

Chapter - I

INTRODUCTION

Background of the Study

Mathematics directly deals with the human life. It is believed that the development of mathematics and development of civilization go together. Mathematics is created to fulfill human needs. It has been development simultaneously with the development of society. Mathematics is not only taught and practiced through the formal institution but the contemporary societies have also been practicing it with its own idea and belief. Mathematics is used throughout the world as an essential tool in many fields, including natural science, engineering, medicine and the social sciences (Bruner, 1983).

Mathematics is the science of numbers and their operations, inter- relations and combination of space configuration and their structures, measurements etc. It is a basic tool of communication. Daily communication involves the frequent use of mathematical concept and skill. So for understanding and interpreting every discipline such as chemistry, physics, social science, economics, psychology, engineering etc. are interpreted as a mathematics model. Without having mathematical knowledge, it is very difficult to understand those disciplines (Basnet, 2013).

Nepalese society is ethnically diverse and complex. The varied ethnic groups were evolved into distinct pattern over time. There are many ethnic groups such as Magars, Rais, Sunuwar, Tamang and Gurungs live in the eastern mountain observing their own culture and speaking their own language. Sherpa ethnic region influenced in the northern Himalayan region influenced with the Tibetan cultural. Newar ethnic group is famous in the Kathmandu valley having own culture and language. The ethnic groups of Tharu, Maithli, Bhojpuri, Danuwar etc.

live in the Terai region. Brahman and chhetri also play an important role in Nepalese society. Newar have lived in the Kathmandu valley since prehistoric times, and immigrants that arrived at different periods in its history eventually merged with the local population by adopting their language and customs. Newar are a linguistic cultural community mostly of Tibeto-Burman and some Indo-Aryan ethnicities. They are bound together by a common language and culture. Their common language is Nepal Bhasa or the linguistic progenitor of that language.

These groups are originally from the east Nepal and now inhabit in most of all parts of the country. Tamang live outside the rim of the Kathmandu Valley. The Thakali inhabits in the north part, upper Kaligandaki River. Apart from the above, they are tied up together by their common ideas of peace and nationalism (Best, 2010).

So, in our school there are the students of diverse culture groups. There are various problems teaching, learning mathematics in the culturally diverse classrooms of children. So many problems are occurring frequently. That is why I decided to carry out systematic study on the topic "Problems Faced by Teachers and Students in Multicultural Mathematics Classroom". In the context of Nepal, all people do not get the chance to be educated due to social, economic and cultural minority groups face mainly problems, which directly affect the education system. Our traditional concept and teaching method play vital role in teaching learning process. In the culturally diverse classroom, what types of problems are faced by the children in learning mathematics? Question like this occurred in my mind, hence I am motivated to carry out the study on "Problems Faced by Teachers and Students in Multicultural Mathematics Classroom".

Statement of the Problem

This study would concern on the problems faced by student and teacher in teaching-learning mathematics in multicultural classroom. This study has brought the answers to the following research questions:

-) What problems do students face in learning mathematics in multicultural classroom?
-) What problems are faced by teachers in teaching mathematics in multicultural classroom?

Objectives of Study

The main objectives of this study are:

-) To find the problems faced by students in learning mathematics in multicultural classroom.
-) To find the problems faced by teachers in teaching mathematics in multicultural classroom.

Significance of the Study

This has demanded for a deeper and wider study on problems faced by students and teachers in teaching-learning mathematics in multicultural classroom. It is also essential that the researcher will give input for making teaching strategy in multicultural mathematics classroom. It is necessary to mathematics educators and teachers to prepare models before going to teach there. It is help to teacher to prepare and implement instructional teaching learning. The students and teachers face language and communication problems in teaching multicultural mathematics classroom. As the communication is the exchange of ideas based on language without meaningful communication no effective delivery of content is possible in the multicultural mathematics classroom situation (Bell, 2008).

The main significances of the study are as follows:

- Its finding can help to mathematics teachers to make their preparation on multicultural classroom.

- Its finding can help to students to know about their friend's cultural environment.
- Its finding can help to parents to think about their children's study environment.
- Its finding can help to improve the mathematics achievement in multicultural classroom.
- This study can help to open the doors for the future study in problems of teachers and students in multicultural mathematics classroom.

Delimitation of the Study

Each study is not rigorous perfect and free from limitation. They have some sort of limitations. This study had some limitations which were pointed as follows:

- The study considers only Sindhupalchok district.
- This study has been carried out in only two government schools which have problems on teachers and student on teaching-learning activities in multicultural classroom.
- The study has been concerned with those students who are studying and those teachers who are teaching mathematics in secondary level.
- The sample schools have been taken purposively by researcher.
- This study has been done on the basis of interview, observation forms and recorded history about schools.
- This study based on only qualitative paradigm.

Definition of Key Terms

Problems

Problems in mathematics refer as things that are difficult to deal with or understand during learning mathematics. In this study problem of students in leaning mathematics is difficult to understand solution of questions in multicultural classroom and problem of teacher in teaching mathematics is difficult to explain topics.

Multicultural Classroom

Multicultural classroom refers as a class where the students are present from different cultures. This means the class which contains students from different casts and different societies.

Public School

The schools that are established by government are called public schools.

Teaching Learning

Teaching Learning refers the process of sharing knowledge, it means all activities done by teachers and students at a classroom to make understand the mathematical topics.

Teachers

Teachers refer as mathematics teachers of secondary level.

Students

Students refer as secondary level students of government schools including different ethnic groups, culture and society.

Chapter - II

REVIEW OF THE RELATED LITERATURE

Literature review may be defined as an account of what has been done on the concerned subject or area by accredited scholars and researchers or a summary of previous research on a topic. It may also be defined either as a part of a larger report of a research project, a thesis or a bibliographic essay that is published separately in a scholarly journal. The literature review is a foundation for the study and is a discussion of your knowledge about the topic under study; as well as the knowledge that is supported by the research literature.

There had been studied about review related literature and framework for the study. Theoretical literature describes learning theories on mathematics. That is helping to construct the framework to achieve the objectives of this study. Also this chapter deals the review of other related literature about facing problems concerning with curriculum, teaching instructions, method and materials teachers' & students' characteristics on teaching activities etc.

Empirical Review

Empirical review deals with the review of the books, thesis, journals, and internet and so on. I have reviewed related to the problems faced by teachers and students in teaching and learning mathematics. So I have reviewed some research related to my study.

Bhattarai (2005) conducted his descriptive research entitle "A Study of Problems Faced by the Mathematics Students in Existing Curriculum." He used questionnaire for students and teachers. He concluded that problems were arisen due to the inadequacy of textbook, highly idealistic curriculum, lack of proper teaching materials, deficit classroom situation, high enrollment of students, lack of supervision, untrained mathematics teachers, dissatisfaction with the job and other facilities and so on.

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

Pathak (1996) conducted his research study entitled, “A study on the problems faced by the teacher of Kathmandu district in the implementation of mathematics curriculum for lower secondary school”. He concluded that the problems regarding evaluation were the most serious problems to the secondary level mathematics teachers.

Maharjan (2000) has studied the research on “Teaching Mathematics in secondary school”, that the combination between different concepts and relations is known as mathematics. He has concluded that knowledge and skill of mathematics is the regular ongoing process.

Basnet (2013) did a research on “Teaching problem faced by the mathematics teachers in existing curriculum of grade eight”. The objective of this study was to find the teaching problems faced by the mathematics teachers of grade eight and the problems faced by students on textbook, teaching learning activities and physical facilities. He used simple percentage for analyzing the data. He concluded that mathematics teaching and learning is not satisfactory at grade eight in Jhapa district. The teachers and students faced many problems due to the lack of training, orientation opportunity for the mathematics teachers in existing curriculum, inadequate textbook, lack of instructional materials, lack of physical facilities in the classroom, large class size and defective evaluation system & so on.

Pant (2007) did a research work on the title “Study of Learning Difficulties in Mathematics Among Grade V Students in the Kathmandu Valley of Nepal.” With objectives to find out the incidence of LDs in mathematics among grade V children, to identify the components of mathematics in which grade V children have learning difficulties and to identify factors affecting learning achievement of grade V students and thereby creating learning difficulties. The study was both quantitative and qualitative design. The researcher gathers information from interview; mathematics class teaching observation and school survey. Then found that learning difficulties among the urban institutional school student was comparatively lower than that of community rural school students. The study further revealed that learning algebra is comparatively more difficult to community school students than to the institutional school students. Also specific indication was the students with LDs have difficulty in learning very basic contents such understanding the concept on algebraic terms, expression, coefficient, power and transferring arithmetical knowledge and four simple rules of problem solving to solving algebraic problems. A number of factors related to both students & schools are positively correlated with the total score of the students.

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

Theoretical Literature

Cultural Difference and Discontinuity Theories

Ogbu (2000) delineates about the cultural differences and cultural discontinuity theory. That deals with the problems in children's learning caused by the differences and discontinuity between the culture of home and school. Those children, whose home is much similar to the culture of school, can cope easily with the system that may result better learning achievement. Similarly, the children with unmatched or dissimilar home cultures with school cultures and those who do not have enough attention in their learning and do not get much recognition of their cultures and they have to work hard achieving learning outcomes compared to their children with good matched. He has identified the features of cultures differences mainly of three types of minority groups, they are: autonomous, voluntary and involuntary minorities.

According to Ogbu(2000),autonomous minorities are minorities in number, they do not have the problem of cultural differences and language since they have similar culture and language into the minority. Voluntary minorities are people who have migrated voluntarily expecting a better life, opportunity and more political freedom in any other society. They usually encounter the problems in the schools mainly due to cultural and language references. Involuntary minorities are found as cast like minorities who were forcefully brought by any other society against their will for slavery or forced labor in the time of colonization. However, he developed the theory of cultural differences on the case of the US, it might have implication to this study that is related to cultural discontinuity and learning problems in mathematics of Newar who are also minorities, discrimination and domination. He argues that the gap between the minority culture and the mainstream culture does not favor schooling/learning of minority children who are socially and culturally disadvantaged.

Ogbu (2000) has emphasized on two types of cultural differences, that is the primary cultural difference of voluntary minorities and the secondary cultural difference of involuntary (cast like) minorities. As his study suggest, “involuntary minorities face more problems in school learning, participation and performance due to his gap between their culture and mainstream culture.” For them, it is too difficult to cross cultural boundaries in schools compared to the voluntary minorities with the primary cultural differences. He further elaborated that primary cultural differences may create problems in inter personal and inter group. Among them most important reason as children with different cultural backgrounds start schooling assuming different cultural world and human relation in school but they get a vast difference in reality.

Ogbu(2001) furthermore argues that discontinuity also occurs in the area of language, though thought and measurement. It happens mainly due to difference in formal education. In case of Nepal, schools are also influenced by western schooling system as a consequence of donor network, modernization and globalization process. Ogbu emphasized that though schools are established for the purpose of helping children’s in their personal development and modernization. There is no doubt in disrupting the transmission of the traditional culture of people. It is mainly due to the alienation of curricular content to the existing culture of the people and very little or no reinforcement in the home and community that results isolation of schools from the cultural system it is supposed to serve. In additional to this, the way/style of teaching/learning in school is also problematic because of its formal and unpredicted ature as it occurs only in rigid and ritualistic manner that does not ensure hearing of children.

Ogbu(2000) argues that language is the major factors for the interaction. He further explained that discontinuity occurs in language. “If there were unmatched language at home and schools culture and interaction may not take place.” Ogbu explained that unmatched home culture and school environment influenced learning.

Theory of Language Code

Basil Bernstein made 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. 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”. 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 (Bernstein, 2002).

According to James Atherton the construct of restricted and elaborated language codes was introduced by Basil Bernstein in 1971. As an educator, he was interested in accounting for the relatively poor performance of [working-class](#) students in language-based subjects, when they were achieving scores as high as their [middle-class](#) counterparts on mathematical topics. In his theory, Bernstein asserts a direct relationship between societal class and language (Bernstein, 2002).

According to Bernstein in *Class, Codes and Control* (1971):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 (Bernstein, 1971).

That is to say that the way of language is used within a particular societal class affects the way of people assign significance and meaning to the things about which they are speaking. Littlejohn (2002) agrees and states, “People learn their place in the world by virtue of the

language codes they employ”. The code that a person uses indeed symbolizes their social identity (Bernstein, 1971).

The most extended empirical examination of Bernstein's code theory was 10 year project conducted at Macquarie University by [Ruqaiya Hasan](#). Hasan collected data from everyday contexts of interaction between mothers and children across two social locations, designated 'higher autonomy professionals' (families where the main breadwinner had considerable autonomy over their working day) and 'lower autonomy professionals' (families where the main breadwinner had no or very little autonomy with respect to their working day). Hasan found significant differences in the ways these families interacted, and showed, contra [William Labov](#), the existence of 'semantic variation' - that is, different ways of saying with consequences for different ways of meaning.^[1] She argues it was these differences in orientation to relevance that explained the differences in educational achievements between middle and working class children first noted by Bernstein in the 1971s.

Bernstein suggests a correlation between social class and the use of either elaborated or restricted code. He argues that in the working class you are likely to find the use of the restricted code, whereas in the middle class you find the use of both the restricted and elaborated codes. His research suggests that the working class individuals have access only to restricted codes, the ones they learned in the socialization process, where “both the values and role systems reinforce restricted codes” (Littlejohn, 2002). However, the middle class, being more geographically, socially and culturally mobile has access to both the restricted codes and elaborated codes (Atherton, 2002). The restricted code is less formal with shorter phrases interjected into the middle or end of a thought to confirm understanding. For example, “you know”, “you know what I mean”, “right?” and “don’t you think?” Elaborated codes have a longer, more complicated sentence structure that utilizes uncommon words and thoughts. In the elaborated code there is no

padding or filler, only complete, well laid out thoughts that require no previous knowledge on the part of the listener, i.e., necessary details will be provided. According to Bernstein (1971), a working class person communicates in restricted code as a result of the conditions in which they were raised and the socialization process. The same is true for the middle class person with the exception that they were exposed to the elaborated code as well. Both groups use restricted code at some point, for as Atherton (2002) points out, “Everyone uses restricted code communication some of the time. It would be a very peculiar and cold family which did not have its own language” (Bernstein, 1971).

The correlation between societal class and language codes shown herein explains for the poor performance in language based subjects by the working class students mentioned earlier.

Though Bernstein's sociolinguistic work on 'restricted code' and 'elaborated code' is widely known it represents only his very earliest work. This early work was the subject of considerable misunderstanding and controversy. Bernstein emphasized that 'code' was not dialect and that code theory was neither a bourgeois alibi for middle-class speech nor a denigrating deficit account of working-class language (Bernstein, 1971).

John Holt Theory of Fear

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 Theory of Fear, 2000).

Bruner's Theory

A major theme in the theoretical framework of Bruner is that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. Cognitive structure (i.e., schema, mental models) provides meaning and organization to experiences and allows the individual to "go beyond the information given" (Burner, 1983).

As far as instruction is concerned, the instructor should try and encourage students to discover principles by themselves. The instructor and student should engage in an active dialogue (i.e., Socratic learning). The task of the instructor is to translate information to be learned into a format appropriate to the learner's current state of understanding. Curriculum should be organized in a spiral manner so that the students continually builds upon what they have already learned (Burner, 1983).

Bruner states that a theory of instruction should address four major aspects: (1) Predisposition towards learning, (2) the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner, (3) the most effective sequences in which to present material, and (4) the nature and pacing of rewards and punishments. Good methods for structuring knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information (Burner, 1983).

In his more recent work, Bruner also included in reference section has expanded his theoretical framework to encompass the social and cultural aspects of learning as well as the practice of law (Burner, 1983).

Bruner describes the general learning process in the following manner. First the child finds in his manipulation of the materials regularities that correspond with intuitive regularities it has already come to understand. According to Bruner burner the child finds some sort of match between what it is doing in the outside world and some models or templates that it has already grasped intellectually. For Bruner it is seldom something outside the learner that is discovered. Instead, the discovery involves an internal reorganization of previously known ideas in order to establish a better fit between those ideas and regularities of an encounter to which the learner has to accommodate (Burner, 1983).

Component Display Theory (CDT) classifies learning along two dimensions: content (facts, concepts, procedures, and principles) and performance (remembering, using, generalities) . The theory specifies four primary presentation forms: rules (expository presentation of a generality), examples (expository presentation of instances), recall (inquisitory generality) and practice (inquisitory instance). Secondary presentation forms include: prerequisites, objectives, helps, mnemonics, and feedback (Burner, 1983).

Ausubel's Theory of Meaningful Verbal Learning

David P. 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 rote or meaningful depending entirely on the process. (Bell, 1978)

Vygotsky's Theory

Vygotsky's zone of proximal development (ZPD) has many implications for those in the educational milieu. One of them is the idea that human learning presupposes a specific social nature and is part of a process by which children grow into the intellectual life of those around them. According to Vygotsky, an essential feature of learning is that it awakens a variety of internal developmental processes that are able to operate only when the child is in the action of interacting with people in his environment and in cooperation with his peers (Vygotsky, 2009).

Therefore, when it comes to language learning, the authenticity of the environment and the affinity between its participants are essential elements to make the learner feel part of this environment. These elements are rarely predominant in multicultural classrooms.

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

1. The teacher should act as a scaffold, providing the minimum support necessary for a student to succeed. The idea is to assist without denying the student's need to build his or her own foundation. The problems for the teachers, then, are to find the optimal balance between supporting the students and pushing the students to act independently. To effectively scaffold the student, the teacher should stay one step ahead of the student, always challenging him or her to reach beyond his or her current ability level. However, if instruction falls outside of the zone (above or below a student's ZPD), no growth will occur.
2. To effectively scaffold students within their ZPD, a teacher should also have an awareness of the different roles students and teachers assume throughout the collaborative process. The roles roughly resemble the following:

- Teacher modeling behavior for the student
 - Student imitating the teacher's behavior
 - Teacher fading out instruction
 - Student practicing reciprocal teaching (scaffolding others) until the skill is mastered by all students in the multicultural classroom.
3. The multicultural classroom should be set up in such a way to foster group work and student collaboration in order to allow students to take on the role of instructor with their peers as they master the skills at hand.

Conclusion

Very few research works have been carried out on the "problems faced by teachers and students in teaching and learning mathematics in multicultural classroom". I found many books, articles and previous research studies, they have not discussed in this area. I noticed the gap between the reviewed literature and my purposed title of the study. Thus, to fulfill this gap I am motivated to study on this topic. So, I believe my title for this dissertation is suitable for carrying out a research.

Conceptual Framework

The teaching-learning problems of mathematics are already explained above. Thus the problems on teaching-learning are considered as the problems of mathematics. The conceptual framework devised through the Literature studies facilitated to attain research, get the answer of the research work.

Analyzing various literatures in relation to problems encountered in teaching-learning mathematics, I have development a conceptual framework for this study shown in figure below:

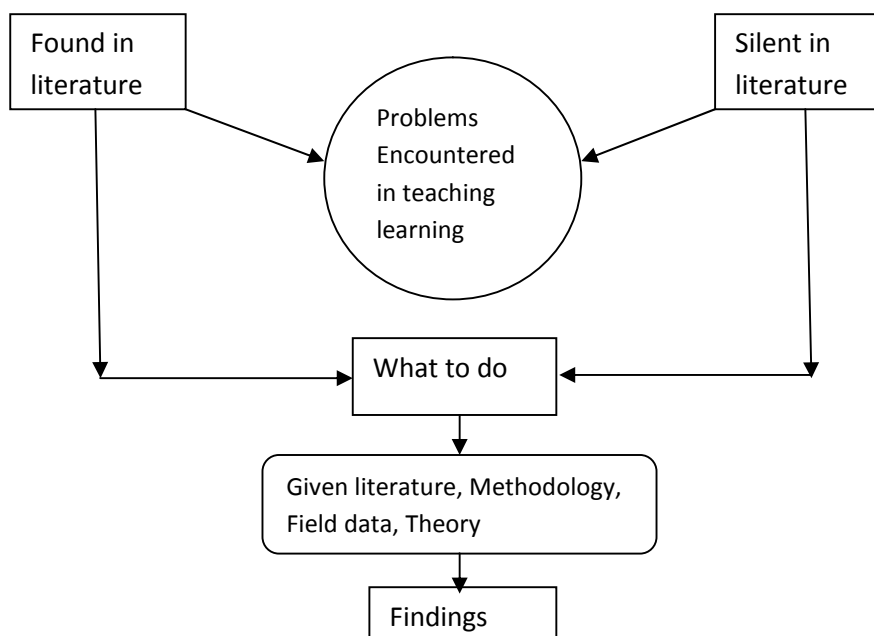


Figure: 1 Conceptual Framework

Chapter- III

METHODS AND PROCEDURES

Research design

Research design in this study is qualitative. Research design is an integrated framework of the whole study that guides the researcher in formulating, implementing and controlling the research work. In this study, problems faced by students and teachers in teaching - learning activities in multicultural classroom in Sindhupalchok district has been studied. The nature of this study is qualitative with ethnography approach. Qualitative research is multi- method involving an interpretive, naturalistic approach to its subject matters (Acharya, 2013). This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them. Qualitative research is involving detailed, verbal decriptions of characteristics, case, settings, people or systems obtained by interacting with, interviewing and observing the subjects (Denzin& Lincoln, 2000). Qualitative research is broadly interpretive in the sense that it is concerned about how the social world is interpreted understood, experienced or produced (Sharma, 2011). This study also investigates real real-world behavior or field of classroom or playground or in institution. This study was related to the problems encountered in teaching-learning mathematics in multicultural classroom.

Study Site

Sindhupalchok district is near the capital city of Nepal. It is located in the middle development region of Nepal. Two schools were the study site in my study. I had chosen Shree Janaseba Higher Secondary School, Kalika (X) and Shree BaghBhairab Higher secondary

School, Thokarpa (Y) for my study site. All the students who study on those two schools were the population of the study.

Sample

For this purpose 2 mathematics teachers and 6 students were the sample of the study. For the sample of my study mathematics teachers and students were selected by purposive sampling method.

Tools

The main tools used in field to collect primary data were observation form and Interview Formats. The already established class observation form (APPENDIX A) was used to observe the activities of teachers and students at learning in classroom. I had constructed two Interview formats in semi structured form. (APPENDIX B) was used for mathematics teacher to find out faced problems, teaching strategies, use of teaching materials in multicultural classroom. (APPENDIX C) was used for students to find out faced problems of learning, attitude, beliefs and interest in multicultural classroom. Researcher studied other schools recorded document related to selected respondent that are schools' profile, teacher and students profile, student attendance register, and result sheet.

Data Collection Procedure

I went to each sample school with tools to collect the qualitative data. Researcher took class observation in teaching of secondary level attending behaviorally with students and teacher. In that period I observed carefully and recorded each and every notable activity of students and teacher in the observation form. Also I took interviewing with Head teacher, Mathematics teacher, Students and parents of case students with the help of guidelines of semi-structured interview Format. The researcher listened the replied of respondent curiously and noted properly.

By reviewing the schools' recorded documents, attendance, profile, result sheets; I noted punctuality, characteristics and other behavior of respondents. By observing surrounding environment of school, conditions of mathematics lab, other facilities of school and interviewing with head teacher as well as document analysis of school; learning environment are seen.

Some supplementary data and information and literature review have been collected from the T.U. campus library and other published and unpublished documents by the concerned authorities.

Data Analysis and Interpretation

Presentation and Analysis of the collected data is the core of research work. The collected raw data are first presented in systematic manner in tabular forms and are then analyzed by applying different logical ways as well as with the help of conceptual Framework to achieve the research objectives. For this purpose the collected sets of data were coded on the basis of respondents and types of faced problems. Faced problems in teaching - learning and learning environment of school were categorized by the themes of observed form, the summarized problems mentioned by researcher on observation form and the problems found from interview format.

Chapter-IV

ANALYSIS INTERPRETATION OF DATA

This was a case study related to the problems faced by teachers and students in teaching learning mathematics in multicultural classroom at secondary level students in Sindhupalchok District. In this chapter I have address my research questions; what problem do students face in learning mathematics in multicultural classroom? What problems are faced by teachers in teaching mathematics in multicultural classroom?

In order to answer first research question systematically. The qualitative information was collected for answering the research question related to problems faced by students. I reached the respective sample school and necessary information was taken during the time of classroom teaching. Different episodes of different classrooms were observed and taken interview with my students and teachers participants. For answering the second research question I took the interview with mathematics teachers, and classroom observation. The interpretation of analyzed data was done using different theoretical perspectives as explained literature review section. For this, this chapter is organized in to two sections. Section I discussed about the problems faced by students in learning mathematics and section II discussed the problems faced by teachers in teaching mathematics in multicultural classroom.

Section I: Problems faced by students

In this section I deal the problems faced by students in learning mathematics. For this I took interview to the students and teachers and observed class of grade IX and X. The process of taking interview and classroom observation is presented below:

Student's response:

Respondent A from school X

Respondent was 16 years old boy. He lived in Kalika -9, Sindupalchok.

There were 9 members in their family. He had joint family including mother, grandfather, grandmother, uncle, aunt, brother, and sister. Father had gone abroad a year ago when he was 15. His Study was not so good because he had to work in his home, farming, doing labor work and earning money was his duty. He said,

"I had to do many works in my house like cutting grass for our domestic animals. So I could not go to school regularly. I had failed in class six and nine also. It is my second year in class nine. I am poor in mathematics which I think the difficult subject. I think that mathematics which I learn in school has not any application in my daily life. "

From the above information I found that heavy work load affect the learning mathematics.

His plan was to study up to S.L.C. and going abroad to earn money. He was very much interested in playing volleyball. His physical fitness supports him to be the player. He was not interested in study. He did not do homework given by the teacher. Hefurther said,

"I have to finish all the house hold work before going to school. I have no time to do homework because I have to be engaged in household work. My father alone cannot earn enough money. I know the importance of education but my family environment is not in favor of study that's why I cannot complete my study."

The above explanation indicates the main cause of dropout rate of Magar students.

Poverty was the main cause which hinders the learning of the Magar children. The community was in backward position. He also wanted to do the work which his friends did in society. The

social cognitive theory suggests that learning take place through observing others in the social environment. The quotation of Bandura, “behaviors are cognition and other personal factors and environment events all operates as interacting determinants of each other”. This theory was quite related in case of the respondent as the respondent said,

“I want to do the things which my elders do.”

His behaviors are shaped by his cognition which affected by his environment.

The reason behind difficulty was the student's unfavorable home environment, poverty and lack of guidance for his study. The respondent had not get enough opportunity to study at home, lack of motivation, unconsciousness about the importance and use of mathematics in real life etc. are the causes of the difficulty in math learning.

Respondent B from school Y

Respondent was 14 years old boy. He lived in Thokarpa -7, Sindupalchok with his father, mother brother and sister. There were five members in his family. His father was an educated man but mother was uneducated housewife. The used Rai language and followed Buddhist religion. His father was a social worker and familiar with Rai culture, tradition and values. He was aware of Rai culture so he always promotes Rai language and follows their own tradition. He was against the acculturation of Rai culture and believed that Hindu culture interference in Rai community was the cause of cultural decline. He was a regular student in class and he always participates in extracurricular activities. He was good singer of Raijhyure and chudka. But language problem always hinders him in school. He could not speak Nepali language fluently which causes him to feel dominated. He could not use respective formal language in school, so the teacher did not care his learning. Sometimes the word pakhe used by other caste students in school that shocked him deeply. He said,

“All the teachers in our school are not from our community. They speak Nepali language. I feel hesitation to ask question directly to the teachers. Instead of asking to the teacher I feel easy to ask my friends in our own language. If there will be Rai teacher in our school, it would be better for me to ask questions in my language. Mathematics is difficult subject for me. Algebra is the most difficult for me I could not even memorize the formula $(a-b)^2$, $(a+b)^3$ etc. and cannot apply these formulae in exercise.”

He had difficulty in verbal problems of mathematics. He could not ask the question to the teachers which he did not understand. But if he felt difficulty in class he preferred to ask his friends in Rai language. So student teacher interaction was not amicable. He had enough time to study at home but the language difference and cultural discontinuity were found main cause of learning difficulty. He did homework given by the teacher but many mistakes were found in his work. The standard measurement unit used in books had no practical use in his house mana, pathi, muri, hat, bitta, dharni were frequently used in his society. Twenty based counting system and Rai counting like: kat bias, nish bias, som bias, buli bias, banga bias chang bias etc. which he had learnt at home had no application in school curriculum. Thus cultural difference and discontinuity faced the learning difficulty in mathematics.

I have concluded that the mathematics teacher should maintain the friendly environment in mathematics class; teaching should make fruitful by using sufficiently instructional materials. The learner is directly connected with his culture and society. According to the social cognitive theory, learning takes place through observing other in the social environment. According to Bandura, (1986), “Behaviors are cognition, and other personal factor, and environment events all operates as interacting determinants of each other.

Respondent C from school X

Respondent C was 14 years old girl studying in grade ix. She lives in Kalika-1 Sindhupalchok. It took forty five minutes to reach school from her house. She had seven members in her family. She is from Kami (Dalit) community. She had very weak economic condition. To go to school, she had to finish all her household works. She said

“Before going to school I have to finish all the works such as getting ghansh for animals and other household work. Our member depends upon the farming but we have no sufficient land. We have difficult to manage food and other problems. So I have no sufficient time to study in home. ”

She reaches school quite late every day. She becomes usually absent in roll call in her school. Because of weak economic condition her father couldn't get any formal education but he was skillful in running the house by doing simple works. He works in field, weaves doko, dalo, nanglo, ghoom etc. of bamboo strips or nigalo strips. But his income was very low. So he could not give enough facility for his daughter required for the proper educational environment. Similarly, her mother was unable to get formal education. It was because in her time daughters were not given education.

After reaching school she got engaged in her study. During the observation in the field I came to know that Kami students had silence home culture, for example the respondent used friendly language in her class like: “yokasribhayobhandeuna sir”. The teacher did not like this language, teacher expected respective language like: “yokasribhayakobhandinusna sir.” Because of this the teacher didn't care her. She also could not ask question to the teacher where she did not understand. She used kam language in her house and community. She had to use Nepali as the second language and third English language in school which was never used in her house. Kami students are obliged to learn three types of language (first kam i.e. they use at

home, second Nepali uses at school, and third is English language) simultaneously. Although the role of modern education system was contributing progressively to betterment the educational condition of kam the situation was still vulnerable and educational standard of kam falls below than the normal standard. She said,

"Mathematics is the hardest subject for me. Unitary Method, verbal problem in algebra and geometry are difficult for me."

I noticed that she had problem in solving verbal problem of algebra like "find the number which multiplied by 3 and subtracting 7 gives 14." She had also difficult in addition of the fraction $\frac{3}{7} + \frac{4}{5}$ but she easily added the fraction that $\frac{3}{5} + \frac{4}{5}$. Here she understood the problem $\frac{3}{5} + \frac{4}{5}$ by looking in example also but for $\frac{3}{7} + \frac{4}{5}$ there needs the explanation and practice to take L.C.M of 7 and 5. She has no basic knowledge of L.C.M She also fails to draw the different angles by using compass and protractor.

As an observer I asked the mathematics teacher about the difficulties faced by the students. He told me she has problems on algebraic expression, multiplied by minus (-) sign, word problem. She told me that she got difficult in learning mathematics because in her house her father and mother did work with simple and not fixed measurements like stick, bricks and hand for measuring length but in school she had to use fixed measurement using ruler, compass, protractor etc. She has to face theoretical knowledge instead of practical knowledge in school. This was her main difficulty.

I had concluded that the interaction between the teacher and the student in classroom due to language difference, illustration/ examples related to the real life of the children, time given to study mathematics at home etc. are the causes of difficulties in mathematics learning. Thus the researcher found that the Carroll's model of school learning was related in case of the respondent as she could not give enough time for learning as required to learn mathematics.

Respondent D from school Y

Respondent D was 16 years old girl. She lived in Thokarpa-5 sindhupalchok. Her family follows Buddhist religion. She was very much curious and intelligent. She did not forget to do her homework as she was good student. She attended all the classes. She always participated in extra activities also. She did not like to do the work as other did in the community. Her father was educated and was a political activist of the village level. Her father generally becomes busy in the work of his political party so he was not able to give enough time to his children at home. But father was quite familiar to the importance of education. He generally visit to school and consults with the teacher about his daughter's study. He agreed that she was interested in study but she was weak in mathematics. According to him the reason was the cultural difference, language discontinuity and inadequate parental help. As he was a political activist, he had to spend much time in this work and her mother was uneducated housewife and could not help her children. She had not the problem of school needed materials like books, copies, pen etc. She took tuition classes regularly as she was weak in mathematics and English. The tuition classes helped her in learning comparison to other Tamang children. She had good opportunities in learning. So she was forward than other Tamang students. Although she had good home environment for learning, she felt some difficulties in mathematics. She said,

"Addition, subtraction and multiplication of algebraic expression are difficult for me. Some problems involving algebraic multiplication, I feel difficult. The unitary methods, geometry, trigonometry in optional mathematics are also difficult to understand."

For example : If 80 people can construct a house in 160 days then in how many days 20 people can construct a house ?

Solution : 80 people can construct a house in 160 days.

1 people can construct a house 160/80 days.

*20 people can construct a house in $(160/80) * 20$ days.*

*= $2 * 20$ days.*

= 40 days.

Hence 20 people can construct a house in 40 days.

Instead of the answer that 20 people can construct a house in 640 days.

This example indicates the mistake occurred in verbal problem of unitary method in indirect variation. From the above description, it is concluded that although the student had good economic condition, her family background was far better in comparison to other students, she had good parental support, but her difficult in math may be caused by the teaching strategies applied by the teacher. The teacher should use the Ausubel's theory of meaningful verbal learning according to which the lecture type session can be made more meaningful if the student have positive attitude to learn, she is likely to learn in meaningful way. The mathematics teacher had to emphasize on real life situation; fed with enough example related to the real world rather to teach the exercise of the textbook.

Respondent E from school X

Respondent was 15 years old boy studying in grade 10. He lived in Kalika -6, Sindupalchok. There were 5 members in their family. He had mother, father, brother, and sister. Father had job on bank. He had to work in his home sometimes.

His plan was to study engineering. He told

“I am interested on mathematics and I am doing homework every day but because of our classroom environment, I couldn't get excellent result. We cannot do

classroom interaction and our teacher has to give more time to make others to understand even a simple topics. I feel bore while teacher repeats topics and questions which already done. My friends take more times to complete simple chapters also which make my times also boring for study.”

He had no difficulty in verbal problems of mathematics. He had enough time to study at home. He could do homework given by the teacher. He could ask the question to the teachers which he did not understand. Also if he felt difficulty in class he preferred to ask his brother. His brother is in class 12 and talent on mathematics. Again he can't be prepared as excellent student. Course could not be completed on time.

I have concluded that the mathematics teacher should maintain the learning environment in mathematics class; teaching should make fruitful by using sufficiently instructional materials. The learner is directly connected with classroom activities. So course should be completed on time.

Respondent F from school Y

Respondent F was 16 years old girl studying in grade 10. She read in school Y. She lives in Thokarpa-3 Sindhupalchok. It took twenty five minutes to reach school from her house. She had six members in her family. She is from poudel (Brahman) community. To go to school, she had to finish all her household works. She said

“Before going to school I have to finish all the works such as getting ghash for animals and other household work. So I have no sufficient time to study in home. Addition, subtraction and multiplication of algebraic expression are difficult for me. Some problems involving algebraic multiplication, I feel difficult. In our community problem in single interest used to be solved by the rate in ‘sayakada tin’

‘sayakadapanch’ and time as monthly but in school teacher used to teach rate in percent and time in years. When teacher taught unitary method they said that if fifty people can make a house in 100 days then I used to increase the number of people and make it five thousand then how would they finish the work in one day ?”

From the above information of the interview of students I found that it was problems for the students to learn mathematics because of the lack of linkage between theoretical and practical knowledge.

Likewise, I took the interview with the teacher about the difficulties faced by the students. He told me,

“She has problems on interaction with teacher and friends and the multiplication by (-). She did not cooperate with friends”.

From the above view of the teacher it is concluded that I had concluded that the problems of learning mathematics because of lack of cooperation and discussion with teachers and friends

I had concluded that the interaction between the teacher and the student in classroom due to language difference, illustration/ examples related to the real life of the children, time given to study mathematics at home etc. are the causes of difficulties in mathematics learning. The learning opportunities at home for her was not sufficient. Mathematics needed more practice to achieve good marks because mathematics is the subjects which includes various theories and methods.

Teacher's response:

Respondent teacher 1 from school X

Krishna Giri is a mathematics teacher of Janasheba H.S.S. He has been teaching mathematics in secondary level for 12 years. He uses few instructional materials while teaching in classroom. When I asked about the problems faced by students in multicultural mathematics classroom then he answered,

“Most of the students have faced problems in multicultural mathematics classroom; everybody thinks that mathematics is difficult subject. And talking about Tamang, Rai, Pahari and Newar students, there are problems at multicultural mathematics classroom, languages, irregularity in homework, carelessness in studies, behavior, culture etc.... Rai and Tamang students are doing progress in their studies. While talking about Dalit (Damai, Kami, Sarki) students irregularity in class, irregularity in homework, attitude and behavior makes the problem on their studies.”

From the above information it found that due to the mixed classroom situation it is difficult to learn mathematics.

Again he said,

“Rai students are average in the classroom. They are neither best nor bad in the classroom. Sometimes they have language problem, they don't understand what we speak and sometimes we don't understand what they speak. Sometimes they use their mother language in classroom for conversation. Sometimes they talk in their own language and create misunderstanding in communication. They create unnecessary disturbances in classroom by speaking unnecessary things in the class.”

The above views indicate that multicultural environment creates language difficulties and behavior problems according to student home environment, their spending times to study is quite different. Those who can give more time and dedication makes better knowledge level and those who gives less time can't make better study.

Respondent teacher 2 from school Y

ChudamaniGautam is Mathematics teacher of Shree BaghBhairab H.S.S. He has been teaching mathematics in secondary level for 7 years. He said that,

“Most of the Tamang, Pahari, Damai, Kami students are very weak in mathematics. They don't have proper base for mathematics. But some of the selected students from the same community are extra ordinary, intelligent and talent in mathematics. Mathematics being difficult subject to understand by students, they have to give more time to practice mathematics for better result. The students from Tamang, Pahari, Damai, Kami community don't get time to practice mathematics because of household works. Most of the students have to help their parents in their household works and agriculture. Some have to go on mela-parma, some have to stay in shop and some have to feed the domestic animals in time which kills their time to practice mathematics.”

From the above view 9 have concluded that the main problems is household works not their community .If the student can give proper time from base label then that student can achieve good posting in study mathematics is a time talking subject, accord to cultural environment the time gives for mathematics is varies that makes gap on learning level.

He also said that,

“The main problem of those students from Tamang community, Pahari community, Damai& Kami community is to make relation with others, to be frank & co-

operative with other friends. These students mostly are passive on class activities. Students from Braman&Chhetry community feel as the whole class is in their favor in language & in behavior also. So they can learn more comfortably. But Tamang students make their own group and can't be open & frank with others like that Pahari,Newari,Rai,Damai,Kami,Sarki students also feels as separate-separate groups. They are quite backward on interaction and that's why in study also."

The above view of teacher shows that relation between student – student and student to teacher is varies according to their cultural background. If a student frank and friendly then he/she can learn easily. All are leaning same but their leaning techniques are different and the times devoted by them are different and the times devoted by then are different.

When he was asked about the language problem faced by students in multicultural mathematics classroom, he said,

"I think those students are facing the language problem whose first language is different from Nepali language. They don't understand other language properly and they don't know how to speak in nice Nepali & English language. They rarely ask some questions. If they were given a chance to learn in their own language then they could understand easily and they could communicate without any hesitation. If we can provide senior class students of their own culture as a guider or tutor for some certain time then that can be fruitful for multicultural class."

According to above views to give classes in own language can help to improve learning label. But in my opening to give extra class to learn Nepali & English from base can be fruitful to make equal class environment for all.

Learning Environment at Home and School

Environment is the totality of the educational atmosphere at home and school. Home is regarded as the first school to all individuals. They learn to behave, how to cooperate to each other. Home environment plays a vital role in learning opportunities of the students at home. School is the second home of any child. The teachers, students and parents are the components of the school. School environment reflect belief and tradition of the school community delineating the relation among parents, students and teachers. Scholarships to the students, extra class provided, dominance of language, cultural dominance are the major aspects of school environment.

"Our parents forced us in farming and household works. They said farming and labor is our main occupation. Parents said to us that we should engage in house hold works like farming, labor etc. and to earn money rather than school."

(Student's view)

The above views indicate that had no sufficient time at home for mathematics learning. They had to engage on their main occupation, i.e. farming, labor etc. The learning opportunities at home for their students were not sufficient. Mathematics needed more practice to achieve good marks because mathematics is the subjects which includes various theory and methods. There students had not such facilities.

"My parents are illiterate. My father rarely comes at home. He always drinks. He works as a physical labor in Sindhupalanchok. Mother spends all time making domestic use materials. Grandmother and grandfather are old and sick. They cannot work and earn money. So I have to handle all domestic problems there is no separate room to read peacefully at home. So I can't take effort about my education."

(Student's view)

The above view showed that most of the students of those castes which are illiterate. Parents could not teach their children at home. Due to lack of education, these castes were engaged on different works. The involvement of their parents in their children's learning was negligible. But the role of parents in involvement and encouragement helped the child to excel. Parents are first and ongoing educators of their own children such as should receive information and support to help their children's learning at home and in the community.

Since I am from chhetry community I would like to express my own view regarding the students and their difficulties.

“My parents are illiterate and they couldn't pay attention on my study any more. When I was in school level I used to act much contradiction towards my study such as solving mathematical problems. My parents used to encourage me to study but they have no idea about particular problem solving. I couldn't go to school many days because my family didn't let me to go because of many house hold works. My works in house were to cut grass, wood etc. and to go 'mela pat' to earn some money. Once in class seven in first terminal examination I couldn't attend school because my parents didn't afford examination fees thus I went to 'mela' and paid the fees. My cultural discontinuity and language problem occurred in my school age. Because of my wrong pronunciation I faced teasing from my classmates and even from my teachers also. I used to be shy to express my problems on group. There was the lack of interpersonal relation between me and my friends and teachers. I had weak presentation in the problem simple interest. In our community problem in single interest used to be solved by the rate in 'sayakada tin' 'sayakadapanch' and time as monthly but in school teacher used to teach rate in percent and time in years. When teacher taught unitary method they said that if fifty people can

make a house in three month then I used to increase the number of people and make it five thousand then how would they finish the work in one day ? Hence there was the great difference between school learning and home environment.”

(Student's view)

The above discussed evidence of students, parents and researcher's views showed that students of high socio-economic condition and educated parents had more opportunities to learn at home than other low socio-economic status. Magar, Rai, Kami, and Tamang Students found difficulty in adjusting and sharing cooperation with teacher and students at school. They were laborious people. The students could not give the sufficient time for the mathematics learning at home. The theory of difference and discontinuity Ogbu, (2000) argued that those children whose home culture is much more similar to the culture of education system that may result better learning achievement. Similarly, children with unmatched or dissimilar home cultures with school they do not have enough attention in their learning and do not get much recognition of their language they have to do hard achieving learning outcomes compared to the children with good matched. I found that the culture of Magar, Kami, Rai and Tamang students at home and school were unmatched. So the students of Magar, Rai, Kami, and Tamang felt difficulty in mathematics learning. From the above views of students teachers and parents it can be said that the home environment of students was not in favor the mathematics learning and school environment was not conducive for the mathematics learning. The low socio-economic status, unmatched culture at home and school, negligible events involvement and not sufficient learning opportunity at home were the main factor that obstruct/ hinder in creating proper learning environment at home and school.

Language

Language is the greatest means of human civilization that sets them apart from the other living beings it is such a means by which we perform communication, thinking, group solidarity, nation buildings, control, creation and absence of which no artistic academic and social activities can be thought. The language is major component for learning. It was observed that Magar, Kami, Rai and Tamang children tried to speak Nepali language with teacher and other students at there was misunderstanding between language communications.

“Magar, and Kami, Rai and Tamang have their own mother language. They do not speak Nepali language at home but in school Nepali is used. The language at home and school does not match. So they felt difficulty to learn mathematics. Our parents at home frequently speak Magar Kami, Rai and Tamang Language but they do not use Nepali. So we must speak Magar, Rai, Kami, and Tamang Language at home. We have no opportunity to learn Nepali language at home but in school teacher always teaches in Nepali language. If the teacher taught us in Magar, Rai, Kami, and Tamang language, it would be easier for us to understand the things. My teacher used to speak Nepali language but My family use to speak Magar, Rai, Kami, and Tamang language instead of Nepali. I was little slow in Nepali language so it was huge problem to me for studying. My language was non respective language so I didn't want to talk with my teachers.”

(Student's view)

From the above view, it showed that language was the major factor for creating the learning difficulties for Magar, Kami, Rai and Tamang students. Magar, Rai, Kami, and Tamang children have language problem. They cannot speak Nepali correctly. They speak mixed language which is difficult for us to understand. Even if they try to speak in Nepali, they use informal language which they generally use to their friends. I always feel their irrespective

language in the classroom. The Magar, Kami, Rai and Tamang children feel difficulty in understanding Nepali language in comparison to other students.

From the above views it showed that the Magar, Kami, Rai and Tamang students had poor Nepali language. They spoke their own mother tongue at home. The language of Magar, Kami, Rai and Tamang not matched with the school language.

One episode of mathematics class is given here. It was observed when I went in the class with mathematics teacher.

“The teacher went to the class, then after I also entered in to the class. The entire student stood up and said, “Good morning sir!” Then teacher said, “Good morning and sit down.”

It was noticed that the school environment has taught them about the respect for the teacher. There were 18 students in the class. Teacher took the attendance of the students. Different caste students were present in the class. Teacher opened the book and wrote the topic simplification. He wrote a problem on the blackboard and solved it. All the students were busy to write the solution from the blackboard. The teacher did not review the previous lesson and did not check the homework. After some time he asked with the students whether they got the point or not, some said. “Yes Sir.” But one of the researchers respondent asked with teacher showing his copy “*Pherybhanidinumailetabhenna.*” The teacher did not take care of him. Then the student started to ask the question to his friend in his language. They discussed for a while but he teacher did not take care. Then the teacher started to do another problem thus they couldn't understand the problem.

From the above views and classroom activities, it was concluded that there was discontinuity in language. The teacher also did not care the students in the situation that they

couldn't understand properly because the teacher was unknown about their language. Ogbu, (2000) furthermore argued that the discontinuity occurs in the area of language. This discontinuity faced the difficulty in mathematic learning. Finally, it can be concluded that language is one of the factors that arise the difficulty in learning mathematics for Magar, Kami, Rai and Nawar at secondary level student in multi-cultural class room.

Teacher- Student Interaction

Interaction is the social activity that can be within persons and between persons. Within persons interaction refers to the mental activities with his/her mind and soul. It depends upon the personal intellectual capacity. Inter-individual interaction refers to the sharing cooperation and adjustment between two or more persons. According to Ogbu (2000, 2001) learning takes place through environment, Culture between home and school.

“All the school teachers at the school are from Brahmin and Kshetry. They do not response us. If mathematics teacher would from Magar, Kami, Rai and Tamang community we could easily interact with him”

Magar, Kami, Rai and Tamang students are poor in language pattern. They always speak in Magar, Kami, Rai and Tamang language. They always used to sit together in group. So they have poor interaction with other students also. I cannot understand their language. They use mixed language in classroom. Sometime I ask questions but they cannot response. So I do not like to ask question to them.

The above views of student and teacher indicate that there was language discontinuity in the mathematics classroom. Due to the mixed language used by students in the multicultural classroom. Teacher did not understand the mathematics problem raised other students efficiently. There were difficulties to interact with mathematics teacher and other students of

mathematics classroom for Magar, Kami, Rai and Tamang students which were due to neglecting language. The above views also indicate that the mathematics teacher had been neglecting them was not proper interaction between Magar, Kami, Rai and Tamang students and other students as well as teacher in the actual classroom practices.

One observed class episode is given below:

“The teacher was just entered in the class with daily using teaching materials I also entered in class with mathematics teacher. He had started to teach. He wrote the topic construction of angle on the blackboard. He did not review the previous lesson. On that day one of the researchers respondents raised one question but the children did not ask the question to the teacher directly rather he asked to his friend sitting nearby him. Both the children discussed the problem in their language. The teacher paid attention toward the students who were taking. The teacher was angry and asked the students not to disturb the class. The students said that they were discussing about the subject matter which they did not understand. Then the teacher ordered them to speak in Nepali language and to ask the question directly to him”

From the above multicultural classroom activities, it indicates that there was no proper interaction between teacher and Magar, Kami, Rai and Tamang Students in mathematics classroom, teacher did not response the Magar, Kami, Rai and Tamang students and the children are always dominated in the language which was limited therefore in learning mathematics ideas sharing cooperation and adjustment became difficult that create since the culture of home and school different in terms of language code and teaching strategies and selection of knowledge.

Interpersonal relation

As I have observed the six key children I found that there was not good communication between Magar, Kami, Rai and Tamang and other children. Although they ate together, played together, but their company was different. The key children felt shame to ask anything with teachers and they didn't speak more with other children. Their interpersonal relation with other children was not developed nicely. Other caste children raised more question but Magar, Kami, Rai and Tamang children lacked the interpersonal relation with other. Due to the behavior of other children towards them, they felt quite serious.

Due to the language problem either the children hesitated to take part in interaction or they felt ashamed to their own mother tongue and culture, but it was not their serious faulty intention not to respect the teacher. They learned restricted language in their family/ community transmitting by the society. The friendly language which they used in their home and with their friends and elder people is used in class. It shows that the culture of home was also influencing factor for the learning mathematics of Magar, Kami, Rai and Tamang Children. So interpersonal relations also influenced to learn mathematics and they feel difficulty in learning mathematics.

Activities of Teacher's and Student's in Classroom

Among the teacher, students and learning environment in class room; Teacher is the main agent for curriculum implementation. Students perceive most behaviors of teacher and impressed to teachers, so the role of teacher in multicultural classroom is most important. The activities of teacher in multicultural classroom are to guide student, create and facilitate the learning environment encourage, motivate, examples to achieve the objective of curriculum. The roles of students are to do the activities promoted by school curriculum and task given by teachers as performer in multicultural classroom.

One multicultural classroom observation of school Y for the activities of student's and teacher's in a class room practice is presented below.

Episode: 1

The teacher entered the class room with daily uses materials chalk, duster and text book. All the students stand up and said good morning sir then teacher replied good morning and sit down. Teacher wrote the topic. "Unitary Method", he described about the topic, he solved two questions on board then he explained and teacher asked to students do they have any trouble to understand in any step of solution? One student raised question then teacher again explain the above solution. After that, teacher gave a problem to students. Also teacher was giving hints at solving the problem. Similarly, more two problems gave to students. When students make mistake teacher correct it in his copy in multicultural classroom. I looked not all students had solve that questions. When bell was ranged, teacher gave assignment to students and come out the multicultural classroom.

The above class room observation shows that teacher is not active and not well prepared about unitary sums. The class is mostly teacher centered. Teacher used lecture practice method in multicultural classroom teaching. Teacher doesn't use blackboard frequently. The mistake of students did not solve in blackboard. Less involvements of students in multicultural classroom practice. Students did not ask question frequently with teacher. Teacher evaluates students by giving class work and home work only.

It is sought that the teacher faced problems in mathematics teaching at appropriate method, materials and examples. But it was not found in class room teaching. Teacher should relate any new concept with already learned concept and present illustrations connecting with daily life problems as far as possible. But it was not seemed at class room teaching. Teacher should create environment to solve the problem and encourage student to define terms unitary

method by giving appropriate hints. But teacher own self solve the problem in blackboard. So, it is seemed to that there is lacking of encouragement and motivation in multicultural classroom teaching.

Constructivism tells that the role of students becomes pivot element in education where students perform some functions in order to get new knowledge. Similarly, the role of teacher is to create and facilitate the learning environment for the students. Whereas, the role of society is to evaluate the knowledge of students' received in the environment created by the teachers. If these roles are correctly perceived, then they must be translated in to the multicultural classroom practices. So, these three distinct roles, which we consider very general as well as very important, are listed as students as performer, teacher as a facilitator and society as an evaluator that must be translated through methods of teaching.

From the above discussion, it is concluded that there is lack of teaching materials in unitary method teaching. The mathematics teacher always promotes lecture method in mathematics. There is lack of participation of teachers and students at unitary method. There are few numbers of students in the class of unitary method. There are few number of students in the class of unitary method but teachers do not use child centered approaching and do not evaluates students work properly, which is also a problems of mathematics. The causes of becoming above problems in mathematics teaching are teachers applied traditional teaching methods, not using materials, not using teachers' guide of mathematics teaching, less participation at unitary method class and don't have formal training to teacher etc.

Teachers and Students Characteristics

The teachers' characteristics directly affect the students' outcomes. The character and students are the collaborator process. The characteristics of teacher indicates sound personality, qualified, language, regularity, punctuality, active and efficient, kind / practical (good

coordinator), truthful/ unbiased, a good parent/friend / model / trainer / researcher, evaluator etc. In the same way students' characteristics indicates active and will, truthful, faithful, punctual, moral etc. Students should do daily homework and class work given by teacher, to observe teachers and students characteristics at mathematics class one episode is presented below.

Episode: 2

The above class observation shows that the teacher and most of students of school are in uniform. The language of teacher is good and he is qualified teacher having 18 years experienced. He is trained teacher. The behavior presented by teacher in class room is angrily while students do not have homework. Teacher did not give home work at the end of class in that day. It indicates teacher is not give homework daily to students. Students were not motivated by teacher. Students also cheat teacher i. e. in the beginning of this class while teacher asked to students about home work; all the students told that we have done homework. But at the end of this class while teacher begged homework form student; only four students submitted their homework. Besides case of emergency, teacher should not sent student to toilet at the time of teaching, but he sent.

Teacher mostly used lecture method at teaching. Only a few students interacted with teacher. Remaining students were only seen to black board. But class room environment was very peace. There were also seen that some students were discussed with friend about subject matter at the time of teaching.

"The most serious problem to students is not attempting class regularly and not doing properly home work every day. For this problem I think students should be responsible to his/her duties and also his / her parents should be responsible to child. Teacher doesn't check homework daily. Generally, after finishing one exercise; once

teacher checks whole home work; teacher doesn't take unit text of unitary method units also. Teacher regularly comes to school except illness".

The above views indicate that there is the main problem of irregularity of students. Teacher does not check home work day by day. There is weak evaluation system. From the teachers; attendance register it is seen that the teacher attempts classes regularly. From students' attendance register it is seen that the teacher attempts classes regularly, but some students are not coming regularly.

Teaching Methods, Materials and Evaluation Technique Promoted By Teacher for Mathematics Teaching

Teaching methods and instructional strategies are the main ways for meaningful teaching and learning of particular topic. Teacher is the main agent of the instructional strategies. In multicultural classroom activities teachers' and students has vital role for the use of materials. The method of teaching should be based on knowledge, understanding, skill and application. Evaluation is a process by which the values of an enterprise are ascertained. Evaluation is a process to measure the achievement, quality and behavior of the students. The participatory approach of teacher should be child centered in multicultural classroom. And evaluation should be helped to provide feedback to students.

For evaluation teacher can use informal evaluation that are placement test, formative test, diagnostic test, achievement test, oral test, homework etc. and formal evaluation that are placement test, achievement test, monthly test, unit test, terminal test etc.

Episode: 3

As usual teacher entered in multicultural classroom with daily uses materials chalk, duster, all the students stood up and said good morning sir. Teacher told good morning and sits down. Teacher took a text book from a student and wrote the topic "Trigonometry". And define as Sin , Cos , Tan , Cosec , Sec and Cot are known as Trigonometric ratios and wherever these come that is Trigonometry. Then he writes some Trigonometric values and formulae of Trigonometry.

After finishing that, teacher cleaned the black board and wrote one question from the exercise of text book and solved that question own self and order to students to see answer of this question from book. The problem was about to solve some sums. Teacher told to student that after copying this solution; solve one question from book. When students were busy to solving problem; teacher just stand in front of class and observed only the students of first bench. When student stopped his pen to write; teacher gave some hints to all student in black board. Only one student showed the solution to teacher. And other students were discussed with friends about solution of that question. Teacher again repeated the above hints on black board. Again teacher told to students to solve the next question by giving hints. At the end of this class; teacher gave homework from text book.

The above observation shows that there is lack of participatory approach of both students and teacher in multicultural classroom; because teacher solved the solution himself without involvement of student. Teacher taught about formula but he did not give class work about this. So, there is lack of learning management also. Teacher ordered to student for looking answer; it means there are also lack of preparation and confidence of teacher. There is lack of diagnostic test and oral test.

But teacher told that

"Mostly I use child centered method at teaching. I initialize Trigonometry by using graph board. I take test after finishing this unit. I am not using any fixed teaching method for Trigonometry teaching; but my aim is to how children receive the knowledge, in that way I go. I initialize formula by discussion method with students. Our teaching is child centered".

There is contradiction on teachers' views and class observation. Teacher mostly use lecture practice method in mathematics teaching. Evaluate students by giving class work and home work.

According to policy statements of the NBPTS, accomplished teachers display a "readiness to work collaboratively," participate in "collaborative efforts to improve the effectiveness of the school," and "cultivate a critical spirit in appraising the schooling". In modern senses, teacher should use the child cantered method, co- operative and more collaborative learning in the multicultural classroom teacher that makes more effectiveness of learning.

"Teacher doesn't use materials except chalk and blackboard at teaching. Teacher doesn't take unit text. Teacher sometimes takes class test. School administration conducts mid- term examination at the time of between two terminal examinations for each subject and final exam at the last of the session. "

The above view of students shows that there is lack of teaching materials. Due to poor evaluation system; students did not have feedback and suggestion to improve in learning. According to above views, I have concluded that we have lack of techniques to teach effectively

by using materials. If we have better technique then for large number of students also we can teach effectively in multicultural classroom if we got problems then we have to try different – different materials. In this regards Bruner said that “If we use different manipulative material our teaching-learning mathematics is more effectively.”

The analysis shows that the problems on mathematics teaching learning are lack of teaching materials such as teachers guide book and instructional materials, lack of learning management in multicultural classroom.

The causes of becoming above problems are; not well participatory approach of both students and teachers in mathematics teaching at multicultural classroom, lack of preparation and confidence of teacher about some topics manipulation, lack of diagnostic test and oral test. Teacher mostly uses teacher centered methods in mathematics teaching. Evaluate students by giving class work and home work.

Episode: 4

When the teacher entered into the classroom, all the students stood up and said good morning sir and the teacher replied saying good morning class. I also entered the class with the permission of the head teacher and the mathematics teacher. In, this regards, I observed the teaching learning activities of grade IX. The teacher was teaching the lesson “Laws of Indices”. He started the lesson with the review of the multiplication and division of algebraic expressions where two basic operations were involved in simplification. And also he wrote basic laws of indices on board. The students in the classroom were multi-cultural setting.

The basic laws were written as follows:

$$i. \quad a^m * a^n = a^{m+n}$$

$$ii. \quad a^m / a^n = a^{m-n}$$

The teacher took examples as follows:

$$\text{Solve: } 4a^{3/2} * 5a^{7/2}$$

$$\text{Here, } 4a^{3/2} = 4 * a^{3/2} \text{ and } 5a^{7/2} = 5 * a^{7/2}$$

$$\text{And therefore, } 4a^{3/2} * 5a^{7/2}$$

$$= 4 * a^{3/2} * 5 * a^{7/2}$$

$$= 4 * 5 * a^{3/2} * a^{7/2}$$

$$= 20 * a^{3/2 + 7/2}$$

$$= 20a^{10/2} = 20a^5$$

As a researcher, I found out that the discussion method was adopted by the teacher in solving the exercise of this type. Besides this, it seems reasonable to conclude that discussion method was adopted in group and lecture method in the presentation of the lesson. Some students did not give attention to the teacher. They were Tamangs and Paharis. It seems that those students did not understand what the teacher taught in the classroom or they could not understand the language spoken by the teacher.

Mathematics teacher may not be able to describe individual and cultural perspectives of the students. Banks (2004) states that from school's curriculum and teaching and learning activities, the students from diverse racial, ethics and social class group will experience

educational equality. In the present situation, multicultural dimensions very important. Cited Slattery (2003) says the key human behavior is neither motivation nor self-interest. It is rather man's capacity to know how to act in any situation and his/her capacity to adopt their behavior. There were some problems as heterogeneous linguistic situation different level of languages, contents realities, interactions in the classroom, communication between teacher and students themselves, respecting the norms and values of each other's culture, adjustment and classroom setting, developing the students participation.

In addition to problems, it also it is also promotes the right of all people enabling the students to understand the issues and problems of diverse society; whatever, the teacher should make their mathematics teaching in multicultural classroom including Tamang&Pahari students. In the line of Vyogotsky social constructivism theory, students can learn anything by interaction and collaboration with each other. So, the teacher adopted pedagogy in the classroom also accepted the Vyogotsky theory of social constructivism.

Episode: 5

My fifth observation was on BaghBhairab Higher Secondary School. Facilitator was Mr. ChudamaniGautam. I had observed his previous class also. He started some methods as before. Facilitating method was group discussion, and that day only thirty students were attained due to few members, a class was not interesting as previous week. He divided them only into two groups and started the discussion on the topic unitary method.

Facilitator asked basic concept related questions of unitary method but students could not reply correctly then the discussion started as below:

If a cost of a pen = Rs. 100 then,

*Cost of two pens = $100 * 2 = Rs. 200$ (because cost of two is cost of one *2)*

*Cost of three pens = $100 * 3 = \text{Rs. } 300$ (because cost of three is cost of one *3)*

*Cost of four pens = $100 * 4 = \text{Rs. } 400$ (because cost of four is cost of one *4)*

*And If the cost of five pens = $\text{Rs. } 500$, it means cost of five is five * cost of one*

That implies that,

Cost of one pen = $\text{Rs. } 500/5 = \text{Rs. } 100$

Students participated personally and responded on questions. They had a problem on finding the cost of two or others except one by cost of three or others except the one which was given. Facilitator used materials while facilitating so it's easy to understand and also discussed in groups, through which their misconceptions were cleared.

Facilitator managed individual instructions for weak student and motivated them for practicing for mathematics in classroom. Facilitator was appreciating them in their correction and motivating them saying such as "Yes you can do it", "Good" , "Excellent" and so on. Class was interesting as a whole.

The above activities of facilitator and students matched the theory of Piaget (1896), where he is concerned on how a child can learn mathematics and what to teach in which situation is very important rather than how to learn mathematics. According, to this theory children are actively engaged in contracting their actions and the result of their actions that they make as much as science of that environment they can.

From this observation, it was found that facilitator managed individual instruction for weak students and also motivated all the students for active participation in class discussion.

Section I: Problems faced by teachers in multicultural classroom

As perceived by my teacher participants and triangulating with the observational information and visiting and revisiting the transcribed data, I came to realize the following key themes that were problems encountered by teachers in multicultural classrooms.

Communication problems

As the communication is the exchange of ideas based on language. Without meaningful communication, no effective delivery of content is possible in the classroom situation. Therefore, linguistic communication between teachers and students was a key dilemma in teaching learning mathematics in multicultural classrooms. In this regard, one of the teachers opines,

"Mostly I teach in Nepali language. But there are multilingual students in the classrooms. I feel that some students who come from Nepali speaking family can understand the subject matter easily. But some from other than Nepali language cannot understand in the same speed. They ask me questions many times. Sometimes, they feel embarrassed to ask questions in Nepali language. Therefore, I attempt to simplify my language so that they can easily understand in the classrooms."

From the above data, I realized that language was a major barrier faced by the teachers as a medium of instruction in the multicultural classroom situation. The teachers were not competent in multi-languages as spoken by the students as their mother tongue. Therefore, it seems to me that the multilingual education practices as envisaged by the government were ineffective in this case. Moreover, there is diversity among the students in the classroom in terms of language they speak. The schools with a total domination of single language instructional medium seems a barrier to learning mathematics. The mother tongue based education was lacking (CHIRAJ,

2001). For me, a teacher's role, therefore, is to organize learning for all children to help them learn to the maximum according to their capacity.

Teacher-Y said that,

“Those students who came here from class one, they became familiar in multicultural classroom but those groups of Tamang students came from their society school to here in class 6 or above classes they have attitude and language problem. For those students to teach mathematics is quite difficult. In classroom they used to talk with their friends in Tamang language which makes me in confusion whether they are discussing about subject matter or their home matter. Pahari students are backward on mathematics, they don't try to do exercise themselves and they try to leave classes. The absent rate of pahari students is high. (Damai, Sarki and Kami) Dalit students used to hesitate to ask questions, I am explaining the topics repeatedly but again while teaching, I feel as they are in class but their mind is not there, they may think as after school where to go for work, what they have to do etc....”

The above views indicates that, those students who came on multicultural classroom from primary level can desist the problem to be familiar with multicultural environment up to secondary level. But those who came later, they might have problem for some times. According to his views I have concluded that students have different-different problems according to their culture.

Teaching without Contextualization

As I observed the classroom situation or the students' context of teaching learning activities, the teachers were found mismatched in their delivery process. As my observation,

When I entered into the grade IX of Shree Janasheba Higher Secondary School in Kalika, I observed that the teacher was teaching geometry and he gave some example of drawing a triangle on the board. He did not attempt to make students understand the feature of triangles giving more other examples which the students saw around their context.

In this regard, one of the teachers expresses his experiences of teaching mathematics in secondary classrooms as,

"Generally, I teach the students what is there in the book. I haven't taught many other curriculum irrelevant matters in the classrooms. I let them to do the exercise whatever given in the book."

These data reveal that the existing pedagogical practices in the public schools of Nepal were largely focused on text- books rather than contextual situation. In other words, the content of mathematics was not associated or embedded with their culture and cultural practices. Moreover, it has been guided by the notion of absolutistic philosophies of mathematical knowledge consisting of certain unchangeable truth and the unique area of certain knowledge with certain algorithms rather than fallibility philosophy. Therefore, I have viewed that this phenomena is a major problem in teaching mathematics in the multicultural classrooms.

Lack of Professional Training

As understood by me in the field work, the most of the teachers have been trained generally. However, they were largely untrained on how to teach in the multicultural classroom situation. During the interview one of the teachers say one of the participants of my research thinks,

"I have taken many training provided by the government. But no trainings have been taken on how to teach in the classrooms of diverse ethnic or culture groups. Therefore, I don't know about this."

The version of the teacher was absolutely justified with his teaching activities in mathematics class which was observed by me during my class observation. Thus the teachers of public schools were not trained in teaching in multicultural classrooms, through the government claimed that there were about ten thousand teachers who were already trained multicultural perspectives. However, these teachers were lack adequate training on the multilingual education and multicultural classrooms. Therefore, it seems to me that these teachers need more relevant trainings and implementation and strategies in Nepalese context.

Teaching Overload

Teachers in public schools have got six or seven periods per day. It created a problem to give individual feedback, individual support, and thus made individual guidance difficult. As per my field experiences, I feel that the public school teachers are over -loaded in teaching activities engaging about five to six hours in a day. This is complemented /substantiated by my participants' voice as;

"Just our experience is not sufficient. Uploading the knowledge of mathematics to acquire, the role of school is indispensable. Financially, school should cooperate the teachers to make availability of teaching materials, library and internet facilities. Teachers have lack of sufficient time to create teaching materials. At least, school should help in reducing the number of periods of teacher so as to allow him to spend his extra time in planning and assessing students. Also, the number of students in the class should be reduced to controllable size so as to allow group work".

The data presented above describe that the teachers are willing to reduce their working hours so as to allocate their time in planning and assessing the students. Morning through evening teachers is overloaded with number of periods. A teacher needs to teach 5 to 6 periods per day and as such they cannot manage their time in planning the future course and assessing the students. The students in the class over-crowded and as such teacher cannot give individual care in the class, nor do counseling out of school time.

Irrelevant Teaching Methods

The main concern of quality teaching- learning is the suitable teaching method for successful learning of mathematics. In this regard, one of the teachers says,

"I generally use memorizing, problem solving and question-answer methods for mathematics teaching. I always think about my students and try to get new ideas for better teaching and learning. I think my methods are productive for students for learning mathematics. I ask question and sometime I let the students to do the problem on the white board. I understand the position of my students' learning from the given task. There are a lot of weaknesses in teaching learning process in mathematics. The teacher asks students to memorize the formula and remember them. Also they ask the students to use formula while they are working on the problems."

From the above view of teacher, I have come to realize that students are forced to memorize the mathematical concepts without practical knowledge. Productive learning is rooted on the appropriate methods used by teachers. But there are lots of drawbacks in the teaching mathematics in the observed classrooms. Classroom mathematical discourse plays a central role in shaping mathematical capability and disposition.

Chapter - V

FINDINGS, CONCLUSIONS and IMPLICATION

This chapter deals the findings, conclusions and implication of the study. Conclusion is described from the result of interpretation of data. The chapter closes with implication of research. An implication of the study is given for the area where this study can be applied.

Major Findings

The main problems faced by students in learning mathematics were:

-) Heavy work load in home affect the learning mathematics.
-) Low economic status of parents was the cause which hinders the learning environment.
-) The mathematics teacher did not create friendly environment in mathematics class; teaching should make fruitful by using sufficiently instructional materials.
-) Lack of interaction between the teacher and the student in classroom due to language difference.
-) It was problems for the students to learn mathematics because of the lack of linkage between theoretical and practical knowledge.
-) The problems of learning mathematics because of lack of cooperation and discussion with teachers and friend's.
-) No sufficient time at home for mathematics learning. They had to engage on their main occupation, i.e. farming, labor etc.
-) Parents could not teach their children at home.
-) Language was the major factor for creating the learning difficulties for some students.
-) There is the main problem of irregularity of students. Teacher does not check homework day by day.

-) There is lack of teaching materials. There is weak evaluation system. Due to poor evaluation system; students did not have feedback and suggestion to improve in learning.
-) Psychological barriers such as shyness and fear effects to learning mathematics.

The main problems faced by teachers in teaching mathematics were:

-) Communication problems.
-) Teaching without contextualization.
-) Lack of professional training.
-) Teaching overload.
-) Irrelevant teaching methods.

Conclusions

It is challenging to teach mathematics in multicultural classroom. To have effective teaching learning environment we need appropriate materials. Diverse cultural classroom do have diverse expectation from the teacher so that he/she should be aware of the diversity of classroom. The mathematics teacher should be well-trained which can make the interaction and promote equal participation between all students. Some teachers seemed to focus talented & students of their own community. It is due to their ignorance rather than the intended bias and discrimination. 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 are from culturally diverse community. Classwork checking, homework correction and active participation in mathematics classroom are key points to have a successful learning in a multicultural classroom.

The problems in learning mathematics because lack of cooperation and discussion with teachers and friends. No sufficient time at home for mathematics learning. Students had to

engage on their main occupation, i.e. farming, labor etc. Parents could not teach their children at home. Language was the major factor for creating the learning difficulties for some students.

The appropriate methods and materials, teacher training, constructive teaching – learning, examples from the real life and understanding of other culture are required for effective teaching- learning in a multicultural classroom. Most of the schools don't have sufficient mathematical materials for mathematics teaching and also lack of protection of available materials for future use. The causes of becoming problems are economic crisis of administration to add materials for mathematics teaching, and not available separate place to store materials. There is lack of teaching materials. There is weak evaluation system. Due to poor evaluation system; students did not have feedback and suggestion to improve in learning. We need better evaluation systems.

Communication problems, lack of professional training, teaching overload are the main problems for teachers in multicultural mathematics classroom. To get optimal output and to have effective teaching learning process professional training is most required. To make teaching plan and materials teachers overload should be reduced. Communication problem is the main problem occurred in multicultural classroom.

The causes of becoming problems are not well participatory approach of both students and teachers in mathematics teaching at multicultural classroom, lack of preparation and confidence of teacher about the topics, lack of diagnostic test and oral test. Teacher mostly uses lecture method in mathematic teaching. Due to poor evaluation system, careless of schools' administration and non- effective learning management; both teachers and students faced problems on mathematics teaching-learning.

Implication

Following are implication of this research for effective teaching –learning inside a multicultural classroom.

-) Training program for the teacher; trained teachers are needed to improve the performance of students for diverse culture.
-) To develop the curriculum, by thinking about multicultural classroom.
-) 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 giving 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 student from culturally and linguistically diverse classroom.
-) School administration should provide opportunities to the teachers to enhance their commanding over subject matter pedagogical knowledge.
-) More Counseling should take place between the teachers and students.
-) Strategies like cooperative learning .social constructivism, motivation, reinforcement, the group discussion, are essential.

-) Making a teaching- learning fun and interactive matters.
-) Use of student centered approach.
-) Developing the friendly behavior between teacher and students.
-) Teacher should prepare strategy for the problems faced by students and teacher in teaching - learning mathematics with teaching methods and teaching materials.
-) This study was conducted using small sample thus the finding of the study cloud not be generalize in the broad sense. Thus, it would be more valuable it the study would be done with covering broad areas.

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Appendix – A

CLASSROOM OBSERVATION GUIDELINES

School's Name: Address:.....

Teacher's Name: Class:

Total No. of Students: Date:

The researchers will observe the classroom under the following criteria.

Classroom Management and environment

-) Classroom Structure and Environment
-) Space for Instructional Materials
-) Cleanliness
-) Seat Planning of students

Student's activities in Classroom

-) Following direction of teachers
-) Availability of textbooks, copies and other instructional materials
-) Medium or language of conversation
-) Completion of class work and homework assignment
-) Participation in classroom discussion
-) Conversation and misbehavior with students and teachers
-) Students co-operation
-) Sharing problem in classroom with other students and teachers
-) Regularity of students

Teacher's activities in Classroom

-) Regularity and Punctuality
-) Classroom Entrance
-) Revision of Course
-) Voice Command
-) Politeness
-) Use of Re-enforcement
-) Use of Instructional Materials
-) Encourage to Students
-) Classroom Discussion Method
-) Interaction with Students
-) Level of Motivation
-) Regularity in Homework Checking
-) Class work assigning
-) Homework assigning
-) Providing Extra Class for Weak students
-) Providing Notes to the Students

Appendix – B

Interview Guidelines for Students

School's Name: Address:

School's Name: Class:

The researcher will ask the respondent students to give information about the following topics and

Sub-topics.

Classroom management

-) Is your classroom noisy while running class?
-) Is seat planning well managed?
-) Do you use appropriate instructional materials?
-) Do your friends talk unnecessary things while teachers are teaching?
-) Do you get disturbed by your friends?

Student's activities in classroom

-) Do you follow the direction of teacher in class hour?
-) Do you complete your class work on time?
-) Do you submit your homework regularly?
-) Do you feel difficult to understand English and Nepali language?
-) Do you feel difficult to talk with teachers?
-) Do you hesitate to share problems in classroom?
-) Do you get equal chance in participation of classroom discussion?

Teacher's activities and school administration

-) Does your teacher give assignment regularly?
-) Does your teacher check your assignment regularly?
-) Do you feel that your teacher's behavior towards you is different than others?
-) Does your teacher discriminate you?
-) Does your teacher ask question frequently?
-) Does your teacher motivate you for practicing mathematics problems?
-) Do you feel difficulty in language used by your teacher?

Socio-economic problems

-) Do you get sufficient time for doing your homework?
-) Do your parents help you in solving your mathematical problems?
-) Does your parent provide you sufficient instructional materials?
-) Does your parent provide you extra classes in home?
-) How many members are there on your family?
-) What does your father do?
-) What is the main resource of income in your family?
-) What does your mother do?

Appendix – C

Interview Guidelines for Teachers

School's Name : Address :

School's Name : Class :

The researcher will take an interview with teachers to gather information under the following mentioned topics and sub-topics (specially focusing on multicultural students).

Classroom management

-) Is your mathematics classroom neat and clean?
-) Is seat planning well managed?
-) Do you use appropriate instructional materials while teaching?
-) Is your classroom noisy while running classes?
-) Does your student talk unnecessary things while you are teaching?
-) Does your student disturb you by asking unnecessary questions?

Student's activities in classroom

-) Does your student greet while you enter the classroom?
-) Do the students follow your instructions in the classroom?
-) Do they bring all their textbooks, copies and other related materials regularly?
-) Do they complete their class work and home work regularly on time?
-) Do they feel difficult to understand English language?
-) Do they participate in extracurricular activities?

Teacher's activities and school administration

-) Do you give assignment regularly?
-) Do you check their class work on time?
-) Do feel difficult to make them understand in English language?
-) Do you make them participate in extracurricular activities?
-) Do you use instructional materials while teaching?
-) Do you ask questions frequently?
-) Do you motivate for practicing mathematics problems?
-) Do you describe the problems individually to the students?
-) Does your school administration provide instructional materials to you?
-) Do you feel that their behavior towards you is different?
-) Do you feel difficulty in language used by them?
-) Does your school conduct extra classes for weak students?

Socio-economic problems

-) Do you think that your students get sufficient time for doing their homework?
-) Do you manage instructional materials from the community?
-) Do you think that it will be easy for you to teach if parents provide students extra classes in home?