential French theories, and then from the linguistic anthropological tradition that maintains closer ties to linguistic structuralism (I.PAZ, 2013).

Conceptual Framework

A conceptual framework is used in the research to outline possible courses of action or present a preferred approach to an idea. Conceptual frameworks are type of immediate theory that attempt to connect to all aspects of inquiry.

(Sinclair & Coulthard, 1975)



In the above figure, on the top shows that the first phase such a preparatory phase which has related with the plans of teaching in classroom, teachers enter into the classroom with or without lesson plan. A prepared teacher prepares the lessons

with objectives, well designs instructional materials to attain the objectives, prepared teaching materials for classroom use and set themselves for delivery of instruction.

The introductory phase is second phase, the teacher provides outlines for classroom assessment and manages the teaching procedures. In this phase teacher introduces the topic, organize the activities, reflects the objectives motivates, students towards lesson, use suitable teaching methods according to situation, create friendly environment in classroom, building relation in the class by linking students' knowledge with the lesson and provides opportunities to explore new ideas.

Third phase is elaborative phase where teacher elaborate the ideas and topic, provide clues for difficult concepts, give encouragement, use maximum teaching materials for effective teaching, response to the students and reduce the confusion.

The fourth phase is interactive phase where the teacher provides extend activities to strengthen students ideas, reward learners attempts and success, speak, writes and communicates clearly, engage all students in classroom activities, links ideas and activities of the lesson, give response and feedback and create warm learning environment.

Fifth phase is recapitulation phase, where the teachers recapitulates their saying, evaluate the students classroom achievement, summarizes the whole lesson assigns students further task and concludes the lesson systematically. So, I applied the above framework for data collection and analysed the process.

Chapter III

METHODS AND PROCEDURE

This chapter describes in detail procedures involved in design of the study, sample of the study tools, data collection techniques, analysis and the interpretation of the result.

Research Design

The qualitative research design helps to discover the individual views for data collection such as individual interview, group discussion and participation of other (Carol, 2016 cited in Bhusal, 2021). This research is conducted using qualitative research design with ethnography approach. Naturalness, data description, systemic study, presence of nature and its deep meaning are its main characteristics. Self-presence observation, FGD and deep interview was the methods applied to collect the qualitative research.

Research Site

Every study needs study area. According to the purpose of my study, I had selected the government school of Arghakhanchi district. Study area selection is a very important task for the study in order to easy access getting information and gathering data directly related to the research objective. The area of the study was based on secondary level student. Shree Nuwakot secondary school was the area of my study.

Selection of Participants

This research is qualitative in nature. So the sample size of this study is small. Qualitative inquiry typically focuses in small sample, I selected a purposeful sampling procedure that serves the qualitative data source to my inquiry. I selected a sample that included two mathematics teacher and five students for interview. Therefore, the

sample size of the inquiry depends on the purpose of the research and credibility of the study. Sample of the study should be appropriate to gain data for the research.

Data Collection Tools

To fulfil the desired objective of the study, the tools of data collection were the classroom observation, interview and focus group discussion in this research. The brief discussion about the tools depict below:

Classroom observation. The concept of observation indicates that the data should enable the researcher to enter and understand the situation that is being described (Patton, 1999). The kinds of observation available to the research lie on the continuum from unstructured and participants. A classroom observation is a formal or informal of teaching while it is taking place in classroom or other learning environment. My observation of students was based on how they discourse each other and with teacher also. I developed classroom indicators that categorized into five group as per the need of classroom observation i. e. Preparatory, introductory, elaborative, interactive and recapitulative activity.

Interview guideline. For the data collection, interview is the common tool. Thus interview stands as one of the prime source of data collection. It gives the depth understanding of the problem and identifies key information for the solution. For collecting information and data with related topic, I conducted in depth interview with two mathematics teachers and six students based on interview schedule. With the help of interview, I tried to find out the existing teaching strategies in classroom discourse in multicultural classroom, how students and teachers discourse in the classroom as well as I tried to find out the ways used by teacher for make classroom discourse students culture friendly.

Focus group discussion guideline. I selected participants purposefully and gathered their experience in focus group discussion. The focus group discussion was conducted with seven people. It was conducted nicely and sensibly. After building friendly relationship, I started discussion with some open-ended questions. I conducted the focus group discussion to dig out the participants perception on classroom discourse, to find out how teacher's and student's discourse happen in mathematics classroom and how do teachers make classroom students friendly.

Data Collection Procedure

In my research, data collection was started with the help of tools as above discussed above. I observed, how teacher and students of Shree Nuwakot secondary school interact each other. I observed carefully and record each and every notable activity of students and teacher. Then I conducted face to face interview with the sample which I selected of this study. I used interview guidelines. For unclear concepts, I provided some explanation where they need.

Data Analysis Procedure

The data of this study is descriptive nature. I read all the data to obtain general sense. In this study first of all, I organized and edited the collected information from interview, classroom observation and focused group discussion then I generated the difference codes according to their similarities and give the title for them which are known as theme. Then I started the detail analysis of data on the basis of themes. Then the represented to address research questions. The data was interpreted on the basis of conceptual framework which was developed in the literature review. The information was critically analyse linking with the theories apply general inductive approach.

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 we have the following criteria. So, I followed these criterias to maintain the quality standard in my research.

Credibility. To maintain credibility of my research I have tried to spend as much as time in observation and engaged in their different 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 replace the concept of external validity. To maintain transferability I tried to capture most of scenario by using thick description of observations, interviews and my meaning making practice.

Dependability. This is the third standard for judging quality standards which refers to the stability or consistency of the inquiry process used over time. To maintain dependability I presented the logic use for selecting people and events to observe. I tried to maintain credibility and transferability to ensure dependability standards.

Conformability. Conformability is fourth standard which refers to the quality of the results produced by an inquiry in terms of how well they are supported by members who are involved in the study and by events that are independent of the inquirer. I am also the part of mathematics students so, to maintain conformability, before concluding information which I received, I reviewed those information myself several times and sometimes I conform those information to my other students/friends.

Ethical Consideration

Ethical consideration is the integral part of the process of qualitative research design. If the research involves the person, special attention should be paid to the person's rights, dignity, privacy and freedom. So I considered some ethical issues in my research such as, I observed the classroom after took permission with head-teacher or other teacher of related school. I conducted the interview only after giving all the prior information to the participants about the study and getting their approval. I didn't use the collected data for my personal gain and benefit and also I respect the diversity in school.

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 do teachers and students discourse happen in mathematics classroom? How do teachers make the classroom discourse students friendly?

The data was collected data through the classroom observation, interview with mathematics teachers and students and by conducting FGD between students of Nuwakot Secondary School is analysed and interpreted by general inductive method.

This chapter is divided in two section as:

I: Discourse on Teaching Learning Strategies in Mathematics Classroom

II: Making Mathematics Classroom Discourse Students Friendly

Section I: Discourse on Teaching Learning Strategies in Mathematics Classroom

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

It was the day of august 28, 2022, I visited my sample school. This school is community school which was established in 1975 AD. I met the head teacher and informed my purpose to go there. The head teacher arranged me for the necessary classes for the observation after having a short informal introduction, I got class ten for observation that day. The subject teacher (T1) had 20 years teaching experience. He was trained. He has graduated in mathematics.

Prepare the lesson plan with objectives

When I entered the classroom, Teacher (T1) was teaching mathematics in grade ten. The topic was circle. The topic of the lesson was introduced first. He wrote the definition of the circle on white board and explained himself. He defined about chord, diameter, radius, sector, and semi-circle e.t.c. He was using lecture method and also sometime discussion method. The teacher tried to motivate students to learn subject matter. The teacher had good relation with students in class. Teacher did not use any kind of teaching materials. He was just describing about the lesson.

From the above classroom observation, it was claimed that the teacher started his class with specific objectives. The teacher tried to motivate the students to learn mathematics subject matter that means the teacher follows the preparatory phase and introductory phase. Teacher elaborated the ideas and topic, provide clues for different concepts or ideas, give encouragement and reduced the confusion. But teacher did not use any kind of teaching materials while teaching in classroom and the interactive phase was not followed satisfactory, teacher recapitulates the lesson as summary, gave instruction to the students but he did not do systematically. In this regard, (Vygotsky, 2009) claims that discussion with each other and teaching learning subject matter will be meaningful.

After the classroom observation, teacher (T1) came out the classroom and discussed about classroom discussion. I asked him "do you prepare written notes or lesson plan before entering the class?" The teacher replied that

Actually, I know as a teacher, before taking a class I should prepare lesson plan but I did not prepare it on written way instead that I roughly prepare objectives and activities.

This means that the 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 he was unable to practice in actual classroom teaching.

From the above information I found that teacher encourage the students by giving the clues for different concepts. The teacher was well known to prepare lesson plan but he did not use in actual classroom teaching. It also found that the teacher roughly prepared about the lesson and objectives.

Classroom activities of teacher and students. It was the day of august 31, 2022. I again went to my sample school. I reached the school around 9:50. Some of the students were playing in the ground. The bell rang at 10 o clock. All the students entered into the classroom. It was second period.

Mathematics teacher enter into the grade 9. The teacher started to teach the students. The unit was Cylinder and sphere. The teacher started to teach the topic. The teacher wrote the topic, Cylinder and sphere and sub-topic Volume of Cylinder. After that he told students to turn yesterday's homework. After that he started to teach. He did not have any teaching materials related to cylinder so he just made figure on whiteboard and explained about length, breadth, and height. First he calculated the area of base of cylinder then applied the formula.

After that, he told the students to solve problem on their copy. He was using lecture method and discussion method. The classroom was little noisy, and then he did one different problem. At last, the teacher summarized verbally the whole lesson of the day then gave some problem as homework.

From the above observation, it was found that the teacher motivated the students to learn. The teacher gave opportunities to students to solve the problem themselves as well as evaluate the students work. The characteristics of effective teaching are lesson clarity, instructional variety, teacher task orientation and encouragement in the learning process. It means teachers' responsibility plays vital role for effective classroom teaching. Classroom is the place where teachers and students work collaboratively to achieve the goals of teaching and learning. In this context, Foucault's(1970) theory of discourse suggest that, students should be 'encouraged', be given opportunities and enabled for making the discourse a lively experience.

After finishing the classroom observation, I asked to my teacher participant (T2)" How do you practice discourse in 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 group among learners and make them competitive with each other. It encourages themselves to participate actively in instruction. I motivated them in teaching learning activities. I use instructional materials according to demand of subject matter. As a mathematics subject teacher, I use whiteboard, textbook and other essential materials.

From the above perception, I felt that active participations 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 be bridge between what is in theory with what takes place within the classroom. Instructional materials also play the vital role in good classroom discourse.

Classroom iteration between teacher and students. It was the day of September 2, 2022, I again went to my sample school Shree Nuwakot secondary school, and it was my third class observation. My observation class was grade 10.

The main purpose to observe the classroom was how to deliver the subject matter to the students. That day the teacher taught the students on the topic 'Trigonometry'.

The teachers' teaching topic and objective were clear, enough and specific.

The class was humorous and he had made frequent eye contact with students.

He encouraged the students to solve the mathematical problems. He was confident in his teaching concepts. He evaluated students after completing topic by asking questions related to Trigonometry and after that he concluded the lesson.

From the above classroom observation I found that teacher was well prepared about the teaching subject matter. He was very confident. I found that the teacher was evaluating the students appropriately. Furthermore, it claims that the teacher concluding the lesson. After finished that day classroom observation I communicated the students about the classroom discourse. I asked to one of my student participant (S1) 'Do you enjoy learning situation in the classroom discourse?' The student replied that

Yes, we enjoy learning process in classroom. We try to discuss more about subject materials, which can make the environment of class more exciting and fun. Classroom discourse help to develop cooperative learning environment in the classroom.

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

easily. The classroom interaction drives teaching and learning process, it involves teacher-students interaction and students-students interaction. Activities like group work, pair work has a vital role in classroom discourse. In this regard, Bell(1978) suggest that for meaningful learning, the learners should have employ positive learning set and the material they learn should be meaningful to them.

Teaching method and strategy. In the day of September 4, 2022, I again observed grade 9 in my sample school. It was my fourth classroom observation. I observes mutually how teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. The observed lesson was Sequence and Series.

When the teacher enter the classroom, students stood up and said good morning sir and teacher replied good morning class sit down. The teacher started his class specific objective. The students seem to be motivated toward the lesson and teacher has good relation with students in the class. However, the method of teaching was traditional teacher centred and he did not seem to enable students to explore new ideas on the topic of the presentation. The teacher did not use any kind of teaching materials while teaching.

From the above classroom observation, it was clearly seen that the teacher aware of preparatory phase and the teacher elaborate ides on the lesson that means the teacher also follow the elaborative phase. But the interactive phase of the lesson was not satisfactory through the teacher. The teacher did not use any kind of instructional materials except daily used materials. The teacher recapitulated the lesson summary but he did not do it systematically means that there was no evaluation of the student's learning during the class that day.

After finished my classroom observation, I asked my teacher participant T1," Which are the teaching methods you use in classroom to have good classroom discourse?" He replied that

Generally, we use the teaching methods are based on problem solving, Question answer, collaborative, cooperative and constructivist that means we use students centred teaching method but in many cases we use traditional teacher centred deductive method as well.

From the above interview with the teacher, it was claimed that teacher was theoretically aware about student's centre methods but practically they are less use student's centred methods in classroom teaching. In this regards 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 reasons, and in general monitor their own mental work as others do their public speech. Similarly, Foucault (1970) argues that, classroom teaching learning scenario creates a specific discourse between teacher and students. These strategies examine relationship between the questioners and respondents.

Teaching materials. It was the day of 6th September 2022, I again went to my sample school for the purpose of data collection. I observed a grade 10 students in my sample school. It was my fifth classroom observation. The main purpose to observe the classroom was how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching.

when the teacher entered the into the classroom, all the students stood up and said good morning sir and the teacher replied saying good morning class, sit

down. I also entered into the classroom for observation. I observed the teaching learning activities of grade ten. The observed topic was statistics. The teacher explained about the central tendency verbally. Then, the teacher presents the individual data on the board and the mean, median and mode from this data with discuss to the students. The teacher did not use any kind of teaching materials except daily use materials. But he gave opportunity to students to discuss with each other.

As a researcher, I found that the teacher in solving the exercise adopted the discussion method. He did not use any kind of teaching materials. It seems teacher had less idea to prepare and use teaching materials. . Besides this, teacher used discussion method and question-answer method was in group and lecture method in the presentation of lesson. The teacher gave priority to content delivery rather than involving the students in learning by doing. Some students did not give attention to the teacher, it seems that those students did not understand what the teacher taught in the classroom. Mathematics teacher may not may not able to describe individual and cultural perspectives of the students. In addition, I found that there was no proper interaction between teacher and students. In this regard, my teacher respondent said,

Every student are from different background and belief. Therefore, they have been diverse ability to gain mathematics knowledge. Some of them are able to understand mathematical knowledge verbally, but some of them need practical demonstration with materials. Some time I faced problem in selecting appropriate teaching materials and strategies for effective teaching.

To find the opinion of student about classroom discourse, I asked my student participant S2, Do you find two way communication in classroom as classroom discourse? S2 replied that,

Yes, our teacher some time gives us opportunity to discuss the subject matter to the friends. If there is any new topic and problem only he solved himself and make us well understand about it. Some time we communicate with teacher but most of the time he did himself.

In this regard FGD conclude that,

Two –way communication is one of the most important part in mathematics teaching learning process. Only from two-way communication between teacher and students, students and students, the topic or problem concluded.

From the above information, it was claimed that in the classroom discourse, the teacher provide the opportunity to communicate each other and with teacher too. Most of the time teacher did solve the problem himself and some time students did also. He did not use any kind of teaching materials while teaching in classroom. In this regard, Yektin(2006) claimed that students were given opportunities to experiences success by engaging with the tasks and activities through multiple representations during collaborative as well as individual learning activities.

Teaching learning process. It was the day of 8th September 2022, I observed grade 9 in my sample school. It was my sixth classroom observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase, in the classroom teaching. The observed lesson was Factorization.

That day the teacher had planned the lesson with well-stated objectives. The teacher started teaching by introducing the concept of subject title (factorization). The student seemed excited for learning as they were kept interested for learning. The teacher mostly used talk and chalk method. 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 classroom. Some of the students were interested but majority of the students remained inattentive in the classroom despite the teacher trying to reduce their confusion about the topic. In the interactive phase, the teacher provided a lot of information about the topic to the students by trying to create a joyful learning environment. Teacher had given opportunity to the students for their response. But most of the students were not attentive to the teacher's delivery in the classroom because of insufficient preparation for classroom management. At the end teacher summarise the lesson.

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

To find the opinion of student about classroom discourse, I asked my student participant S3, What types of activities your teacher used to conduct classroom discourse in your classroom? Student replied,

In our classroom, most of the time our teacher deliver the subject matter himself. Sometime he also gives us opportunity to discuss about the subject matter. After teaching he asked questions to us and if we got confusion he elaborate the topic. He tires his best to make us understand about the problem.

The FGD reached a similar conclusion just like the above information by (s3), Most of the time teacher delivered the subject matter and some the teacher gives

opportunity to students to discuss about the subject matter with each other which help students to enhance their skills in subject matter.

From the above information it concluded that the activities used by teacher focused on delivery of subject matter where students got less time to discuss with each other in subject matter. That means the teaching process of the teacher is product oriented rather than process oriented. That means his teaching process disagreed of Burner Theory of learning which claims that teaching learning process is process oriented rather than product oriented.

Pre-requisites knowledge of students and motivation in classroom. It was the day of 11th September 2022, I observed grade 10 students in my sample school. It was my seventh classroom observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. The observed lesson was probability.

When the teacher entered the classroom, all the students stood up and said good morning sir. The teacher replied" good morning class and sit down". Before the lesson started, the teacher tested the student's pre- knowledge of the subject matter. After then the teacher started the topic. He elaborated about the topic and solved some questions, after that he asked students, do you have any confusion about the subject matter? Some students raised their hand which means they had confusion about the subject matter after that teacher tried his best by showing some examples to make students able to understand. At the end of the class the teacher summarized the lesson.

From the above classroom observation it was found that before starting the lesson teacher wanted to know the pre- knowledge of students about the topic. It

means his introductory part was motivating. His teaching was more focus on elaborative way rather than interactive phase. At the end of the class the teacher summarized the lesson. It was also found that the teacher frequently encouraged the students. After the classroom observation, I asked my student participant S4, "Are you satisfied from the classroom discourse"? Why? The student replied that,

Yes, because before starting the lesson our teacher asked about the topic and pre-knowledge about topic. After that, he started the class and discussed about it with us, which help us to make learning process more effective and long lasting.

In this regard FGD concluded that, the teacher started the lesson by knowing the students pre-knowledge about the subject matter and by motivating them. He elaborated the topic with showing some example related with topic, which help students to understand about the topic. The teacher is motivating and supportive towards students.

From the above information, it concluded that the teacher motivated the students to learn mathematics and the first impression of the teacher was good. The teacher explained enough about the subject matter which helps students to learn. The teacher sometime tried to co-ordinate with the students themselves.

Teaching strategy and motivation. It was the day of 13th September 2022. I observed the grade 9 in my sample school. It was my 8th classroom observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. The observed topic was Linear equation.

The teacher entered the classroom, all the students stood up and said good morning sir and the teacher replied good morning and sit down. He wrote the

topic on the board and asked students about the topic to know the pre-knowledge of students. During that period the teacher motivated students to learn mathematics. The teacher solved some problem on the white board and explained about it with some other examples. But he did not use any kind of teaching materials except daily use materials. After that the teacher asked some questions to students randomly for the student's evaluation. At the end of the class the teacher summarized the lesson and gave some questions for homework.

After the classroom observation I asked my student participants (S5), do you get enough chances to ask doubtful question in the classroom? The student replied,

Yes, our teacher gives us chances to ask about doubtful questions about the subject matter. After finished his explanation about topic, he asked to us, do you understand? If we asked to him for repeat explanation, he always did. He always tried his best to make us able to understand by showing related examples.

In this regard, the FGD concluded that, the teacher gives chances to ask doubtful questions. If students did not able to understand, the teacher repeat his explanation to make students able to understand. The teacher was very supportive and motivated towards students.

From the above information, it was concluded that his teaching strategies were mainly focused on elaborative phase and recapitulation phases. The teacher was very supportive for students to learn. The teacher has been given chances to students to ask doubtful things about subject matter in the classroom, which helps students to

discourse in classroom about subject matter. The teacher has the good command on subject matter and sequential presentation.

Collaboration in teaching. It was 15th September 2022, I observed the class 10 in my sample school. It was my ninth classroom observation. I was not new to the teacher and students in the school. So, I directly entered into the classroom with the subject teacher. The observed topic was statistics.

The teacher and I entered into the classroom, the students greeting us and we replied. And the mathematics teacher started to teach the topic "statistics". The teacher introduced the teaching topic and started his elaborative activities. At first he asked the students preliminary concept about the statistics. His initial phase of classroom discourse was elaborative. The teacher illustrated subject matter with related examples. The tried to make the class more elaborative. At the end the teacher summarized the lesson and evaluate the student's achievement by asking questions.

From the above classroom observation, I found that the teacher teaching strategies was more focus on elaborative and recapitulation phases but less focus on interactive phase. In addition, during my classroom observation, I found that the teacher was helpful to the students in mathematical concept. In this context Herman (2006 cited in Wagle 2017) believes that the teachers need to use all forms of representation equally and not show bias towards a certain form and students will pick up on this preference and tend to favour the form chosen by teacher.

In the day of 20th September 2022, I observed the class 9 in my sample school. It was my 10th classroom observation. The observed topic was Triangle.

The teacher and I entered into the classroom, students greeting us by saying good morning sir and we also replied. At first, the teacher checked the

homework and then teacher started the lesson. He described the topic by showing some figure on the white board. But he did not use any kind of teaching materials except daily used materials. He explained the topic by giving some examples.

From the above classroom observation, I found that teacher's teaching strategies were mainly focus on elaborative phase and recapitulation phase. He was less emphasis interactive phase. The teacher did not use any kind of teaching materials in classroom teaching except daily used materials.

Section II: Making Mathematics Classroom Discourse Students Friendly

In this section, I tried to deal for making classroom discourse students friendly. For this, I took interview with mathematics teachers and students. I also conduct FGD with students and linking their views with theories. On the basis of view of my participants, I have generated the following themes for making mathematics classroom discourse students friendly.

By applying cultural-based pedagogy. Culture is the way in which a group of people make meaning of their experiences through language, belief, social practices and the use and creation of material objects (Bank, 2006; as cited in Acharya, 2015). In teaching mathematics it's required to addressing diversity because it is need for the people of different culture. Cultural based education is the grounding of instruction and student learning in the values, norms, beliefs, practice and language that are the foundation of a culture.

Teachers must 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 chance to adapt the

norms of classroom. In this regard, my research participant mathematics teacher T1 shared his views as,

Being an experienced teacher I think, to make mathematics classroom discourse students friendly, we need to be familiar with students, our teaching-learning activities should link with students' daily activities, we need to be like a friend with students in teaching-learning activities. We need to know student's social-cultural background and we have to share our cultural perspective too. If we teach by knowing students' social-cultural background then students can be able to do their problem easily. For this, teacher's needs to show sufficient examples related with social-cultural norms.

From the above view of mathematics teacher (T1), it was claimed that for making classroom discourse students friendly, we have to create mathematics classroom discourse based on students' daily life activities. We have to link their social-cultural norms in our daily learning process. Students come from diverse background, so they have their own socio-cultural values, norms, beliefs, learning experiences and knowledge that ensure that they will understand mathematics if the teacher links all these things in classroom teaching-learning process. In this regard, teachers need to rethink traditional approaches and provide their diverse classroom community with opportunities for deeper mathematics learning. In this regard, Acharya(2017) suggest that, teaching in mother tongue, contextualize, ethno mathematics and local language in curriculum were the basis indicator for making mathematics culturally relevance.

Classroom discourse is guided by many different factors such as socio-cultural values and norms, belief that reflect in classroom teaching-learning situation.

Teachers and student's behaviour and activities inter-linked through their cultural

norms that make learning environment healthy and fruitful. Teachers need to rethink traditional approaches and provide their diverse classroom community with opportunities for deeper mathematics learning. As teachers and students strive to meet the standards set by NCTM (2000), it would be irresponsible for teachers to disregard the needs of diverse learners. Students from all culture deserve to be taught in a way that ensures that they will understand mathematics. Teachers can use teaching strategies that acculturate and enculturation the students in their classroom teaching process.

In the context of Nepalese school, there are lack of using various strategies in teaching learning activities. Most of the teachers use traditional teacher-centered methods i. e lecture method, rote learning. These methods are easy for teacher but students unable to understand and do response. In this regard my research participant mathematics teacher (T2) shared his view as,

Teaching learning activities is more effective when the teachers and students have friendly relationship. The foundation of a friendly relationship built as teachers take time to learn about student's interest, culture and experiences. All these things helps teachers to use various strategies according to the interest and experiences of students. If our teaching learning activities, evaluation technique all are links with students culture then the classroom discourse will be students friendly.

From the above view of mathematics teacher T2, it was claimed that making mathematics classroom discourse student's friendly, teaching-learning process should be linked with student's interest and experiences. While conducting the classroom discourse in mathematics classroom in delivery of subject matter the teacher should apply the various strategies according to the nature of subject matter. Teacher may try

to create their own mathematics classroom practices based on the students need and experiences in classroom teaching. While the students have different ability of learning styles, the teacher should use the various students cantered teaching learning methods like group work, roll playing and game method in classroom teaching learning process. Then the classroom discourse becomes students friendly.

By using various strategies in teaching-learning mathematics classroom.

In the classroom, students may come with a belief formed from their individual and cultural experiences, Teacher can be sensitive to these differences and incorporate into the classroom community and achieve academic success. In this regards, my research participant Mathematics teacher T1 said,

By exposing students to different strategies, teachers may help students become familiar to the practices preferred in any given school and community. Nevertheless, while teachers may try to create their own mathematics classroom practices based in the needs and experiences of the students in the classroom, the pre-set curriculum and local curriculum, state or national educational regulations will in some instances limit the types of classroom practices that the teachers will be able to utilize. Then the mathematics classroom discourse become student's friendly.

From the above information it found that every students have different learning styles, different capacity of learning and understanding, so the teacher should various teaching strategies and teaching methods in classroom teaching-learning process. While conducting the classroom discourse, the teacher may try to create their own mathematics practices based on the individual needs and experiences of the students in the classroom to make classroom discourse students friendly. In this regards, to meet the standards (Gay, 2000), suggest that teacher must incorporate a

variety of teaching strategies that appeal to and consider all of the learners in their classroom involvement in learning mathematics. In the same issue, my other search participant mathematics teacher T2 shared his view as,

We have to apply various teaching-learning strategies of teaching-learning mathematics rather than single strategy in the delivery of the subject matter to the students. Teacher should try to create child friendly environment in the mathematics classroom for making mathematics classroom discourse students friendly.

From the above information by my research participant T2, it was found that while conducting the classroom discourse in delivery of subject matter we have to apply multiple approach according to nature of subject matter instead of single teaching approach. Then the classroom discourse become students friendly.

Implementing Co-operative learning. Co-operative learning is an instructional strategy that enables small group of students to work together on a common assignment. Co-operative learning involves structuring classes around small groups that work together in such a way that each group member's success is dependent on the group's success. Students spent much more time actively involved in experimental co-operative setting. We attributed this change to the increase in mathematical communications, which has defined in general as student-student and student-teacher interactions related to the learning material. Teacher can use many methods to facilitate co-operative learning. In designing a co-operative learning strategy in mathematics, special attention usually given to the following issues: the structure of co-operative groups, students interaction in each groups, interaction among the different groups, learning tasks and the teacher roles in the classroom and assessment and evaluation of the learning process. These five criteria influence the

type of co-operative learning strategy that takes place in classroom and its success. In this regards, (Vygotsky, 1978) states that adults, teacher, parents or a child's peers can help student development and that teacher can use co-operative learning to increasing the understanding of mathematics by students of all backgrounds. In this regards my teacher respondent T1 said,

Co-operative learning provides all students to well participation for discussion in the classroom. By the help of co-operative learning, students got opportunities to participate in discussion in classroom which helps to practice and development of communication skills of students.

In this regard, FGD concluded that, through co-operative learning, students get opportunity to spend much time together. Through co-operative learning, Students get opportunity to do group works, they interact with each other on the subject matter which helps them to understand about the subject matter and it also helps them to develop their communication skills.

From the above information, it is claimed that through the co-operative learning, students get opportunity to communicate each other in friendly environment in the classroom. Through this practice it is overcome the challenge of their communication skills of their mathematical understanding. Co-operative teaching learning strategies are the effective culturally responsive pedagogy in mathematics. In this regard, Foucault (1970) state that, discourse can thought of as a way of describing, defining, classifying and thinking about people, things knowledge and abstract system thought. He argues that discourse are never free of power of relations and should understand as the products of creative human minds. There is no power relation without the correlation. Therefore, a classroom is breeding ground of both the differences and similarities that the teacher had expected to pay attention to.

Through avoiding rote learning. Rote learning is the process of memorizing information based on repetition which is still popular in Nepalese Mathematics classroom. However, the western countries have given more importance to practical learning and conceptual learning rather than rote memorization. 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 research participant mathematics teacher T2 expressed his views as,

Rote learning without understanding the subject matter is meaningless. Only rote learning without understanding destroyed the critical thinking of learners. It also kills the creativity of students. So the primary concern of the teacher is for students is to enhance their creativity and enjoying to learn the subject matter. Teachers are now incorporating more problem-solving and investigation activities in teaching-learning process to replace the traditional skill and drill exercise that were previously used in our school then ultimately classroom discourse students friendly.

From the above view of my research participant T2, it was found that only rote memorization without understanding the concept of subject matter is meaningless to learn mathematics. So, the main concern of the teacher is for students to acquire the content through understanding the subject matter. In this view, the student-centered, modern, western classroom, society view education to be positive experience in which students should enjoy a pleasurable learning experiences. In this regards, (Moreno 2025) claimed that the teacher known questions answers and monologue discourse in the classroom focused on rote memorization of mathematical procedures, where as a less monologue discourse in other focused in understanding these procedures. In

addition, he suggests that classroom discourse and normative interaction pattern guided and influence students learning ways that can improve mathematical goals.

By sharing with acculturation and enculturation. Acculturation is the process of learning and incorporating the values, beliefs, language, customs and manners. It is also the process to ask students to adopt dominant classroom norms. For these, teacher needs to socialize into the norms and practice of mathematics classroom. And also, Enculturation is the process whereby individuals learn their group's culture through experience, observation and instruction. So, by enculturation teacher needs to adopt the student's culture in mathematics classroom teaching-learning process. In this regards my teacher participant mathematics teacher T1 share his view as;

In school, students come different background like as cultural, religious, and lingual. So, the inclusion can be significant source for student's motivation in the mathematics teaching-learning process. We should share acculturation and enculturation. Students will feel personal connection to the concept taught and they will be more motivated to learn Mathematics.

In this regard, FGD concluded that, "by sharing with student's values, culture, norms, beliefs and language in teaching-learning process being more productive." From the above information, it concluded that by sharing student's values, norms, culture and language makes mathematics classroom more productive and classroom discourse student's friendly.

Through multiple representations. The use of multiple representation is another effective strategy of classroom discourse which help the students to make connections and communicate their mathematical understanding. In this issue, my research participant mathematics teacher T1 share his view as,

When students use various forms, they have more opportunities to communicate their thinking. A representation form can stimulate dialogue with peers and teachers, and enable students to discuss the merits of their chosen representation form and be able to compare it to other forms. Once a student is able to represent a concept in different ways and can explain how each of the representation forms relates to others, it can be said that they truly understand the concept of subject matter.

From the above view of mathematics teacher T1, it's concluded that the multiple representation of the single concept, it help to understand mathematical concept easily. By applying this type of classroom discourse in mathematics classroom, the mathematics classroom becomes students friendly. In this context my teacher respondent T2 shares his view as;

Using multiple representation gives all students opportunities for discussion to improve their mathematics understanding. Students can also practice and develop their communications skills through the classroom discourse.

From the above view of mathematics teacher T2, it was found that the good classroom discourse can be carried out through cooperative learning method. Through multiple representation all students get opportunities to discussion about the subject matter and to develop their communication skills.

In this regard, FGD concluded that "the multiple representation gives students opportunities for gains deep understanding on mathematical concept and to develop the communication skills to all students".

From the above information, it is concluded that the multiple representation of each single concept helps students to understand the mathematical concept easily. In this regard, Acharya(2017) suggest that the good classroom discourse can carried out

through multiple representations, all students can get equal opportunity for participation on discussion about the mathematical subject matter. By following this type of classroom discourse, mathematics classroom discourse become student's friendly.

Chapter-V

FINDINGS, CONCLUSIONS AND IMPLICATIONS

This chapter deals with the findings, conclusions and implications of the study. After the rigorous analysis and interpretation of collected data, the findings of the study have been derived and conclusions have been made based on findings.

Findings Related with Mathematics Classroom Discourse

In this section, I tried to dig out the view of mathematics teachers, their teaching learning strategies and student's participation on mathematics teaching-learning activities. Classroom discourse helps to provide the students the student's centred method in teaching learning mathematics classroom. It gives interaction between students-students and teacher- students. Thus, the findings of this section deduced through classroom observation, interview guideline of teachers and students and focus group discussion. Following were the findings of the study:

- The teachers were well known about to prepare lesson plan but practically they are not well prepared to practice in actual classroom teaching-learning activities.
- Teaching and learning activities are the reflection of what the teacher and students perceive to be meaningful activities.
- Teachers were theoretically aware about student's centred method. But practically they were not using properly in their classroom.
- Teachers use monoculture practice in multicultural classroom situation.
- In collaborative teaching method, there is opportunity of good classroom discourse but practice was less seen in actual classroom teaching-learning activities.
- Teaching was more focused on elaborative phase and recapitulation phase.

Findings Related with Making Classroom Discourse Students Friendly

Finding of this section deduced through the classroom observation, interview guideline of teacher and students and focused group discussion. Following were the findings of the study:

- By applying cultural-based pedagogy.
- By using various strategies in teaching-learning mathematics classroom.
- By avoiding rote memorization.
- Through co-operative learning.
- By sharing with acculturation and enculturation.
- Through multiple representations

Conclusion

Based on the analysis of data and findings derived, the following conclusion has been derived.

In the context of Nepal, the classroom discourse in mathematics class mainly focuses on elaborative phase and recapitulation phase, so we can follow the preparatory, introductory, elaborative and iterative phase also. It is also concluded that the teachers mainly focused on text-book based teaching. Teachers did not use written lesson plan and they did not use proper teaching materials in classroom teaching-learning activities. Usually they used their teaching experiences for helping students to secure high score in final examination. It was concluded that present scenario of classroom discourse was basically teacher centred, it should be made students centred. The emerged discourse in mathematics classroom can viewed to have been more a book centred actively than activity led participation. Classroom discourse and questions more guided by examination then by the need of students to connect them with their daily application. It was concluded that the present situation of classroom

discourse is teacher centred. Further, it concluded that teaching-learning mathematics and culture has mutual relation. It's also concluded that though, by applying cultural-based pedagogy, using various strategies in teaching-learning mathematics in classroom, by avoiding rote memorization, by applying co-operative learning, through sharing with acculturation and enculturation, by multiple representations making classroom discourse students friendly. So we should focus in this direction for classroom discourse.

Pedagogical/ Educational Implications

Every research has implications in different sectors. The study entitled "Classroom discourse in Mathematics learning" also has implications, which are as follows;

- This research focus the classroom discourse in mathematics classroom. So it is helpful for teachers, educators, text book writers and curriculum planner to develop their professional field.
- It is helpful for teachers to understand cultural diversity in classroom and to apply culturally relevant teaching activities.
- It is helpful to enhance co-operative teaching learning in mathematics classroom.
- It is helpful for teachers, students, researchers, institutions and policy makers.
- To develop the curriculum by thinking about multicultural classroom.

Theoretical Implications

This research based on Classroom Discourse of Students in Mathematics learning. Therefore, it is also useful to theoretical implications. Which presented as bellow;

- This study conducted by using small sample thus the finding of the study could not be generalized in the board sense. Thus, it would be more valuable for the study with covering the board areas.
- The identical and communicative concept can be applied in classroom discourse because classroom is a ground for materializing our concept and cultural reflection.
- This study open the door for many researchers to study the diverse students and their classroom interaction in mathematics subject with friends and Teachers.
- This research is helpful to make classroom discourse students friendly.
- This research could be good learning resource for students, teachers and researcher as well.

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Appendices

Appendix I

Interview Guideline for Teachers

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

Appendix II

Interview Guideline of Students

- Do you enjoy the 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 way communications in classroom discourse?
- Do you have enough chances to raise question in classroom? How is it responded?
- Are you happy with the day to day classroom discourse? If not why?

Appendix III

Guideline for FGD among student

- Do you enjoy the learning situation in classroom discourse?
- Which factors are more affective to you to be interested to participate actively in the classroom discourse?
- Which teaching methods you like the most? Why?
- What are the differences did you find between today's and previous classroom discourse?
- Do you have enough chances to raise questions in the classroom? How is it responded?
- Are you motivated in the day to day classroom discourse?
- Are you happy with the day to day classroom discourse? Why?
- What activities you suggest to conduct classroom discourse more effectively?

Appendix IV

Classroom observation Guideline

Preparatory Phase

- Plans the lesson with objectives
- Plans instructional activities to achieve objectives
- Prepares teaching materials
- Readies the materials for classroom use selectively
- Prepare an outline for classroom assessment

Introductory Phase

- Introduces the topic
- Organizes ideas to meet the objective
- Initiates student talk
- Motivates students towards the lesson
- Use teaching method according to the situation
- Cerates warmth and build up relation in the class
- Links student's knowledge with lessons

Elaborative Phase

- Elaborates ideas and topics as per the need
- Follows classroom rules and routines
- Provides clues for difficult concepts/ ideas as encouragement
- Stresses ideas of apparent importance
- Makes maximum use of prepared materials
- Models appropriate behaviour/ responses to the students
- Reduces confusion
- Builds on new ideas

Interactive Phase

- Uses questions to bring out learning response
- Provides extended activities to build strength ideas
- Rewards student's 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