

Chapter-I

INTRODUCTION

Background of the Study

Mathematics is the subject that has significant impact on people. Every people need mathematics to solve the problems in the daily activities. The development of mathematics was simultaneous with the development of social development. The development of mathematics has its far history with the development of human civilization. "Mathematics is used throughout the whole world as an essential tool in many fields, including natural science, engineering, medicine and the social science" (Bell, 2008).

Mathematics provides the knowledge. "Mathematics is the body of knowledge and information related with the concept of quantity, structure, space and change and also the academic discipline that studies them (Michaelis, Grossman, & Scott, 1967). It is the science of pattern found in numbers, space, science, computers, imaginary abstractions, or elsewhere. (Pradhan, 2014p. 23)

Culture is a way of life. This includes the way of eating food, wearing clothes, using language, making love, getting married, playing the games etc. It also includes reading, writing, listening, looking a bounds. All of this represents the culture of society. Different society has their different cultures. In our educational institutions, many children from different cultural backgrounds come to acquire education. A major goal of multicultural education as stated by specialist in the fields to reform schools, colleges and universities so that students from diverse racial, ethnic and social class groups will experience educational equality. Another important goal of multicultural education is to give male and female students equal chance to experience educational sources and mobility. (Acharya, 2015 p. 161)

Culture generally refers to patterns of human activity and symbolic structure. There are many different definitions of 'culture' and each one of them reflects a different theoretical basis for understanding or criteria for evaluating, human activity. The culture term includes technology, art, science as well as moral system and the characteristics behaviors and the habits of the selected intelligent entities. Anthropologists most commonly use the term 'culture' to refer to the universal human

capacity to classify, codify and communicate their experiences symbolically. It can also argued that culture is the way people live in accordance to beliefs, language, history or the way they dress. Similarly, culture is continually being socially constructed and because individual identifies are constructed through the interaction of racial, ethnic, class, gender and other experiences. (Acharya 2070 *Studies in Mathematics Education* p. 92)

Cultural diversity creates a rich and varied world which increases the range of choices and nurtures human capacities and values and therefore is a main spring for sustainable development for communities, peoples and the nations. (UNESCO, 2003)

Nepal is a multi-cultural country where the multiple language and the ethnical groups reside. There are 61 ethnic groups and 125 languages in the country which invites the multi-cultural nature of culture. (Upadhaya, 2067p.305).

The central bureau of statistics has identified 126 casts and ethnic groups in Nepal. (CBS, 2011). They have their own culture, tradition and languages. This nature of society obviously indicates that there are diverse groups of children in the schools of Nepal. They have been brought up in different socio-cultural setting. Therefore to meet the learning needs of such diverse interest groups who have distinct family background. The curriculum is a means to address such needs. (Acharya, 2072p. 150)

Mathematics is now considered as social creation. Culture is the contributing factor for the development of mathematics. The understanding of the term culture is broader than we generally perceived. "Culture refers to the fabric of ideas, ideals, belief, skills, tools, and aesthetic objects, method of thinking, customs or traditions". Secondly, mathematics plays an important role in the advancement of culture and civilization so, development of the culture and the mathematics contributes each other for their advancement. (Ranjeet, 2006p. 41)

A multicultural class is natural in society. The classroom is a society in which we have the students of different ages, cognitive styles, cultures, education, ethnicities, language proficiencies, gender identity and so on. Therefore it is self-explanatory that each student in a class is a different in terms of socio-economic background. After analyzing above mentioned view we can say that culturally diverse

classroom is one that reflects the rich diversity of the students. Where students are different each other, they have individual differences. They are different in culture, language, attitudes, age and the intelligence. It is challenging job for a teacher to teach in the class with mix ability.

A clear view of multicultural classroom is viewed nationwide. The voice of mother tongue teaching is rising in these days. The study medium, the medium of curriculum and the presence of students from different linguistic background opens the floor for the serious study of shortcomings and prospects of multicultural classroom.

Statement of the Problem

Nepal is a multicultural, multi-lingual, multi religious country with various languages so, a teacher must know special instructional issues to accommodate students from different cultural background (Acharya, 2014p. 50). In multicultural classes, opportunities should be provided to everyone and as a result they can analyze and evaluate mathematical thinking and strategies of others. In culturally diverse classrooms the cross cultural communication and multicultural values are very essential. Basic and action research are necessary to address the problem of those classroom. Children should be allowed to construct and express mathematical ideas on their own way. Local curriculum introduced in the primary level is also a very brilliant idea. The integration of students' mathematical tradition and games in the teaching program is very essential. This whole research is intended to find the problems that the teacher and students feel inside the culturally diverse classroom. This study has solved the following research questions:

-) How do math teachers address the adversities in culturally diverse classroom?
-) How is it possible to make students learn mathematics inside a culturally diverse classroom?

Objectives of the Study

-) To explore adversities faced by the secondary level teacher in teaching mathematics in culturally diverse classroom.

-) To explore adversities faced by the secondary level students while learning mathematics in culturally diverse classroom.

Significance of the Study

The language is a means of two way communication. During the teaching learning process of mathematics the language plays a vital role. The problem faced by the teachers and students due to the multicultural nature of the classroom is the main quest of this research. What kinds of teaching learning materials, preparations and cautiousness were taken by the teacher are the main findings of this study? The genuine problem and its intensity among teachers and students are the finding of this research.

Delimitation of the Study

-) The study considers only schools from Kathmandu district.
-) This study only covers three schools, three secondary level teacher and twelve students where mathematics is taught.
-) The sample schools were chosen randomly by the researcher.
-) The research only covers the students and teachers who are involved in teaching-learning process of mathematics in secondary level.
-) The qualitative approach was applied by the researcher to complete this research work.
-) The research activity was done in direct approaching method within the limited schools in Kathmandu.
-) This study applies the method of interview and observation to come to the conclusion.

Definition of Key-terms Used

Cultural diverse Classroom: The study room in a private or public school where students from various ethnic backgrounds, social strata and economic structure come for educational purpose.

School: The public place where student learns the various skills and the teacher teaches.

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

Secondary Level: The level containing grade nine & ten in Nepalese School system.

Adversities: Adversities refer to the problem faced during a certain period or process. The challenge here refers to the difficulty to the student from diverse ethnic community to learn the lessons. The challenge also refers to the problems faced by the teacher to make students learn.

Students: In this study student means those students who are learning secondary level mathematics.

Teacher: In this study teacher means teacher who is teaching secondary level mathematics.

Chapter – II

REVIEW OF RELATED LITERATURE

Review of theoretical literature paves a way to the research since it clearly visions the status of the past research. The theoretical background of the ongoing research and the importance of the proposed aspect should meet the interest. The need of the proposed research is also clearly advocated in this section.

Examining the various researches done by using the similar theoretical concepts this section at the same time proves the importance of the proposed research.

Empirical Review

Each and every research work requires the knowledge of previous background to open the targeted objectives and to validate the study. Here, this section is an attempt to review the related studies, articles and the reports. Some of the old thesis has been reviewed considering them as a related literature and also as evidence to the present study.

Lamichane (2001) has conducted a research study entitled “A study of problems faced by the secondary level mathematics teacher in teaching mathematics in Kaski district”. He concluded that several problems, up in the eyes of teacher such as inadequacies of text book and teacher guide, lack of instructional materials, ir-revelency of teacher’s training. Lack of supervisors’ help, lack of physical facilities etc. Further he concluded that the lack of motivation to learning mathematics is poor on the parts of students.

Upretee (2006) has carried out a case study research on ‘classroom management from multicultural perspective .The main objectives of his study were to find out the knowledge of teacher about multicultural perspectives and to find out the actual situation of mathematical classroom management from multicultural perspective .This study was limited to the schools with the students from diverse cultural background in Kavreplanchowk district. The selected students from primary level the teachers and the head teachers, the used different tools like ,observation from interview ,guidelines and school documents .This research was interpreted by using qualitative method. The major findings were teacher beliefs and understandings

of multiculturalism directly affected the classroom and there were very few teachers known to the fact of multiculturalism and its effect on the classroom. The level of understanding of multiculturalism was higher in Brahmins and Chhetri's in comparison to Newars.

Adhikari(2006), Conducted a research on cultural discontinuity and learning difficulties in Mathematics: A case study of primary *dalit* school children: The main objectives of this study was to identify the cause of difficulties in learning Mathematics of Dalit children of school and to identify the influencing factor in learning Mathematics for the Dalit children at school. This study was focus on all the grade five students of Banibilas secondary school of Chapagaon V.D.C. in Lalitpur district. He used in-depth interview, observation for the data collection procedures. This study found that there is discontinuity between silence culture and forwarded culture. He also found that Dalit children have poor language ability and they cannot concentrate in their study due to their involvement in household works.

Poudel (2007) carried out a research entitled "A study on the mathematical skill used in tailoring". This study found that many conventional mathematical concepts are embedded in the practice of the tailoring. He made extensive use of such concept are playing, perpendicular, straight line, parallel line, area, pre operational congruence, similarity, circle, curves, parabola, fraction, mid points of the line in everyday work. These mathematical concepts mostly used to make different types of clothes. To make clothes they use mathematical concepts knowingly or unknowingly. At the time of tailoring, tailors are used shape-cult, image table, cutting table, measuring tape, square, tailor chalk, scissors etc. As the tools of methodology of the research was observation.

Bom (2009) also carried out a research study on the topic, "Effects of home environment in mathematics learning". This study was based on the objectives to assess the existing learning achievements of Body children in mathematics of lower secondary level of Rukum District. He applied written documents and the previous research reports. Furthermore, he also used interviews, interaction, observation and FGD to collect data from five Body students studying in different classes in Lower secondary level. His study conducted that parents of Body students were not

responsible for learning achievements of their children; He further found that the body students were not discriminated by the teachers.

Bhatta (2012) has also compiled an M.Phil case study research on the topic "Classroom practice at primary level: a multicultural perspective. This site of the study was Gram Sewa Higher Secondary School of Kathmandu district. He selected participants by using purposive Random Sampling Method. His study was focused on ten teachers, twenty-four students & six guardians concerned to Gram Sewa School. He used both questionnaire and interview to collect data from the participants to fulfill the objectives of this study. The main objectives of this study were to identify the situation of Primary School students from multicultural perspectives and to find out the practices of teaching in multicultural classroom setting. He found through his study that teachers have applied individualized teaching rather than group teaching to address the issue of multicultural setting. He further found that the teachers were unable to address all the students' equality through extra-curricular activities and they have been applying the traditional way of classroom setting. In a nutshell, he found that classroom practices at primary level were not culturally responsive and relevant.

Majhi (2012) carried out a research on a study of ethno mathematical concept practiced by their community in Morang district. He started his research with the objectives to identify ethnographic mathematical concepts used to construct artifacts in Tharu community. He used observation, photographs, and interview to collect primary data for his study. He studies the Tharu community of Kaseni VDC Ward No. 9 of Morang.. He found through his study that their community children used different mathematical concepts in their daily works but they were ignorant of its use in pedagogy.

Bhatta (2014) has also conducted a research on the topic "Pedagogical process of mathematics teacher in ethnically plural classroom in secondary level": The objectives of this study were to explore the management practices of secondary teachers to manage diverse classes and to investigate the learning needs of different groups of students. The study was limited in ten surrounding secondary schools in Kanchanpur district. He selected 50 secondary students and the ten teachers for his study. Interview, observation and the questionnaires were the tools to collect the data for his study. He found concluded that disconnected teaching activities and traditional

oriented teaching methods and materials where mostly applied by secondary teachers in their classrooms. He further finds that lack of knowledge in mathematics teacher has also a barrier to make all the students equally involved in the classroom.

Theoretical Review

Vygotsky's Theory

The constructivism of Vygotsky emphasizes the real cultural background of the learners which he terms as 'experience'. The radical constructivism is noted as:

It is an unconventional approach to the problem of knowledge and knowing. It starts from the assumption that knowledge, no matter how it is defined, is in the heads of persons that the thinking subject has no alternative but to construct what he or she knows on the basis of his or her own experience. (Sharma, C&N, 2011p. 165)

This view of Vygotsky's radical constructivism prioritizes the role of cultural background in the process of learning. This view also devalues the role of objectivity in front of subjectivity. The view of Vygotsky is also described as:

Vygotsky (1978) also highlighted the convergence of social and practical elements in learning by saying that the most significant moment in the course of intellectual development occurs when speech and practical activity, to previously completely independent lines of development, converge, through practical activity a child constructs meaning on an intrapersonal level, while speech connects this meaning with the intrapersonal world shared by the child and her/his culture. Through the process of scaffolding a learner can be extended beyond the limitations of physical maturation to the extent that the development process lags behind the learning process. (Shrestha, 2010p. 171)

The above lines clarify the importance of practicality in learning. For Vygotsky the collaboration of the practicality and theoretical context only can make a better learning. The learning only can be possible when the learner able to connect them to 'her/his culture'.

The theme of vygotsky's work is that learners cognitive development takes place in a social context. Throughout their lives learners are surrounded by the parents,siblings, relatives, friends, teachers and fellow students, they communicate with one another and stimulate one another .Parents and teachers, in particular, are more knowledgeable and skilled than learners and ...Learners acquire knowledge about their culture and culture and history from their encounters with adults, peers and the media.This cultural knowledge includes shared beliefs, ways of viewing the world, patterns of interacting with people and language. (Pradhan, 2015p. 23)

Bruner's Theory

“Bruner thinks that the process of education is more important than product.” The main statement of Bruner's theory gives more emphasis on then the subject matter. He prioritizes the importance of environment during learning process.

The important aspect of Bruner's theory is that the learners learn the things according to the previous structure of the mind. Bruner's theory of instruction is expected to address four different aspects. The first aspect is predisposition towards learning whereas the second is structure of knowledge the third aspect is sequencing the presentation of materials and the fourth is providing rewards and the reinforcement.

For Bruner the importance of the background of the student is very important. The learning and instructional theories can be used in a various ways inside a classroom.

Bruner's theories define one of the general objectives of the education is to assist students in learning to control their responses and make socially acceptable responses. To internalize external events into a mental structure that corresponds to the environment of the learners and that aids learners generalizing from specific instances is another characteristic of mental development.

The third characteristic of mental development is the increasing ability to use words and symbols to represent things which have been done or will be done in the future. The fourth characteristics of the mental development is formal discussion with

next person whereas the fifth is to use and understand high level language. The final characteristics of mental development according to Burner are informal representation and discrimination of similar subject matters (Bell 1978 p.140).

Burner's learning theory has three stages namely the inactive level, the iconic level and the symbolic level. The inactive level is the level in which the child manipulates object or things. The iconic level is the level at which the child deals with pictures or images of objects but he doesn't manipulate the objects. The symbolic level is the level where child deals with the symbols or numerals. The child no longer deals with tangible or concrete objects. (Upadhaya 2070 p. 51).

Social Critical Learning Theory

Critical theories from the very first, experiences impressed in the abolition of social injustices in learning opportunities provided in the school, community and even in the family. Actually it is social theory oriented towards critiquing and changing society as a whole in contrast to traditional theory oriented only in understanding or explaining it. In other words it is the examination and the critique of the society and the culture, drawing from knowledge across the social sciences and the humanities. Moreover, social critical learning theory discusses about gender issues, cultural discontinuity, power of teachers in classroom etc. It studies how these factors affect in teaching learning process.(Acharya, 2015p. 42)

Streitmatter expresses:

Gender inequalities can be described as unfair treatment of students based on their sex. Historically it has been characterized by male students receiving more attention and praise, sometimes resulting in male students getting more academic help from their teachers, gender inequalities are motivated by an underlying belief that boys and girls differ in mental intellectual abilities. (1984)

Cultural Reproduction Theory and Caste Based Discrimination

Number of theories talk on the social structures. The society is compiled of variety of social structures namely, gender, caste, race, religion and class. The whole unit of such diversity brings the multicultural nature in the society.

The cultural capital is also one aspect of the society. Sadovnik writes:

Cultural capital suggests that in understanding the transmission of inequalities we ought to recognize that the cultural characteristics of individual and the groups are significant indicators of status and class position and human culture cannot be understood as an isolated and self-contained object of study must be examined as part of large social and cultural structure. (Sadovnik, 2001)

Basil Bernstein's Theory of Language Code

Basil Bernstein makes a significant contribution to the study of Communication with his sociolinguistic theory of language codes. Within the broader category of language codes are elaborated and restricted codes. For the purposes of this paper, the term code, as defined by Stephen Littlejohn in *Theories of Human Communication* (2002), "refers to a set of organizing principles behind the language employed by members of a social group" (p.278). Littlejohn (2002) suggests that Bernstein's theory shows how the language people use in everyday conversation both reflects and shapes the assumptions of a certain social group. Furthermore, relationships established within the social group affect the way that group uses language, and the type of speech that is used. (Spring 2002)

John Holt Theory of Fear

About the impact of fear among children Holt says: Fear of failure, punishment and disgrace, along with the anxiety of constant testing, severely reduces students' ability to perceive and remember, and, thus, drive them away from learning. Holt, with his trust children philosophy, believes, perhaps naively, that they have a strong sense of what is right and have an innate self-correcting mechanism that will help them to (eventually) solve a problem. Most instruction, especially reading, Holt argues, is self-taught anyway, so why the need for overbearing teachers and parents? Holt believes that learning can be pleasurable and that learning in the form of games can be the first step in having children embrace a lifetime of learning. (Holt, 2000)

Further he states his idea on classroom teaching as: "Holt rejects the idea that children are "monsters of evil" who must be beaten into submission or computers whom "we can program into geniuses." Neither are they the passive receptacles of

knowledge that can only learn in a schoolroom. Instead, he calls upon parents and educators to "trust children"”. (Holt, 2000)

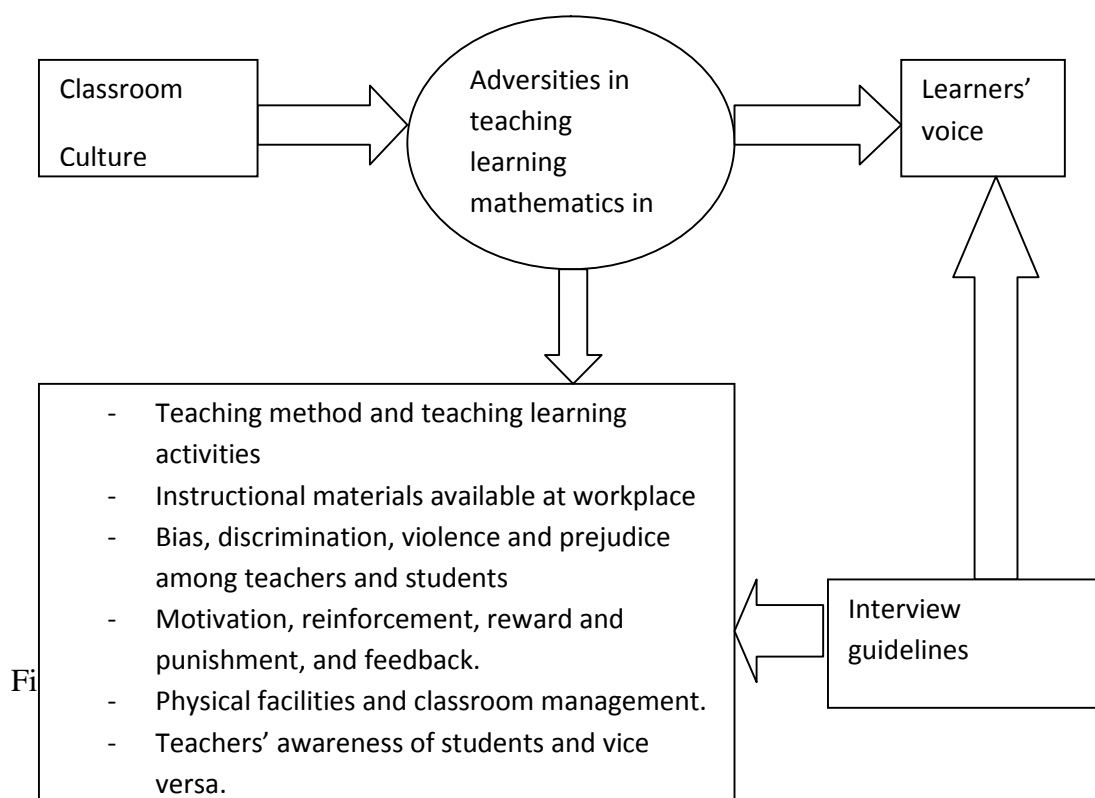
Filling the Gap

Though various researches have been made in for and against the different learning theories there is the scarcity of research in the field of research on ‘the problems faced by teachers and students inside a culturally diverse classroom.’ Very few researches have been carried in this area. This research will fill the gap between the theoretical perspectives and practices. This research aims to study the genuine nature of the problem through the classroom observation. So, I believe my title for this dissertation is suitable for carrying out a research.

Conceptual Framework

Findings of the study are drawn from the collected data and related literature by using qualitative methodology of data analysis and interpretation. Researcher used both observation and interview guidelines for the students as well as teachers to collect data.

Conceptual framework is an outline of the whole research that tries to associate the related branches and fields in itself.



This above chart presents that as per the classroom culture, needs and expectations of the children are different. The teacher can only be able to address the need of the learner after he/she has a good knowledge of the learners' culture. On the same way, the students who have knowledge of the teachers' culture can only understand better. The pedagogical strategy, teaching materials and the physical facilities play significant roles in learning. The chart focuses on the bad aspects like biasness, discrimination, violence and prejudices that hampers the learning and equally on the other hand reinforcement, motivation, reward and punishment, and feedback plays a positive role on learning. The tools of the research namely, interview guidelines and classroom observation is also indicated in the chart.

Chapter III

Methods and Producers

Research Design

Research design is the specification of the methods and procedure. It is also a way of the research that paves a way for the researchers to achieve the goal of the research. Research framework is divided from research design. This study focuses on the problems faced by the teachers and students in the multicultural classrooms of Kathmandu. This is a research based on qualitative with ethnography approach.

Qualitative research shows that, although the researchers in anthropology and sociology have used the qualitative research approach from century old, social sciences started to use it after 1960s. In the past, observation of school activities, classroom activities, interview with the teacher and the manager to explain the teacher- student behavior in the classroom, called the field study where related to education and it was called qualitative research. (Sharma, 2011p.17)

Qualitative research, is multi method involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researcher study things in their natural settings, attempting to make sense of or interpreted phenomena in terms of the meanings people bring to them (Denzin& Lincoln, 2000 cited in Acharya, 2013, p. 28). The quantitative approach also is used during the observation of the classrooms. The analysis and finding consists the qualitative approach. The study hovers around the problems faced by the teachers and students during teaching learning activities of secondary mathematics.

Study Site

Kathmandu is the country capital of Nepal where students from all 75 districts and 14 zones study. Being from various cultural and linguistic backgrounds they have their own way of learning. The classrooms have now become a community having unity diversity. The three schools from the vast city will be selected as the study site for this research.

Selection of Participants

The participants of this study are three secondary mathematics teachers and twelve secondary mathematics students. I used purposive judgmental sampling to select the participants for my study. In judgmental sampling, the participants are selected on the basis of the sole judgment of the researcher. I only selected the participants those I found to provide data for my present study.

Tools

Three major tools of data collection, interview and classroom observation are the tools of this research. The major means of collecting data is tools and instruments. The tools are modified and developed according to the suggestion of the supervisor. APPENDIX I is used as Interview Guidelines for teachers where APPENDIX II is for the interview guidelines for students. Already established class observation form (APPENDIX III) is used to observe teachers' and students' activity during teaching learning mathematics. Interview Guidelines is used for mathematics teacher to find out faced problems, teaching strategies, use of teaching materials in multicultural classroom. Index is used for students to find out the adversities of learning mathematics in multicultural classroom.

Data Collection Procedure

The researcher went to each sample school with tools to gather the qualitative data. The researcher took class observation in teaching secondary level attending behaviorally with students and teachers. In this period the researcher observed carefully and records each and every notable activity of students and teachers in the observation form. The researcher took interviews with mathematics teachers and students with the help of guidelines of semi structured interview.

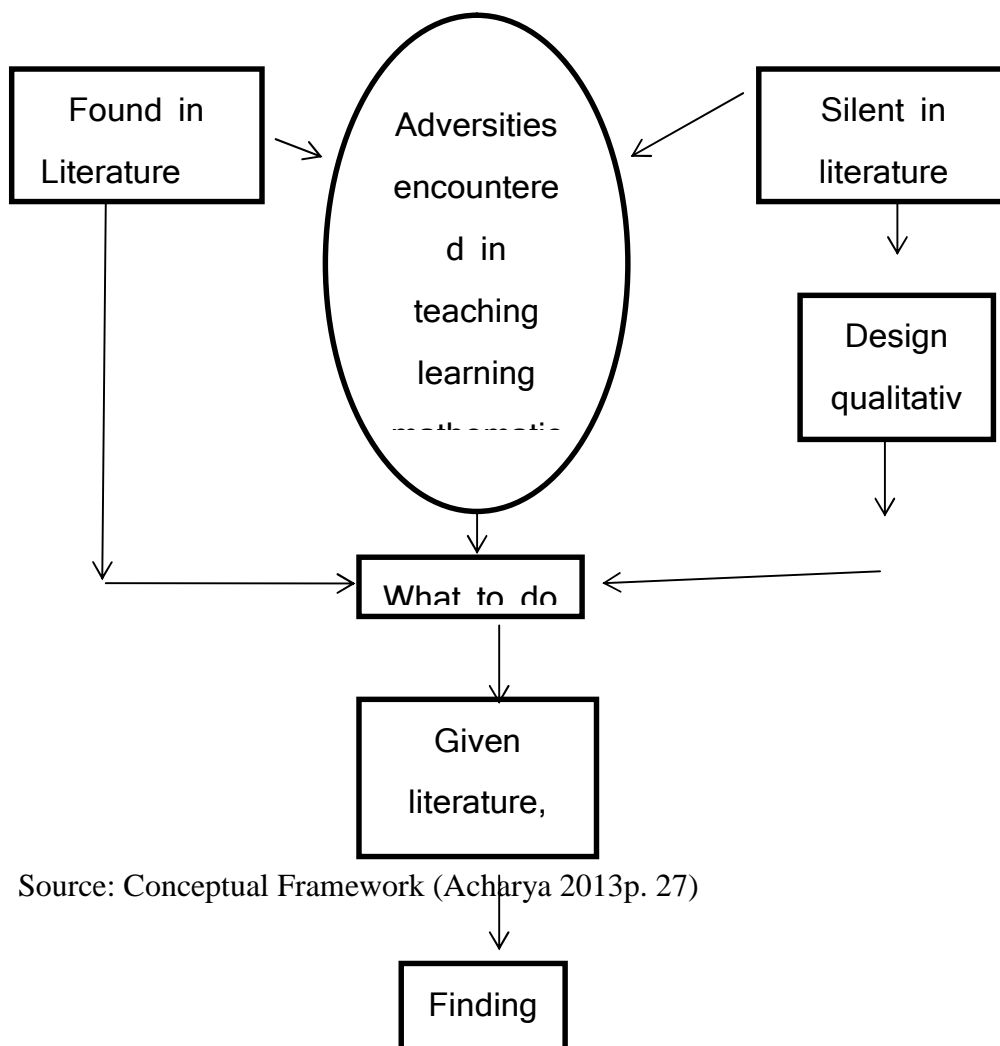
Data Analysis and Interpretation

The core value of a research is the analysis and the interpretation stage. The obtained data are analyzed with the help of theories & literature described in the literature review section. The researcher has used the Vygotsky's theory of constructivism, Burners' learning theory, Social Critical learning theory, Cultural

reproduction theory and Caste based discrimination, Theory of Language code, John Holt theory of fear etc. to find the real problems inside a culturally diverse classroom.

Almost all the teachers in multicultural classroom have experienced the jumble of problems inside a multicultural classroom. The procedural framework to complete the research work fascinates the researcher to reach the destination.

The procedural framework devised through the literature studies facilitate to attend research objectives to get the answer of the research questions and carryout the research work as a whole smoothly. Analyzing various literatures in relation to adversities encountered in teaching learning activities. I have developed a framework to complete this research that is shown below:



Source: Conceptual Framework (Acharya 2013p. 27)

Chapter IV

Data Analysis and Interpretation

The data were collected from the students and teachers as a main source of the study. Data analysis is more important and crucial part than the collection of data. Thoughtful interpretation of the data can only give a right gateway towards the problem solving.

Data analysis, being a continuous process of reviewing the information as it is collected, classifying it, formulating additional questions, verifying information and drawing conclusions, is crucially important in the research process (Thesis and Grady, 1991). Discussing the principles of analysis, Kerlinger (1983) writes that analysis means the categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions. The purpose of this analysis is to reduce data to small scale business intelligible and interpretable forms so that relations of the research problems can be studied. (Uprety, Timalsina, Khadka, 2009p. 129)

The data were collected from secondary level students and teachers from different schools of Kathmandu. The schools that were taken as samples were Learning Realm International (LRI) School, Bandana Academy Kalanki and Creative academy Kirtipur.

The data were collected, grouped and then searched the similarities and differences. The researcher carefully and systematically arranged to analyze the realistic scenario of teaching learning activities in ethnically diverse classroom. The data clearly informs the behavior and activities of teachers and students inside a culturally diverse classroom. The data and the information are carefully analyzed and interpreted to reach to the rightful conclusion. The information from students and teacher are carefully compared and contrasted on the base of their answers and classroom observation of the researcher.

This chapter deals with the realistic interpretation regarding the following guidelines to find the fair conclusion:

-) Teaching-learning practices in culturally diverse classroom: Teachers' and students' perceptions and practices.

-) Teachers and Students' view on language inside an ethnically diverse classroom
-) Teachers' understanding on culturally diverse classroom/ classroom culture.
-) Strategies and techniques applied in teaching mathematics in culturally diverse classroom
-) Students encouragement and motivation in Multi-cultural classroom
-) Obstacles and difficulties in teaching in Multi-ethnic classroom
-) Mathematics practices and homework activities among diverse students
-) Gender diversity in multicultural classroom

Teaching-learning Practices in Culturally Diverse Classroom: Teachers' and Students' Perceptions and Practices.

According to J. Banks (2006), multicultural education is an idea an educational reform movement and process. Banks believes that an idea multicultural education seeks to create equal educational opportunities for all students including those from different social ethnic and social groups.

“There is no any distinct and disturbing problem faced by me while studying with friends of diverse culture rather it is more fun and entertaining.” (*Student's View*)

According to this view of the student, the multicultural classroom becomes a more curious classroom not a boring one.

Most of the mathematics teachers agree that they use educational materials, teaching aids and group activities frequently. The teachers reported that they often generated the feeling of mutual co-existence, justice and equity among the students. Hence, the role of the teacher is to minimize the problems faced inside a culturally diverse classroom.

Based on the interview with the students the researcher has found some replies regarding the special techniques of the secondary level mathematics teacher to solve the problem of multi-cultural classroom. Regarding the special technique of her teacher, student 'A' reported, 'the teacher relates every mathematical problems with practical life that rises interest among students'. The answer of this student suggests that a teacher should be aware of the real life situation of the students inside a

culturally diverse classroom. Then only he can relate the mathematical concept to their cultural life. The answer of the student 'B' was, "*The mathematics teacher encourages students solve the problem on their own.*" This response shows that the mathematics teacher is cautious about the real condition of the students so that he wants them to be actively participating in the problem solving process.

The answer of student 'C', "*The teacher gives example from our real life situation that helps us understand better*" shows that the teacher goes to the root of culture and society to make students learn clearly. He provides the examples from their own local culture which brings clarity among the students.

In this regard Bhatta, L.B. says, "Culturally relevant teaching is an approach to ease education that puts the culture, language and the background of the students at the forefront, rather than the unrecognized background of the classroom".

We can assure that the culturally relevant teacher has to be familiar and should possess deep knowledge regarding the diverse nature of classroom. And according to above replies the teacher had already started that practice inside his classroom.

To make a classroom friendly with the diverse culture students, group discussion is also another significant aspect. Group discussion can bring all students in a forum where they can discuss openly having reference to their personal and cultural diversity. They get chance to extend their horizons, talk frankly and learn each other's dialects. It strengthens their bindings and improves unity and team spirit. In this regard, answering the teachers technique student 'D' replied, "*Our mathematics teacher apply group discussion and interactive classroom to make memorable and enjoyable classroom.*" This answer clearly indicates that the group discussion among multi-cultural students make them interactive and enjoyable. Along with the interesting classroom the student also claimed that such classes are memorable. We can conclude that the group discussion that is applied to lessen the problems of multi-cultural classroom is very helpful and students are interested on it.

Answering the teachers' technique to mitigate problem inside culturally diverse classroom, student 'E' replied that the teacher uses cultural pictures to make them visualize the solution. Student 'E' also said, "*The teacher waits for the slow learners and promotes peer teaching.*" Analyzing this answer we can claim that the

teacher inside a multicultural classroom should pay attention to the speed of the learners that come with varied abilities and aptitude for learning. At the same time the teacher can use the cultural pictures to make learning effective interactive inside a culturally diverse classroom. The peer teaching is also taken as a weapon to fight against the problem inside culturally diverse classroom.

Teachers and Students' View on Language inside an Ethnically Diverse Classroom

“Language is an important element of symbolic interaction. Language is a form of symbolic communication through structured and sound pattern which are infused with shared meanings” (Abraham 2006). Language is not only known for the words and the grammar. It is a particular way of thinking and perceiving. Language matters in all human activities and shape their thinking and learning.

“Language is another important aspect that directly affects the understanding and clarifying the concepts of each other. The mother tongue is regarded as the easy language for communication. For example there are a large number of people who only understand their local language clearly and have no knowledge of Nepali language. What types of result can we expect from them when we only use Nepalese and English medium as a means of teaching? That is why language should be considered as a main issue in teaching learning process” (Upadhaya, (2070), *Exploratory Teaching Mathematics*, p. 137). From the above explanations we can come to the point that language is one of the most significant aspect in teaching learning process, as Vigotsky clearly states, “a clear understanding of interrelation between thought and language is necessary for the understanding of intellectual of the child” (Dahl, 2004).

Following are the responses of the teachers and students based on the issue of language in culturally diverse classroom. Bernstein’s theory shows how the language people use in everyday conversation both reflects and shapes the assumptions of a certain social group. Furthermore, relationships established within the social group affect the way that group uses language, and the type of speech that is used.

Teacher A finds the difficulty in understanding the language of the students from diverse cultural and linguistic background. As he says:

“The main problem for us in the multicultural classroom is difficulty in understanding their language” (Teacher’s View)

The difficulty in communication gap between teacher and students can create a mess inside a classroom and hampers their learning. The teacher will definitely get stressed to reach to the genuine problem of the students and will be unable to provide feedback too.

Regarding the difficulty of language and the problem in communication teacher B expresses the similar view on it,

“While teaching in culturally diverse classroom some of the students can understand the language of the teacher while others takes time to understand.” (Teacher’s View)

The teacher B says the language of teacher too becomes a problem sometime. For example if the teacher is from an ethnic community, his tone and speaking style will vastly different to the students from other linguistic background. The hardship in language understanding of teacher can Holt the learning process and group works.

One of the students C1 answered *“Language understanding is problem because it creates hardships in understanding” (Student’s View)*. According to this student, the problem is equally faced by both the teachers and students to have a smooth classroom practices.

In a question concerning teachers’ language as a problem to learn mathematics in multicultural classroom, students answered in various ways. Student C2 said, *“Since Newari is my mother tongue, I definitely feel easy in learning problems in mother tongue. Secondly, Nepali learning is easier for us than English. So learning the English language of teacher is hard for us.”*

In this regard, Acharya (2013) writes,

. . . the language other than mother tongue has created a challenge to the students who are from culturally different community. Nepali language used as a medium of instruction may have a barrier to understand the mathematics learning to non- Nepalese speaking students. It seems to me that English may have become more difficult to these students in learning mathematics. However, the above result

shows that it has become a prime barrier in learning mathematics.
(Issue 34,p.31)

The teacher C has already reached into the core of the problem and found the solution too. His approach was quite different as he replied, “Sometimes I try to teach the students in their mother tongue. If I do not have knowledge of their language, I divide them to their own linguistic group which improves their learning.”

The creative thought of teacher C might be the special way to treat with the students of diverse cultural background. Whenever students get enough support in their own language in group work or activities they can obviously improve learning. In this regard Bernstein clearly states, “Forms of spoken language in the process of their learning initiate, generalize and reinforce special types of relationship with the environment and thus create for the individual particular forms of significance”
(*Class, Codes and Control* 1971)

Teachers’ Understanding on Culturally Diverse Classroom

Teacher should be culturally responsive to conduct teaching-learning activities in culturally diverse or multicultural classroom. Moreover, to be a culturally responsive teacher s/he should have following characteristics:

- Culturally responsive teaching strategies (supports constructivist view of knowledge, teaching and learning)
- Constructivist view of learning (promotes critical thinking, problem solving, collaboration and recognition of multiple perspective)
- Learning about students (students past history and the home culture etc.)
- An affirming attitude towards students from culturally diverse back grounds (respects cultural differences)
- Sociocultural consciousness (examines the sociocultural identity and the inequality)
- Commitment and skill to act as an agent of change (develop skill of collaboration)

(Bhatta LD, 2012 p. 75)

Analyzing the above context, almost all mathematics teachers from the sample schools have consciously prioritized the issue of cultural diversity inside their classroom. They are serious about the lingual, gender and cultural diversities of the students. To be precise, most of the teachers answered the main problem is the problem of language inside a culturally diverse classroom.

Regarding the weak, slow performance of the students from ethnically minorities and economically poor student's, teacher 'A' replied "*It is due to the poor basic knowledge, afraid of that particular subject and lack of guidance and practice*". On the basis of this reply we can easily come to the conclusion that the students do not have sufficient time to practice due to their family works, their parents cannot guide them because most of them are uneducated.

In this regard teacher "B" says, "*The cause behind the poor performance of culturally diverse students is low educational status of the parents, problem in acquisition of second language, low economic condition of the family and sometimes discriminative behavior of the teacher*". This reply of the teacher "B" is the conclusion of the whole research to find the realistic problem regarding the poor performance of the diverse cultural students. To analyze the answer of the teacher, as the previous teacher also admits that the poor economic and educational status of the family hampered the regularity and guidance of the students. As I already clarified that due to the low economic status, students also are unable to practice the mathematics problems since they have support the family in their household.

Taking Vygotsky's constructivist thought of learning is very significant in this context. Vygotsky terms 'experience' for the history or background of the student that play a pivotal role in teaching learning process. Here the problem or the weakness of mathematics students inside a culturally diverse classroom is crystal clear that their family history is playing a significant hurdle.

Along with the constructivist thought of learning to understand the 'experience' of the learners cultural reproduction theory and caste based discrimination are the other important aspects to be discussed for the effective, inclusive and equitable education.

Summing up, the conclusion of the researcher is that teacher should be culturally responsive to become a successful teacher inside a culturally and linguistically diverse classroom.

Strategies and Techniques Applied in Teaching Mathematics in Culturally Diverse Classroom

Planning for different techniques, styles for teaching learning process are technique strategies. Handling class effectively, motivating the students, encouraging them for further improvement, involvement of the students, active participation management, psychological and the physical treatment of the students etc. are the key aspects that instructional strategies give focus on. Moreover, the teacher focuses on cooperative learning, social constructivism, group discussion, reinforcement and so on. Instructional strategies mean the procedures for effective teaching learning process. Here, relation between teacher students plays vital role. (Upretee, 2006. p. 46).

To achieve the positive outcome from the multicultural classroom, teachers have used various skills and techniques. As it has already mentioned that group discussion is the best technique to strengthen the ability of multicultural classroom, many teachers have applied the method of group discussion. Teacher “C” spoke about the strategy and said, *“The strategies I apply in multicultural classroom are individual teaching, collaborative teaching, and peer group discussion.”*

Based on this reply we can say that the teacher ‘C’ is applying mainly three strategies to make multicultural students learn mathematics in realistic manner. The teacher uses the method of individual teaching to take the weak students in equal position to others whereas he uses group methods and peer methods to unite the feelings of the students from different cultural backgrounds.

Teacher ‘B’ seems more concerned about the result of his teaching learning activities that lead him to *“Take extra classes and give more preferences in classroom activities for slow learners”*. According to his statement, the weak students from various cultural backgrounds can take the pace of learning through the help of his strategies.

Teacher 'A' has a quite different thought to deal with the multicultural classroom. He informed that the strategies he applies are "*displaying model in front of the class and giving formula and derivation clearly*". From his reply we can say that teacher A believes in clear presentation in front of the class.

Students Encouragement and Motivation in Multi-cultural Classroom

Motivation directs controls and clarifies the human behavior. Some student seems naturally enthusiastic about learning, but many need or expect their teachers to inspire, challenge, and stimulate them. (Acharya 2013, p.31)

In the concept of John Holt theory of fear, children's have fear of being punished and disgraced from the teacher. They get afraid of the probable failure in their study and they have innate self-correcting mechanism that helps them to solve the problem correctly.

Encouraging the student is one of the effective processes to make their standard better and to encourage for further learning with enough exposure. Children need to be encouraged to recognize and acknowledge their feelings, both negative and positive. Both negative and positive reinforcement can speed up and better their further performance. Effective school research (NLH1999) focuses on the constructive guidelines to the students in the classroom for improvement that helps students' learning as well as developing positive attitudes and belief. Motivation is also one part of reinforcement. It helps to develop by the reinforcement if that is positive reinforcement. It equally harms if that is negative reinforcement. (Upretee, 2006 p. 39)

In this regard students and teachers from the sample schools expressed mixed responses.

Teacher A replied, "*Students are encouraged to help and share their problems. They are encouraged to ask their problem and discuss among them.*"

In the above statement teacher A believes that the peer group discussion and the cooperation between students can make them understand better and enhances effective classroom practices. The teacher let students discuss and ask for difficulties among themselves.

A student remarked, *“Mathematics itself is not a boring subject. Interest of students and teaching way of teachers make it really relaxing and productive in my classroom.”* The remark of the student A finds mathematics as an interesting subject which inspires him to learn. His remark also suggests that the method of teacher is also reinforcement for the learning mathematics in culturally diverse classroom.

Student A2 response is that *“I feel relaxed to be in mathematics classroom because unlike other it is rather more fun to study.”* This response focuses on the creative and interesting nature of mathematics education that inspires and encourages students to learn it.

Teacher B has a different technique to deal with the students of multicultural background. He said, *“I divide the students in group on the basis of their mother tongue and emphasis on students who are not able to understand language properly.”* Secondly he informed, *“I always behave equally to all students so they want to read and they take teacher positively.”*

In this regard the group discussion and cooperation among students is a way for collaborative learning which have greater significance in modern education.

A contemporary application of Vigotsky’s theory “reciprocal teaching” is used to improve students’ ability to learn text. In this method, teacher and students collaborate in learning and practicing for key skills “summarizing, questioning, clarifying and predicting.” (Upadhaya, 2070 p. 153-54)

Regarding collaborative technique, Kevin Crouse has said, “Collaborative learning is more than group work in an English or history class. It is different philosophy with real usefulness in mathematics classes.” (Maharjan, 2068 p.136)

Teacher C said, *“We encourage students by praising their works, reward should be given, and teaching in group is another way for reinforcement.”* Here teacher C takes reward and praising as the tool for motivation.

In the aspect of encouragement student C responded, *“Our teacher refers us to go to the tuition class to understand better.”* From this response of student C, we can come to the conclusion that some of the teacher’s motivation is not in the right way.

The motivation as student C replied is a bad one which never respects the students curious nature so that leads to the blunt mind.

According to Middleton, J., teachers' own motivation often plays a pivotal role in activities they choose, and fostering motivation depends on the extent to which teachers' motivation matches that of students for participating for class activities. Middleton describes how teachers can learn to understand the students' motivation and work according to that motivation into the goals of classroom work. Teacher can begin integrating motivation into their lessons by talking to individual students about their goals in mathematics. (Sharma, G. 2015. p. 119-20)

Obstacles and Difficulties in Teaching in Multi-ethnic Classroom

The teacher's ability and skill for classroom management has great importance in the multiethnic classroom. Problem in language, gender, culture, sitting adjustment, cultural beliefs and perception, racial discrimination, class struggle among students are some of the issues that should be taken under consideration inside a culturally diverse classroom. Respecting and addressing of cultural issues in education is to provide equal opportunity to the students from various cultural groups. If the language that is spoken in mathematical class is ambiguous and different than the language of the students, the exact idea of the subject matter cannot be conveyed and imparted. In such a class the cross cultural communications and the multicultural values are very essential. Therefore, it is essential to design the classroom pedagogy to address the problems of the students from multi-mother tongue background.

In a question regarding the obstacles on teaching mathematics in multicultural classroom, Teacher A replied, "*While teaching multi-ethnic students, we face problem to make them understand properly the particular topic due to their mother tongue*". In the given response the teacher clearly states that the linguistic background of the teacher and student has also become a hindrance in effective teaching.

The teacher further said, "*Teacher has to take 6 to 7 periods everyday which make them tired s that it creates challenge to give individual support and individual guidance to the students. The classrooms are overcrowded and not possible to do counselling even after the school time.*" Regarding the view of this teacher we can

understand that the large number of students inside a class and the overload to a single teacher cannot give a good result inside a multicultural classroom.

Similarly, the teacher B remarked, *“The teachers from different cultural background have difference in thinking style.”* From his given response we can have the idea that there is difference in thinking style according to their cultural background. The teacher further remarked, *“Students are habitual in their own mother tongue that makes them difficult to understand the subject matter.”* Similar to the teacher A, the remarks of the teacher B also suggests that the mother tongue of the student is notable issue that hinders the learning process.

In the response of teacher C, the problem gets worsen inside a classroom when a teacher fails to response a multiethnic classroom. In his remark, *“Classroom becomes noisy and the students’ interest decreases while they are unable to get teachers tone clearly.”* In this response teacher C is clear that the classroom in fact becomes a mess while the teacher is not able to address the multicultural and multilingual students. Unless students get clear idea from the teacher they cannot raise a sharp interest therefore a classroom becomes a noisy room. In the base of this fact the problem also lies in the teachers’ capacity to address the students from diverse lingual and cultural background.

Mathematics Practice and Homework Activities in Multicultural Students

The practice and homework of the mathematics students is the significant aspect to make their subject strong. All students do not get equal time and close guidance to complete their tasks at home which directly hampers their study. In my research the students from ethnic minorities and people having Nepali as second language get less help from their family. They have also replied that they even do not get sufficient time to study at home due to their tasks in household to support their family. Here are some representative voices of the students from the sampled schools.

Student A frankly replied that *“I do not have separated time for mathematics. I do not practice it.”* Her statement shows that she has not got enough time for her academic tasks.

A student from Brahmin community here I have noted him as A2, said *“I spend a lot of time studying mathematics at home and my parents support in*

difficulties.” In this response it is clear that most of the students from good social status have enough time for their educational practice.

In the same line student A3 responded, “*Much studying time of mine is spent in mathematics and my family also do encourage.*”

Student B has some awful experience regarding her practice and homework of mathematics. She said, “*I do not give more time for mathematics at home because I have many tasks to do.*” Being an ethnic Tamang student she has to support her family on their household tasks. She further explained that “*I do not get support in solving questions because my parents have no idea on it.*” She might have more suffered because she belongs to female category too.

Student B2 said, “*I spend most of the time in studying mathematics, searching more techniques, ideas etc.*” Being a member of well-to-do family she said, “*My parents help and guide me.*”

In the third school many students took mathematics as a tough subject and provide 2-3 hours per day which showed the possibility of hampering other subjects. Few students expressed their problem that they have lack of time and guidance at home.

Classroom Observation Episodes

Observation as a research tool has a long history in anthropology. It had been long used in ethnographic research basically in the study of primitive cultures. Observation is the first step of the behavioral research and accumulation of knowledge. Knowledge is generated through experience, learning and practice. The experience is the first stage of knowledge and learning is due to curiosity and practice which enhances learned knowledge and verifies the gaps and adds new things in knowledge. Observation in other words, enhances acquired knowledge through empirical test of facts, triangulation of data and participation with event, communities and persons. The communities and persons are the best and reliable sources of knowledge by which everybody is socialized and educated. It is the fundamental basis of the all type of research. (Adler and Adler 1994 cited in Angrosino: 2005)

The observation inside a mathematics classroom can stop students from diverting their mind towards unnecessary issues. A sincere observation can point the real lacking factors inside a classroom and it plays a significant role in providing feedback to the students as well as teachers.

Episode-1

This observation was held at Bandana Academy Kalanki, Kathmandu. The mathematics teacher enters into the classroom and then I also enter the classroom. Students stood up and greeted the teacher and I also greet and permit them to have their seat. There are 40 students in the classroom. Desks and bench seemed sufficient according to the number of the students. The class consisted of the students from various ethnic communities namely Brahman, Newar, Chhetri, Tharu students. The topic of that day was 'volume of cylinder and sphere'. Firstly he explained the concept of sphere and cylinder. Then, he solved the questions from the book describing the students. When students finished copying the questions, he solved another question which was different from the previous. The students were copying the solution on their exercise book. Two boys asked about the solution and the teacher replied. All students finished copying. He again gave one similar question for the classwork. Some of the students couldn't be able to show the teacher. Three of them were ethnic students. At last he guided from the whiteboard and gave rest of the number of exercise as homework and went out.

The teacher applied the practical aspects rather than the theoretical aspects that made students learn better. In class observation, the teacher used various teaching materials to teach. The teacher used pictures of sphere, cylinder, formula chart etc. Due to the clear projection of the teaching materials and the direct participation of students learning was fruitful. Only few of them had problem in understanding. Students seemed to feel relaxed inside the class.

From the above mentioned interpretation of classroom observation, I found that the teaching method was student centered rather than teacher centered. From the above class the teacher is found very sensitive and skillful in teaching process. He is practical and considerable about the linguistic problem inside the classroom. The students were actively participated in the classroom activities. The suggestion to the

teacher is that he could give more examples because more examples can only make multicultural students clear.

Episode-2

I got chance to observe a mathematical class of grade IX in Creative academy Kirtipur. During my observation session I found that the teacher entered the classroom with the usual materials and the greetings were done by the students. There were altogether 56 students inside the classroom. The teacher started his class without any discussion on previous topic. He went ahead by writing the topic on the board and started with few background of the topic. I came to know that the topic for the day was home arithmetic. He was giving some examples related to topic on discussion like telephone bill, electricity meter and so on. He went ahead just by solving the questions given in the book. I found that only around half of the students were somehow active and able to comprehend. His teaching style and technique was only suitable for the students only for Newar community. It was due to his style and the tone of speaking. It was learnt that the teacher was also from the Newar locality. The students who were from other communities have difficulty in understanding the teacher. The teacher did not bring the problems related to their day to day life. Teacher was found mismatched in his delivery process. The teacher was unable to contextualize the mathematics problems because he could use the school electricity of water bills to solve the problem.

From my observation I found that the example given in the classroom were not properly linked and explained considering all the students' level and capability. On the other hand the focus was only given to the teacher centered method. Teacher's style and the tone of speaking was also a problem for the students to understand the content in the classroom.

The teacher needs to improve his linguistic ability and tone. To make students clear he could have taken the examples from the school and their house activities. The teacher centered method and lecture method cannot meet the need of the students from multicultural background so that it should be improved.

Episode-3

The final observation during my research was held at Learning Realm International School (LRI) Kathmandu, Nepal. This is an observation of a mathematics classroom; the mathematics teacher entered into the classroom with the daily using materials namely: marker, duster, etc. He wrote the topic of the lesson on the board 'Geometry: Construction'. The teacher showed some samples of geometrical shapes and asked students to identify their name and later he wrote their name on the whiteboard. The teacher introduced the steps of construction through writing on the whiteboard. The teacher used scale and compass to demonstrate the detailed steps to construct geometrical shapes. First he gave idea of constructing the triangles, square, parallelogram etc. The teacher gave the task to construct the shape in group themselves as classwork. He observed their classwork randomly and solved again in front of them. He gave homework to construct parallelogram and triangle at home.

The teacher seemed very much sensitive regarding collaborative learning because he gave tasks to be conducted in groups. He presented the steps in very interesting way with motivating students. He clearly defined the steps on the board so that it became crystal clear to all students. The teacher watched the students' movements during classwork which stopped them from diverting their mind to anything else. The best part was that the teacher repeated the solution after he found few of them who had difficulty in learning.

The teacher should have revised the previous concepts regarding geometry which would help multicultural students to understand in better way.

Gender Diversity in Multicultural Classroom

A classroom is a place where there is the presentation of diverse culture, class, language, religious group, community, culture, environment and different intellectual background people who make a miniature society.

Gender equality in education includes the equal opportunity and equal availability of education. None of the students should be excluded from the educational opportunity according to their caste, gender or economic class. Every boys or girls should have knowledge of mathematics to cope with the problems in the future. Equality in education has become the most interesting and important topic in

the present world. Though there are no final conclusions, remedial methods are used to minimize the problem of discrimination in mathematics learning. There are four models namely, assimilation model, deficit model, pluralistic model and social justice model to minimize the gender problems inside a culturally diverse classroom. (Pandit, 2067. p.149)

Gender diversity is another inevitable diversity inside a mathematics classroom. Almost every classroom is compiled of students from diverse gender. The students/ teachers were asked about the performance of the students from diverse gender and here I have presented the few samples of those answers. The teachers were asked question ‘What is the role of teacher to manage gender-friendly classroom?’ and students were asked, ‘What do you think about the performance according to gender inside a multicultural classroom?’

The answers had variation with the similarities in the core problem and concept.

Student A, who was a girl by gender said, *“There are many boys inside our class and we feel shy to ask questions because they laugh without reason.”* Students’ remarks

In this answer the problem of girl students from all over the country is presented. Girls feel too much hesitation regarding the frank performance inside a classroom.

Student B remarked, *“When the teacher asks the questions the boys are faster in reply.”* Remark of this boy shows that girl students are shadowed inside a classroom.

Teacher A remarked, *“Most of the girls have poor performance because they do have many tasks in their house before and after the school.”*

Though this teacher did not refer to the teachers’ failures, he is clear that the tasks provided to the girl child inside her house are in fact a burden to the girl student.

Teacher B remarked, *“The discipline of girl student is praiseworthy but they are weak in mathematics because they get less time to practice.”*

This reply also seemed similar to the previous teacher because both of them have similar understanding regarding their free time at home.

Teacher C remarked, *“The introvert natures of girl student sometimes create difficulty to interact.”* This reply has a direct connection to the patriarchal social structure of Nepalese society.

The remark of student C, “*When we are chosen as the monitor inside a classroom, boys sometimes do not obey us.*” This statement is the result of our social structure that prioritizes male over female. Females are always taken as weak and submissive characters in the society who cannot lead male.

As Sadovnik explains that every individual and social group are significant indicators of status and class positions and human culture cannot be understood as an isolated and self-contained object of study must be examined as part of large social and cultural structure.

These lines clearly points to the background and the socio-cultural status of the students in the teaching-learning process as everything is guided by economic and cultural reality.

The gender diversity of students is not celebrated rather condemned as in sufficiency. Talking about gender aspect, the patriarchal society like ours always prioritize the son instead if daughters except in some high-class families. And it affects in learning. (Upadhaya 2070.p. 137).

Gender diversity is one of the most prominent aspects of multicultural classroom as Acharya (2015) writes:

Beside all these learning theories, the teaching learning process is affected by gender inequality, cultural discontinuity, power in classroom etc. Gender difference in mathematics still exists in learning of complex mathematics, personal belief in mathematics and choice that involve in mathematics. Gender difference in mathematics may be decreased by improving socio-economic status and ethnicity, politics of schools and teachers’ attitude. (p. 44)

Summing up, the problem in taking gender diversity as a problem is a long rooted problem in our educational sector too. This can only be removed by cultural responsive type of thought and social critical theory. In this regard Streitmatter states, “Male students getting more academic help from their teacher, gender inequalities are motivated by an underlying belief that boys and girls differ in mental intellectual ability.”

Chapter V

Findings, Conclusions and Implication

Though Nepal is small in geographical area it is rich diversity regarding culture, language and ethnicity. In the same manner this diversity is found inside a classroom. The diversity is more visible in the city areas than the villages because of the internally migrated population in the city. The reality of the multicultural situation of our country can be seen in the classroom of different schools.

The classrooms in the city areas nowadays have become the bowl of salad due to the presence of students from every part of the country. The students from different social status, students from different cultural background, linguistic community and the gender study together inside a same classroom. It is really hard for a teacher to make all the students equally understand due to the constraints of different cultural diversity. Most of the teachers have not changed their teaching style according to the changed situation. The teachers are unaware of new demands of multicultural classrooms. Teachers do not have knowledge of language of all students inside a classroom. The teaching strategy is not yet changed according to the demand of new generation. The methods like, lecture and sometimes question answer and demonstration method are dominating the classroom teaching. Only few teachers use the collaborative method to address the problems of multicultural classroom.

The Students inside a multicultural classroom were found more curious than the students from similar cultural background. Students said they never feel boring rather it is interesting to have inside a multicultural classroom. The mathematics teachers and students mostly found language as the main hindrance inside a culturally diverse classroom. Most of the teachers are unable to find the real problems of the students because of their linguistic difference and difference in tone. To cope with such problems some teachers have used collaborative and grouping method where students from similar cultural and linguistic background could discuss about their mathematical problems.

Students praised group discussion and interactive classroom as memorable and enjoyable classroom. The students from different cultures who are present inside a

classroom feel intimacy and motivated with teacher when he uses life like examples from their cultural practices.

To avoid the discrimination among students, teacher inside a multicultural classroom inspires them to solve their problem themselves and they get enough support from their friends. Such type of interaction and peer work promotes the understanding and respect for various cultures, gender as well as their language.

Some of the teachers are already familiar with the problem of the culturally diverse students. The teacher uses the cultural images and other visual materials that inspire them in effective learning. This type of familiarization of the cultural root help students learn about each other's tradition and cultural identity.

Those teacher who are aware about the cultural diversity waits for the slow learners. These teachers try to reach to their students through their mother tongue.

Some students do not have sufficient time to have practice and academic works at home because of their low economic status. The students from culturally diverse background also face problems due to the low educational status of their guardians and sometimes discriminative behavior of the teachers.

Some of the teachers approach to deal with the culturally diverse class was really inspiring. Those teachers used the method of individual teaching to those students who couldn't take the pace with other students from diverse culture.

In the aspect of encouragement, the teachers seemed to help and share their problems and solve them in a family environment. The students seemed to have no guilty for their mistakes rather they were too eager to learn through their own friends.

Gender diversity is another significant aspect of multicultural classroom. Gender biasness in the patriarchal society has become a curse to the modern developed world. The classrooms are also facing the same problems as the society is still engaged in discriminative culture. Though the teacher try to mitigate the biasness there still exists such problems. Students during interview told that girl students' leading was indigestible to the boy students. In the teachers questions too, the boys seemed active responders whereas the introvert nature of girls make them passive. During the class observation the girls really saw backward comparing to the boys.

Following were the Findings of this Research:

-) Disconnected teaching activities and traditional oriented teaching methods and materials were mostly applied by the teachers.
-) The de/contextualization of mathematics teaching learning activities is another adversity. Some teachers were found incompetent in teaching mathematics in multicultural situation as they are not trained to teach yet.
-) Most of the mathematics teachers were found to have little knowledge about other cultures of students.
-) The teacher only concentrated on a single method and example of the problems.
-) Positive behavior of teachers towards talented students but indifference to poor as well as partly bias, discrimination and violence to the students inside a classroom was found in many classroom.
-) Mathematics teachers were less known and incompetent towards applying latest technology in teaching mathematics.
-) Almost all the teachers prioritized the issue of cultural diversity inside their classroom.
-) Mathematics is no more a boring subject if it is taught by considering the interests and the cultural diversity of the students.
-) Group discussion seems to be a technique applied by some teachers in culturally diverse classroom to exchange each other's cultural flavor and dialects.
-) Psychological barriers such as humiliation, inferiority, shyness and fear in students reduces the behavior of math learning.
-) Problems for the teachers in understanding the tones and accents of the students from various linguistic backgrounds and vice versa was found prominent in many cases.
-) Some students cannot manage sufficient time to practice due to their family works, their parents cannot guide because most of them are uneducated.
-) John Holt's theory of fear seems to be also applicable in mathematics classroom.

-) The students having Nepali as their second language get less help from their family and the teachers from different cultural background.
-) The girl feels hesitation and shyness regarding the frank performance inside a classroom. They also have poor performance in the classroom because of their household works.
-) Girls were found to be more disciplined than boys inside mathematics classroom.
-) Mathematics has been considered as a difficult subject and hence this hegemony has contributed in creating problem in mathematics teaching learning activities inside a class.

Conclusion

It is challenging to teach multicultural students in Nepalese context. It has become essential to find appropriate way of teaching and appropriate materials to meet the need of multicultural mathematics students. Diverse cultural classroom do have diverse expectations from the teacher so that he/she should be aware of the diversity of classroom. To understand the real cultural background of the students, a teacher must have knowledge of their linguistic community, cultural traditions and their gender problem. The teacher can learn their mother tongue and participate in their cultural functions which create a cultural intimacy between teachers and students. Extra-curricular activities related to culture has significant role to make students familiar with diverse culture. The mathematics teacher should be well-trained which only can make the interaction and promote equal participation between all students. Some teachers only seemed to focus talented and boys students in the interactions though they always talk about equal participation. It is due to their ignorance rather than the intended bias, discrimination and the prejudices in math teaching. These drawbacks or ignorance caused by a math teacher is due to the lack of trainings and expertise to handle multicultural classroom. The teacher should give equal priority to the students who sit in the back benches and are from culturally diverse community. Collaborative teaching and group methods were found very effective in multicultural classroom where lecture method and problem-solving methods have become traditional.

Classwork checking, homework correction, interaction in the class, role play, active participation in mathematics classroom are the key points to have a successful learning inside a multicultural classroom.

Taking mathematics subject as an interesting and teaching it with fun, suggesting students for solving problems in pairs, individual support to the weak students, division of the student groups according to their linguistic background and equal treatment from teacher were the good examples of encouragement that was fructifying the multicultural mathematics classroom.

The regularity, homework time management, guidance and support for the girl students and ethnically minority students were found very weak. To solve these problems the girl students and students from multicultural background should get enough time and freedom at home. They should get enough time for study and they should get guidance in their problem.

Due to the perceiving difficulty of second language; many students from other cultural background seemed weak in mathematics classroom. The problem of language and tone can be addressed in two ways. The first is by giving teacher training about the local languages and tone and the second is that the students should be made familiar with all the language communities inside a classroom.

So, multicultural students regarding ethnicity, language and gender should be specially treated to guarantee their right to equitable education. Along with the appropriate methods and materials, teacher training, collaborative and group teaching, pair learning, constructive teaching-learning, examples from the real life and understanding of other culture are the essential elements for effective teaching-learning inside a culturally diverse classroom.

Implication

Following are the implications of this research for effective teaching-learning inside a multicultural classroom.

-) Training program for the teacher: To improve the performance and participation of the marginalized and students from diverse culture the trained teacher is a must.

-) Sincerity in teacher selection: The teacher should be selected with high sincerity. The school management should be aware of his/her cultural background and his/her perception towards diversity.
-) Curriculum and teacher guidebook as per the local interest: The priority and preference should be given to the local curriculum for the respect and promotion of local culture which in fact is more useful in local context.
-) The teacher should be culturally responsive to accommodate students from culturally and linguistically diverse classroom.
-) Strategies like cooperative learning, social constructivism, motivation, reinforcement, group discussion, pair activities are essential.
-) Making a teaching-learning fun and interactive matters.
-) Use of student centered approach.
-) Developing the friendly behavior between school and home.
-) The teacher should facilitate learning.
-) Ample opportunities need to be provided to the girls students for their better learning.
-) To enhance classroom practices in teaching mathematics in culturally diverse classroom.

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APPENDIX I

Interview Guidelines for Teacher

I am Mr. Keshav Raj Pandey, student of Tribhuvan University Department of Mathematics Education as an area of specification, Now I am carrying out research on 'Adversities in Teaching Learning Secondary Level Mathematics in Cultural Diverse Classroom' with special focus on three secondary schools from Kathmandu. I request you to cooperate by giving your response to the question below. I assure you for the confidentiality and won't misuse the information other than research purpose. Your cooperation in this regard will be appreciated and equally invaluable to complete this research.

1. What are the strategies those can be applied in teaching Mathematics in Multicultural classroom?
2. What problem do you face while teaching in culturally diverse classroom?
3. How can the students be encouraged to learn in multicultural classroom?
4. How is your relationship with the students? Do you consider all the students equally?
5. What are the factors behind ethnically diverse students' poor performance in mathematics?
6. If you have been teaching in culturally diverse class, how have you been addressing the learning problem of ethnically diverse students?
7. What is the most useful technique that you have been applying in culturally diverse class? And why?
8. What type of obstacles and difficulties have you felt while teaching multi-ethnic students?
9. What sort of behaviour do you think is suitable according to the need of culturally diverse students?
10. What sort of problems do the students of culturally diverse group may feel?
11. What should be done to provide balance teaching to the students of culturally diverse groups?
12. What are the techniques that you have been applying while teaching in culturally diverse classroom?
13. What is the role of teacher to manage gender-friendly classroom?

APPENDIX II

Interview Guidelines for Students

1. Does teacher regularly take your class?
2. Do you feel relaxed while being in mathematics classroom?
3. What are the problem you face while studying with friends of diverse culture?
4. What sort of punishment and rewards that your math teacher makes you learn better?
5. How is your relationship with your mathematics teacher?
6. How does your mathematics teacher evaluate your learning?
7. How much time do you spend in studying mathematics at your home?
Do your parent's encourage you to study or not?
8. Any special techniques by your teacher?
9. What do you think about the performance according to gender inside a multicultural classroom?

APPENDIX III

CLASS OBSERVATION FORM

Name of teacher:.....

Gender a) Male.....

b) Female.....

Teaching Experience.....

Types of Training.....**Duration**.....

School's Name and Location.....

Class: **Topic:**.....

Period:..... **Time:**

Teacher spends time in classroom:.....

Total No. of students:..... **Male students:** **Female Students:**.....

a) **Striking points of the Lesson:**

b) **Mention the observed Problems on learning:**

c) **Suggestions to improve the teaching of the lesson:**

Observer's Name..... **Date:**.....