

**PROMOTING MATHEMATICS LEARNING IN CULTURALLY DIVERSE
CLASSROOM**

**A
THESIS
BY
NETRA MANI NIROULA**

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Letter of Approval

This thesis entitled "**Promoting Mathematics Learning in Culturally Diverse Classroom**" submitted by **Mr. Netra Mani Niroulain** partial fulfillment of the requirements for the Master's Degree in Education has been approved.

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Recommendation for Acceptance

This is to certify that Mr. **Netra Mani Niroula** has completed his M. Ed. thesis entitled “**Promoting Mathematics Learning in Culturally Diverse Classroom**” under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize the final viva-voce.

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Asst. Prof. Krishna Prashad Bhatt

(Supervisor)

Date:

Dedication

This thesis is dedicated to my father **Mr. Chandra Nath Niroula**,
mother **Mrs. Uma Devi Niroula**, and my dearest sister **Mrs. Jhuma Niroula**
Whose love, support, and encouragement have enriched my soul and inspired me to
purpose and completed this research.

Declaration

This dissertation contains no material which has been accepted for the award of another degree in any institution. To the best of my knowledge and belief, this dissertation contains no material previously published by any authors except due acknowledgment has been made.

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Netra Mani Niroula

Abstract

The main concern or area of this study was “Promoting mathematics learning in culturally diverse classroom”. The objectives of the study were to explore the causes of students' difficulties in mathematics learning of culturally diverse classroom and also to identify the teaching approaches used by teacher to promote the students' mathematics learning in culturally diverse classroom. The descriptive ethnography approach was adopted to conduct the study for convenience under the qualitative research method. This study was bounded in only MaijogmaiGaupalika of Illam district and also this study was only delimited on Shree Amarkalyan Secondary School Maijogmai-1 of Illam district. In-depth interview, classroom observation, document reviews were used as tools for data collection. This study was conducted with the sample of four mathematics students, two head teacher and two mathematics teachers. The researcher observed classroom for five days and interviewed with related students, Head teacher, mathematics teacher and parents. Collected information were analyzed and interpreted with the help of conceptual framework and linking with theoretical construction.

The study found that, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, family's socioeconomic status, discrimination in classroom and home-school mismatch were the difficulties in learning mathematics of culturally diverse students at secondary level. There is mutual relation between culture and learning mathematics. addressing individual differences, arranging co-operative learning, providing opportunities and motivating, connecting cultural phenomena with mathematical contents, making representative parents aware and responsible, creating proper environment of family as well as society, suggesting administrative team for manage extra class, are the effective

teaching approaches for the culturally diverse classroom at school. It has also concluded that mathematics teaching and learning ways from the schooling is not good. Existing school mathematics teaching learning practices seem failing to address social and cultural needs of the students.

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List of Abbreviation

ANOVA	-	Analysis of Variance
B. Ed	-	Bachelor of Education
BS	-	BikramSambat
CLD	-	Cultural and Linguistic Diversity
INGO	-	International Non-Governmental Organization
M. Ed	-	Master of Education
NGO	-	Non-Governmental Organization
Ph. D.	-	Doctor of Philosophy
SES	-	Socio Economic Status
SLC	-	School Leaving Certificate
TU	-	Tribhuvan University
ZPD	-	Zone of Proximal Development

Chapter I

INTRODUCTION

This chapter presents the background of the study, statement of the problem, objective of the study, significance of the study, delimitation of the study and definition of related terminology.

Background of the Study

Nepal is a multicultural country with a various ethnic groups and castes. People are not perfect in one common language. So, their children spoke own mothertongue. Pupils enroll into the school from different cultural background with their ethnicity and voices. This type of discrimination directly affects towards mathematics learning. Nepal is multi-cultural country where the multiple language and ethnic groups reside. There are 61 ethnic groups and 125 languages in the country which invites the multi-cultural nature of culture (Upadhaya, 2067, p.305). According to national census 2011, there are 125 castes and 123 languages, varieties in costumes and rituals. Student come school from different socio-cultural background. So, similar diversity exists in school. That makes cultural diversity in school and inside the classrooms. Administrative team and the teacher should be carefully about the needs, interests, choices, voices, economic backgrounds, family environments and understanding level of students. In my view, in order to manage this type of diversity inside the school and among the classrooms, the teacher should follow the principle of equity.

Nepal is a small landlocked country located in the south Asia. The country has a total population 26.6 million that consists of 92 different language groups, 125 caste/ethnic groups and 10 religious' groups (CBS, 2011). The official language is Nepali, which is spoken as a first language by 44.6% of people, followed by Maithili with 11.7%, Bhojpuri with 6% and Tharu with 5.8%. There are ten religious groups

reported in the 2011 census. The majority in Nepalese people, more than 81% are Hindus, followed by 9% Buddhists, 4.4% Muslims and 3% Kirant (CBS, 2011). Nepali society has deep roots with the Hindu caste system, with a hierarchy of different groups of people within the system since ancient times. According to the CBS, 2011, the literacy among Nepalese over six years of age has increased from 54.1% in 2001 to 65.9% in the 2011 census. Male literacy is 75.1% compared to female literacy at 57.4%. It shows that more women are illiterate than men, displaying extreme gender disparity and inequality in education. Culture reflects all norms and values of human. Nepal is a multicultural nation, many people who are living in this country have different religions, languages, belief, norms and values. Due to the different geographical regions and unequally development, they have different economic status. Some of them have high economic status and some of them are under the poverty line. They are most marginalized caste groups in Nepal. A number of students in Nepal in the past have shown that disadvantaged groups, particularly Dalits have comparatively lower access to governmental institution and organization involved in development. Dalits as a whole poorest community in Nepali society. Dalits in Nepal are not only economically marginalized but also discriminated by the high caste and Janajati groups in many areas of social, cultural and political life.

Human being is divided in many respects. They belong to particular place, region, caste, ethnicity, language, culture and different value system. All these things contribute a person to be different from one to another. Nepal as a multicultural, multiethnic and multilingual society has more divisions and these divisions are manifested in different forms. It has diversity in many respects such as geographical, socio-cultural formations as well as deep rooted caste system, kin system

and inhibition of mixed ethnic group along with their own different norms, values, culture and religions. As school reflects the society, Nepalese classroom therefore consists of all these heterogeneity in its construction. In this context without examining the micro social setting of the classroom and understanding its meaning, structure and interaction, no classroom business and any forms of outside intervention would be meaningful, effective and successful (Adhikari, 2007). The social function of the school is that it equips individuals with societal norms, values, behaviors and that norms can be both discriminative and not discriminative. The social injustices of past schooling practices can no longer be tolerated. Mathematics has become a critical filter for employment and full participation in our society. It indicates the vital role of mathematics that filters pupil; which generates negative attitude of the students towards mathematics (Upadhyay & et al. 2067). Different researches show that mathematics is considered as a difficult subject and most of the student fear of it.

Culturally diverse in mathematics classroom. Nepal is multi-religious, multi-caste, multi-lingual, multi-cultural country with geographical diversity and inhabited by various regional groups. Because of diversity in the Nepalese society, there are inequalities in socio-culture, economy, and educational based on the caste (Bista, 2004). In mathematics education, although reform documents highlight “Mathematics for all” (NCTM, 2000; cited in Acharya, 2013) as the principle of equity and excellence, they do not provide a coherent conception of equity or strategies for achieving it. The multicultural education literature, on the other hand, emphasizes issues of cultural and linguistic diversity and equity, but with little consideration of the specific demands of the different academic disciplines. Cultural diversity in mathematics education is a widely used expression to discuss questions around why students from different culture, ethnic, social, economic and

linguistic groups perform differently in their school mathematics. These questions are not new in cultural perspectives to mathematics education development since the late 1980s and in cultural approaches to mathematical cognition. Learning is the process of acquiring new knowledge and new responses. (Hull, 1998; cited in Acharya, 2013) defined learning as a relatively permanent change in behavior potential which occurs as a result of reinforced practice. There are certain steps in learning such as goals, motivation, recreation, obstacle, responses and generalization. In each of steps in learning, culture plays a key role. So, the cultural difference should be regarded as one of the influential factors for children's learning. The children with different family background to the school may face difficulty in involving and interacting in order to assimilate them accordingly to educational setting. Because of the difference in the home and school cultures, the nature of curriculum and textbooks differs to the children's needs and they feel difficulty in learning.

In context of Nepali society, people say that mathematics is the so hard subject, only gifted students can study this subject, the girl's students can't study optional mathematics in school level etc. these are the traditional thinking and this is the example of Nepali culture towards the mathematics. Similarly, people said that mathematics subject is only for teaching occupation, it can't use in others sector. So, this is also the main difficulty in learning mathematics due to the negative thinking of people. By this discussion we can say that gender beliefs towards mathematics, approach towards the mathematical literature, religious and cultural approach to study mathematics and relevance language, learning mathematics and its future etc. are the cultural diversity in mathematics education.

In the Nepalese society, much diverse varieties of classroom are experienced. All students are not from same cultural background. They have different perspectives

towards the learning mathematics. The students who have low economic condition, illiterate family, narrow conception towards mathematics, lack of equity and justice are not ready to study mathematics properly. Low passes rate and overall poor achievement also affect the school education sector. This is always blamed that school has used traditional methods of teaching, poor school environment, monolingual instruction, lack of teaching materials, dominants culture, school has not been addressing justice, equality, freedom, peace, compassion and clarity of all students in learning, teachers failing on to use multiple culturally sensitive techniques to assess complex cognitive and social skills. So, I have been thinking that how cultural diversity affects in learning mathematics? What are the causes of difficulties? Why they do feel difficulties in learning mathematics at school? In which area of mathematics, they feel more difficulty? What is the relation between culture and learning mathematics? How to teach effectively in culturally diverse classroom? What is the relation between everyday life and learning mathematics? These questions are challenging for all who are interested in learning mathematics. Therefore, I am motivated to select this topic for the inquiry. My research will move forward on to explore the causes of students' difficulties in learning mathematics ofculturallydiverse classroom and also to identify the teaching strategies used by teacher to promote the students' mathematics learning in culturally diverse classroom.

Statement of the Problem

In the perspective, the teacher needs to teach the students so that they used mathematics to solve their own community problems. The cultural discontinuity and children's learning would be the state controlled national curriculum and teaching methods, which might be, in terms of the need and cultures of children, inappropriate and irrelevant to them. In favor of this notion, (Ogbu, 1982; as cited in Adhikari, 2006)

has argued that children cannot acquire the intended learning outcomes of curriculum through certain teaching methods provided in a different learning environment, which is culturally different from their home environment.

The cultural differences between home and school can influence children's learning. There are so many castes in society; they have different cultural perspective and individual differences. The students who have been participated in classroom, they have not same language, culture, religion, and beliefs. Due to this diverse, the achievement of students seems different. Generally, teaching language of Nepalese school is in Nepali and English, but those students who have own martial language, it was the problem to know him/her. They cannot understand properly, what is taught in class. Therefore, language is one of the main problems in learning mathematics. All students have not same home environment, their home environment in favor to learn mathematics therefore there arise different question related to mathematics as far as Dalit, disadvantaged, and marginalized students are concerned. Do they feel difficulties in learning mathematics at school? In which area of mathematics, they feel more difficulty? Does their everyday life support to learn mathematics? Is their cultural diversity a hindrance? What factors influence them to learn mathematics? Is the environment at home supportive to learn mathematics? There are numerous such questions, which, I cannot include at once. So, my concern is on difficulties, influencing factor and impact of home and school environment on learning mathematics, relation between culture and mathematics and effective teaching learning activities. So, I am also a mathematics related person it is necessary for me to study about what are the causes of students' difficulties in learning mathematics ofculturally diverse classroom and also how to teach mathematics effectively in

culturally diverse classroom. Therefore, this topic has become a problem for me and I got to connected with this problem.

Objectives of the Study

The research objectives of this study were as follows;

1. To explore the causes of students' difficulties in mathematics learning of culturally diverse classroom.
2. To identify the teaching strategies used by teacher to promote the students' mathematics learning in culturally diverse classroom.

Research Questions

A research question is the fundamental core of a study. The research questions of this study were as follows;

1. What are the causes of students' difficulties in learning mathematics of culturally diverse classroom at secondary level?
2. How should we teach effectively in culturally diverse classroom?
3. What strategies do teachers should adopt to promote the students' mathematics learning in culturally diverse classroom?

Justification of the Study

Teaching mathematics is a difficult and challenging because of its nature, course content, social need, student interest and exploration of new field of knowledge. Mathematics is an essential part of school curriculum, so every student should study. It has been taught for all pupils as a compulsory subject at school level as well as optional subject. If we try to meet the challenges, significant changes in education need to occur. Nepal's education sector suffers from several constraints that affect its efficiency and effectiveness. In school level dropouts and failures are still in large number. But there is no enough study related to socio-cultural aspects of

children that uncover the issues in their schooling and learning. In this context this study can make significant contribution on the school improvement process and building up the model of learning culture in an ineffective school. This study is helpful to get information about the effect of cultural diversity and difficulty in learning mathematics. In this study, it is helpful for the following aspects;

- This study is helpful for find out the causes of students' difficulties in learning mathematics of culturally diverse classroom at secondary level.
- This study provides the knowledge about the relation between culture and learning mathematics and difficulties in learning mathematics.
- Mathematics teachers would benefit from this finding for to selection the effective teaching strategies in learning mathematics
- I hope that these finding would also be beneficial to mathematics teachers, curriculum planners, textbook writer, policy maker and students itself
- This study helps the parents to create learning environment to their children
- This study is helpful to make the inclusive classroom teaching.
- This study helps to know the effect of individual difference in mathematics achievement.

Delimitations of the Study

According to Khanal (2019) delimitation is the process which a researcher determines the scope of his study area and what kind of tools he wants to study based on the available resources & time. This study was delimited as follows;

- This study was delimited in only one government school of Illam district.
- This study was focused only secondary level students of Illam district.
- This study was bounded on Shree Amarkalyan Secondary School Maijogmai-1 of Illam district.

- This research was based on the response of one head teachers, two mathematics teachers, six mathematics students and their parents.
- This study was based on ethnography approach under qualitative analysis.

Definition of Related Terms

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

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

Culturally diverse classroom. A class where the students are participant from various culture and society.

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

Inclusive education. Inclusive education is a process of addressing and responding to diversity of needs of all learners on the classroom, in school, and on the society. Inclusive education creates suitable environment for all learners addressing multicultural differences.

Difficulty in learning mathematics. In this study, difficulty refers to the problems that come up while teaching and learning mathematics in the classroom. And also, difficulty in learning mathematics belong difficulties in acquiring knowledge and skills of mathematics to the normal level expected of those because of cultural diversity.

Chapter II

Review of Related Literatures

The review of related literature is systematic identification and analysis of documents containing information related to research problems (Niure, 2018). Review of related literature is an essential part of the research for the researcher because related literature helps and guides researcher to meet the motto of the study. A brief summary of previous researches and the writing of recognized experts provide evidence that the researcher is familiar with what is already known, and with what is still unknown and untested. So, I have collected some books, journal, articles, researches which are related to cultural diversity and difficulty. By deeply study of these resources, I am going to review the related literature as follows;

Review of Empirical Literature

Adhikari (2006) carried out the study entitled “Cultural discontinuity and learning difficulties in mathematics: A case study of primary Dalit school children”. The researcher was determined the objective to identify the cause of difficulties in learning mathematics of Dalit children and to identify the impact of home environment of the Dalit children in learning mathematics. The researcher was used case study research design under qualitative research approach. The researcher was limited to his study on two public school of Kaski district by using purposive sampling. For the data collection tools, he was selected to participation observation and in-depth interview. He was concluded that caste system in Nepal appeared to be a focal point that has affected the everyday lives of people. Caste system seems to be influencing factor for perception and thinking towards other people. In every field whether in community or in school, they have to be dominated, humiliated and oppressed due to their culture & poor languages. So cultural discontinuity is one of

the main cause of difficulties in learning mathematics. I concluded that, due to the negative home environment of Dalit children, low income of the family, uneducated family environment and excessive household chores are the main factors of difficulty in learning mathematics for the Dalit children.

Kafle (2016) carried out the research entitled “Teaching/Learning Strategies in Mathematics at School Level”. The main objective of this study was to find out the role of headmaster for improving instructional strategies and to identify the teaching strategies of teachers in mathematics classroom. This study was based on descriptive and explanatory research design. For this study the researcher was selected an effective public school of Arghakhanchi district. Also, the researcher was collected data by using direct observation of school, face to face interview with the head-teacher, teacher, parents and students. The researcher found that, the mathematics teacher teaches the mathematics using a lot of the discussion method, lecture method, sometimes using project work and also using the discovery methods in the classroom during teaching/learning mathematics. Also, there were highly qualified and sufficient numbers of teacher. Most of the teacher were trained and some of them were experience but untrained. And also, she found that, immediate rewards after each good action of students were the best methods for motivation in the classroom. I concluded that, problem solving method and lecture method are mostly used in teaching/learning mathematics rather than interaction to each other. Also, students, teachers, environment and teaching methods have assigned equal responsibilities for effective teaching/learning of mathematics.

Shrestha (2016) carried out his study entitled “Cultural Diversity and Difficulty in Learning Mathematics.” The main purpose of the study was to identify the difficulties in learning mathematics of culturally diverse students at school and explore

the relationship between culture and learning mathematics. The research raised a questionnaire for both teachers and students. Selection of the research design was qualitative and ethnography approach. Observations with in-depth interview and documents analysis were the research tools of the study. The researcher concluded that there was a mutual relation between culture and learning mathematics, pupils' weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, socioeconomic status of family, and discrimination in classroom and home-school mismatch were the difficulties in learning mathematics of culturally diverse students at school. The researcher had also found that mathematics teaching and learning ways from the schooling was not good. Existing school mathematics teaching learning practices seem to have been failing to address social and cultural needs of the students.

Acharya (2017) conducted an international journal "Strategies for Making Mathematics Classroom Discourse Student Friendly: An Intercultural perspective." The main objective of the article was to investigate existing mathematics classroom discourse in basic level students and explore the ways for making classroom discourse students' friendly from intercultural perspective. The research design was qualitative with case study approach. The main tools of the study were classroom observation and interview guidelines. The data have been analyzed by connecting theories. From this study, the findings of the study were existing classroom discourse in mathematics classes that focuses on elaborative and recapitulation phases and also concluded that though culturally-based pedagogy, using different strategies in teaching-learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, by implementing co-operative

learning, through sharing with acculturation and enculturation, through multiple representations making classroom discourse students' culture friendly.

Molefe (2004) completed the Ph. D. on "Challenging Students Through Mathematics: A Culturally Relevant Problem Solving". He raised the research questions: What are the students' concepts of mathematics when posed with culturally relevant problems? Using any language of their choice, can students' participation of their thinking helps us understand their learning process? What can we learn about student mathematical understanding when students are provided an opportunity to solve culturally relevant problems using their own thinking? To deal the above research questions, he used participatory action research design and research tool were class observation, participants, journals, and transcripts of audio taped interviews. By this research, he found that, the belief system held by the teachers about mathematics is overflowing into students. Conceptual mathematics began to emerge as soon as we started solving culturally relevant problems. The revelation that the participants are able to use their own strategies to some success. They adjusted these when the need arose and they made reflections. These strategies helped them give their own meaning of the problem. The achievement by the struggling students is possible. Instruction that encourages culturally relevant problem solving, led the students to use their own individual strategies. Teachers must develop an effective strategy of communication. He also concluded that, if given chance they can connect knowledge and practice by constructing previous experiences and previous agreed norm of community, class and culture. They learn through the use of their own language to communicate and feel comfortable in explaining their discoveries.

Adhikari (2007) carried out the study entitled “Learning Culture in Mathematics Classroom in an Effective School (A case study)”. His aim was to explore the mathematics classroom culture and climate in an effective school. He raised the research questions: What types of learning culture is adopted in mathematics classroom effective school? And what is the relation between culture and learning mathematics? He used qualitative research design and the tools were nonparticipant observation, ethnographic interview and school documents. He concluded that indeed classroom is full of heterogeneity constituted and influenced among other things by the socio-cultural complexities. There is certain structure, culture and a value in which classroom is operated. They have their own rituals and traditions. The achievement of the students responds to the cultural capital of the students, the rich have different cultural capital than the poor students. The students from the matched and educated family have the opportunities to learn at home, they are also getting guidance from their parents. But in the school, there were no any symptoms of discrimination between different cultural group students. The learning culture in the classroom is inclusive where every child can share their beliefs, values, norms among all member of such community.

Upreti (2006) has carried out a case study research on “Classroom management from multicultural perspective.” The objective of his study has to find out the knowledge about multicultural perspective and to find out the actual situation of mathematical classroom management from multicultural perspective. This study was limited to the school with students from diverse cultural background in Kavrepalanchok district. The selected respondents were primary level students, head teacher and other teachers. They use different ways like observation from interview, guidance and school documents. This research was interpreted by using qualitative

method. The major findings were teacher beliefs and understanding of multiculturalism directly affected the classroom and there were multiculturalism and its effect on the classroom. The level of understanding of multiculturalism was higher in Brahmins and Chhetri in comparison to Newari.

Wagle (2017) conducted the research study entitled “Classroom discourse in mathematics: A multicultural perspective.” She used questionnaire for teacher and students. Such as how are existing teaching strategies in classroom discourse from multicultural perspectives? And how are existing teaching strategies in classroom discourse as students friendly? She was used qualitative research design with case study approach. In this research, altogether 8 persons were involved according to purposive sampling techniques. Classroom observation form and interview guideline were the main tools of this study. She uses different theories to produce the information and draw conclusion on the study. From the analysis of the data, she has found that theoretically teachers were well known about to preparation of lesson plan but practically teachers were unable to practice in actually classroom teaching. She has also concluded that for making classroom discourse students friendly through: culturally based pedagogy, by using different strategies in teaching-learning mathematics in the classroom, by replication of communities of practice in the classroom, by avoiding rote memorization, by implementing co-operative learning.

Ghimire (2013) carried out a study entitled “Promoting and Demoting factors for professional development of mathematics teachers in Nepal”. His aim was to explore the promoting and demoting factors of professional development for mathematics teachers. He raised the research questions: How the mathematics teachers mean by professional development? What are the areas of their professional development? What efforts have been made for the professional development of

mathematics teachers? What are the encouraging and discouraging forces? And what are the obstacles for the professional development of the teachers? He used mixed method research design to deal above research questions. He used chi-square and inferential statistics method to analysis collected data. He found that professional development as skill for the time management as a tool for developing contents and pedagogical knowledge as a skill in the use of information, technology, process for modernization. In the same way professional development ensures the continuous attachment with academic community, method of survive, method of self-satisfaction, a skill of balancing the household life and social life. He also concluded that the motivation towards student's success, level of experiences, nature of the job, qualification of teachers, opportunities for professional development and career development requirement for the promotion and maintaining the hierarchy on the post, capability to develop the decision making, access to benefit, preparation time, financial factors and attitude of teachers were the influencing factors for the professional development.

Kubat (2018) conducted his study entitle “Identifying the Individual Differences among Students during Learning and Teaching Process by Science Teachers.” The main purpose of the study was to determine what science teachers are doing to bring out the individual differences of students during the learning-teaching process. He raised research questions like; what are the individual differences instudents? What are science teachers doing to determine the individual differences of Strategies to Promote Equity in students? What do science teacher do in their lessons to design a learning-teaching process appropriate to the individual differences of students? What are the suggestions of science teachers to support individual differences of students? He had been chosen qualitative research method

and case is designed according to phenomenology. Semi-structured interviews were the research tools of the study. He concluded that, individual differences are important for determining the learning styles of students; students identify their individual differences with the help of test, homework and activities during the teaching and learning process. He also concluded that, in order to design the learning-teaching process appropriate to the individual differences of the learners, the learners would make active participation in the lesson and the individual differences could be supported by increasing the experiment and school trips.

Acharya (2013) carried out a research entitled “Problem Encountered in Teaching-Learning Mathematics in Multicultural Classroom”. The main objective of this study was to explore the problems faced by students in learning mathematics in multicultural classroom at secondary level and to explore the challenges faced by the teachers in teaching mathematics in multicultural classroom. The researcher was used qualitative research approach and ethnography research design. The researcher was selected a one public school of Kavre district and also, he was selected 3 mathematics teacher, 5 mathematics students & 2 parents by using purposive sampling for the population. The research tools were interview and observation. The researcher found that the school environment was not suitable for the mathematics learning for culturally diverse students. Also, he found that there was a communication problem between teachers & students and also teachers' hegemony may have to creating problems in mathematics teaching/learning activities in the classrooms. I also concluded that, it is need to present mathematics curriculum should be revised. It should be better to include the contextualize problem in our mathematics curriculum. The knowledge of learners is not given priority in our mathematics curriculum and

the lessons are not contextualized. So, we need to change the education system of Nepal.

Research Gap. Overall review of related literature shows, cultural diversity is the major point in learning mathematics. Due to the different culture mathematical learning is affected. Socio-economic factors, difference languages, school environment, home and school culture, different learning strategies, teacher's professional skills and knowledge are the factors which affects in learning mathematics. The cultural background is the main pillar of learning. From the above review of literature, what are the causes of difficulties in learning mathematics of culturally diverse students at school? What is the relation between culture and learning mathematics? And how teach effectively in culturally diverse classroom? It is important to explore about it. But there was no such research to explore such a culturally diversity and difficulty in learning mathematics. There is a gap that the different cultural causes and factors on learning mathematics. So, through this research I am going to identify the causes of difficulties in learning mathematics of culturally diverse students at school and the relationship between culture and learning mathematics. Thus, from the above literature review, it can be noticed that the studies about the cultural diversity and difficulty in learning mathematics have not been done any researcher. I have chosen this topic for generating various causes of difficulty faced by diverse children in learning mathematics. I claim that, the topic is new and oriented in the research process.

Theoretical Framework

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

theory and so on. So, for the analysis and interpretation of data, I will use a Cultural reproduction theory, Cultural discontinuity/difference theory and everyday life theory.

Vygotsky's socio-cultural theory. According to socio-cultural theory, knowledge is the best constructed when learners collaborate together. Student supports one another and encourages new ways to form, construct and reflect on new materials. Social interactions and participations of group members play a key role in developing knowledge. Vygotsky believed that parents, relatives, peers and society all have an important role in forming higher level of functioning. Vygotsky's socio-cultural theory of human learning describes learning as a social process and the origination of human intelligence in society or culture. The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. Vygotsky believed everything is learned on two levels.

First, through interaction with others, and then integrated into the individual's mental structure, every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals. (Vygotsky, 1978) A second aspect of Vygotsky's theory is the idea that the potential for cognitive development is limited to a "zone of proximal development" (ZPD). A teacher or more experienced peer is able to provide the learner with "scaffolding" to support the student's evolving understanding of knowledge domains or development of complex skills. Collaborative learning, discourse, modeling, and scaffolding are strategies for supporting the intellectual knowledge and skills of learners and facilitating intentional learning. Vygotsky's Zone of Proximal

Development “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance.”

Bourdieu’s cultural reproduction theory. In this theory, Bourdieu suggests that the major role of education system of schooling is cultural and social reproduction of the culture of the dominant classes. He found that school holds the cultural capital of controlling class and transmits it unevenly to children. Bourdieu (1977); argues that cultural capital through education can be converted into health and power. Students who are from the middle class and above have advantages because school is adopting their culture. Therefore, the children from upper class take more benefit out of school than lower class counterparts. The skills and knowledge which is transmitted in the classroom, is alien to the lower-class children and hence, they usually fail. In other words, the achievement of the students responds to the cultural capital of the students, the rich have different cultural capital than the poor students. The poor and the working-class children lack favorable situation and appropriate cultural capital. Thus, they fail in examination and never enter higher education. Therefore, social inequalities are reproduced and legitimated. The main reason for under achievement of working-class children are the education systems because it reproduced the culture of dominant class, which is based. This is way the children from the working class and the income poor do not understand more and learn specific skills. On the other hand, the school environment is comfortable for the middle-class parents depend on the teacher to educate their children whereas lower class parents do not supervise and monitor educational progress of their children. It is also a part of culture.

For parental background to engage in the social reproduction process via cultural capital, parental cultural capital needs to be transmitted inter-

generationally. But this requires four conditions: first, a strong association between parental and pupil's cultural capital must exist. Second, this cultural capital must persist over time. Third, parental cultural capital must exert significant effects, after controlling for other background factors, on an offspring's initial occupational achievement. Finally, the effects of parental social class on offspring's occupation must be significantly mediated by offspring's cultural capital. For transmission to translate itself into stratified educational outcomes. We need to know whether the effect of parental cultural capital persists significantly on the offspring's educational outcomes before that offspring enters the labor force (Tzanakis, cited in Peter, 2011).

Cultural discontinuity and difference theory. In the cultural discontinuity theory, Ogbu (2000) deals with the problems in children's learning caused by the differences and discontinuity between the culture at home and school. He says that those children whose home culture is much similar to the culture of school can cope easily with the system that may result in better learning achievement. Similarly, the children with unmatched and dissimilar home cultures with school cultures do not have enough attention in their learning and do not get much recognition of their cultures and they have to work to achieve learning outcomes compared to the children with good matches. Ogbu emphasized learning not only the product of the culture and language differences but the nature of the relation between the culture and language of minority, disadvantaged and dominant groups. The dominant group controls the school system through implementing curriculum and using languages as the only means of instruction.

Ogbu (2001) has emphasized on two types of cultural differences i.e. the primary cultural difference of voluntary minorities and the secondary cultural differences of involuntary minorities. His study suggests, involuntary minorities face

more difficulties in school learning, participation and performance due to big gap between their culture and mainstream culture. For them, it is too difficult to cross cultural boundaries in school compared to the voluntary minorities with the primary differences. He further elaborated that primary cultural differences may create problems in interpersonal and inter-group relations as well as difficulties in academic work for several reasons. Next lack of necessary concepts and skills in their own cultures may obstacle their learning. Finally, differences in teaching style and learning strategies may be important reason that affects their learning.

Ogbu (2001) argues that the secondary cultural discontinuity is evolved after members of two population groups with distinct cultural background have been in touch or they have started to participate in an institution like school which is controlled by another group, the dominant one. The dominant group sets school system in accordance to their own convenience and benefits e.g. their norm, value and aspirations in the curriculum, medium of instruction, and teaching/learning approaches that suit to them. The features of secondary cultural discontinuity are less specific, more diffuse and stylistic that creates difficulties in identifying and comprehending them. There are always dilemmas that the dominant group does not know or does not want to know about the cultures of subordinate group by saying difficult to know because of the multicultural existence of children in school/society. It is just an escaping trend and nature of the dominant group, the higher caste people from including the subordinate group or disadvantage group into the mainstream.

Conceptual Framework

The conceptual framework devised through the literature studies facilitated to attain research objectives, get the answer of the research questions and carry out the

research work as a whole smoothly (Acharya, 2015). My research study was based on the following conceptual framework;

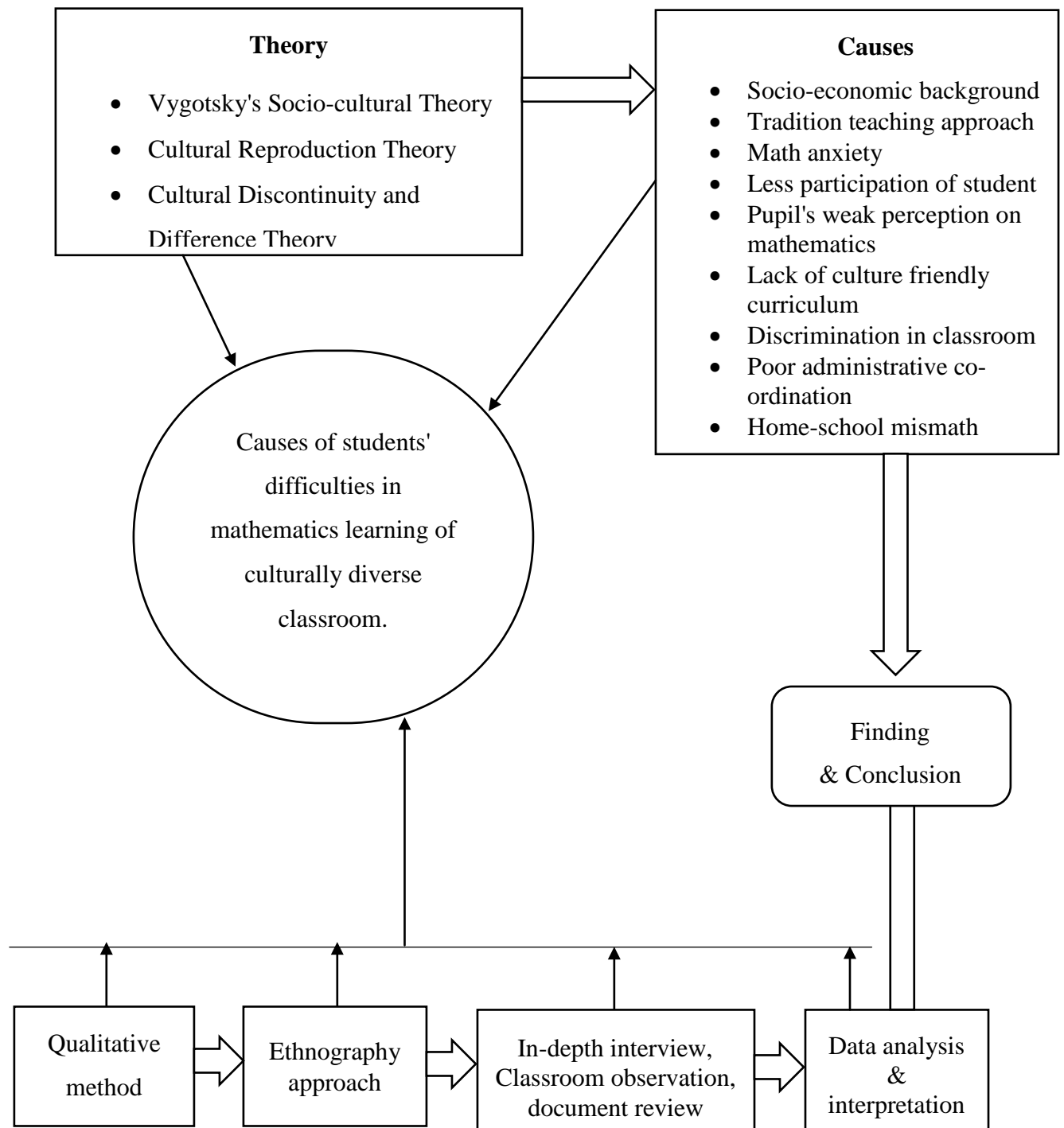


Figure: 2.1. Conceptual Framework

The conceptual framework, which I mentioned in above figure 2.1, is the important part of this study. Causes of students' difficulties in learning mathematics of culturally diversity classroom is major issue of this study. I had applied the qualitative

research design and ethnography approach for carrying out this study. Different theories i.e. cultural discontinuity/difference theory, Vygotsky's socio-cultural theory and cultural reproduction theory was used to interpret the data. There are many socio-economic factors which effects on learning mathematics. Families' background plays the key role in children's learning achievement. This study was centered to explore thecauses students' difficulties in learning mathematics of culturally diverse classroom and ways of addressing diverse classroom practices. The research design of my study was qualitative and ethnography approach. Data collection, analysis and interpretation process was collected by the help of different theories mention in theoretical literature.

Chapter III

METHOD AND PROCEDURES

This chapter begins with its design of the study, area of study, selection of respondent, data collection tools and techniques, data collection procedure and data analysis procedure and ethical consideration.

Research Design

The qualitative research approach helps to discover the individual views for data collection such as group discussions, individual interviews and participation of others (Carol, 2001). This study was based on the qualitative research design with ethnography approach that especially concerns with exploring meaning and the way people understand things. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Sharma, 2011, p.18). Qualitative research emphasizes on inductive analysis of data that proceeds to find theory to explain the data (Acharya, 2017).

Ethnography approach. Ethnography is a specific form of qualitative inquiry and it enables us to research the realities embedded in a socio-cultural setting (Hersh & Peter, 1997). Ethnography is a study through direct observation of users in their natural environment rather than in a lab. The objective of this type of research is to gain insights into how users interact with things in their natural environment. According to Carol (2001) ethnography methods include direct observation, diary studies, photography and artefact analysis such as devices that a person uses throughout the day. Observations can be made anywhere from the user's workplace, their home or while they are out with family and friends. The length of the studies can vary depending on the research that is being conducted. They can range from a couple of hours of observation, to studies that last several months. Ethnography refers to both

the data gathering of anthropology and the development of analysis of specific peoples, settings, or ways of life. It helps to understand the cultural word of the researched from their perspectives. Further, it intends to capture detailed and in-depth description of everyday life practice of people (Hoey, 2014; as cited in Rai, 2015). Ethnography focuses on an entire cultural group. Ethnography is a qualitative design in which the researcher describes and interprets the shared and learned patterns of values, behaviors, beliefs and language of a culture-sharing group (Harris, 1968; cited in Creswell, 2007). As a process, ethnography involves extended observations of the group, most often through participant observation. Ethnographers study the meaning of the behaviors, the language, and the interaction among members of the culture-sharing group (Creswell, 2007). According to Hersh&Piter (1997)

"Ethnography is a form of field research that seeks to learn the culture of a particular setting or environment. It often relies on participant observation through prolonged field work and may include other qualitative and quantitative methods. The researcher becomes embedded in ongoing relationships with research participants for the purpose of observing and recording talk and behavior. In such cases, the researcher is the primary instrument for data collection and analysis. The researcher seeks to place specific events into a broader, more meaningful context, with a focus on the culture and social interaction of the observed people or groups. Ethnography is particularly valuable in understanding the influence of social and cultural norms on the effectiveness of health interventions".

In this study, I had chosen the ethnography approach because of my research objective and research questions. My objectives of this study were to explore the causes of students' difficulties in learning mathematics of culturally diverse classroom and to

identify the teaching approaches/strategies used by teacher to promote the students' mathematics learning in culturally diverse classroom. I thought that only the ethnography approach could fulfill my objectives, so I applied this approach in my study.

Area of the Study

According to the purpose of my study, I chosen the government school from rural area of Illam district where the different cultural background students can be found. The area of study is also a very important task for the study in order to obtain easy access, establishing immediate rapport with informants and gathering data directly related to the research objectives. I had chosen the Shree Amarkalyan Secondary School Maijogmai-1 from Illam district. I convinced reason for selecting the school that it is located in rural area where the culturally diverse students were studying. The students of this school are from diverse community. Most of them are indigenous and some were from Dalit community. By relating to that side, I had chosen the schools from Illam district under rural area.

Selection of Respondents

This is the qualitative inquiry, so the sample size in this study won't fix. According to Anderson, there won't rules for sample size in qualitative inquiry (Anderson 2001, p.123; cited in Adhikari 2007). Therefore, the sample size of this inquiry depends upon the researcher what s/he wants to know, what the purpose of inquiry was, what can be credibility of the study and what can be done with available time and resources.

For participants, I selected Shree Amarkalyan Secondary School Maijogmai-1 from Illam district using purposive sampling technique (based on my convenience). And also, I had selected one head teacher, one mathematics teacher, six mathematics

students and their parents from one school which I have chosen for my research. Based on the school's annual result with high, medium and low score abilities students will select according to their knowledge level. Thus, I used purposive sampling technique for selection of participants.

Tools of Data Collection

Creswell (2007) visualizes data collection as a series of interrelated activities aimed at gathering good information to answer emerging research questions. An important step in the process is to find people or place to study and to gain access to and establish rapport with participants, so that they were provided good data.

In-depth interview. I had developed the different interview schedule form for students' interview, for their parent's interview and for mathematics teacher's interview. In this study all, the required information was not possible to gather through the observation and documents. To go in-depth of the information interview was much more helpful. So, I had carried out open ended interview to clear his/her difficulty regarding learning mathematics. I had taken in-depth interview of head teacher, mathematics teacher, mathematics students using unstructured questionnaires. I used this tool as required to the key students and their mathematics teacher. On the basis of objectives, I developed the interview theme in semi-structured form

Observation note. Observation note was used to identify the students' activities, teachers' activities, interaction between students-students and students-teachers, classroom management and physical environment of the classroom while teaching/learning mathematics. Observation guideline was developed with reference to research objectives. Observation was helped me in collecting detail information about respondents, their everyday practices and capture actual experiences of the

participants. I observed school overall as well as key respondents individually and collectively during their work at school, classroom, playing with peers, interacting with teachers and friends, school behavior, culture, and participation. I became a friend of students. also, I observed teacher's collaboration and discussion in subject matter, participation of students in classroom activities as well as extracurricular activities in terms of gender, caste, religion etc., teachers' behavior towards students in teaching learning process, and teaching learning strategies of teachers and students. Participating in a naturally occurred setting, whether either classroom or school, I get a great opportunity to see, feel, test, hear and interact with the informants very closely through the senses that can produce necessary data.

Documents analysis. Document analysis is an inquiry, which review yield experts, quotations or entire passage from records; memorandum, publication are reports (Best & Kahn, 2004; as cited in Bajaracharya, 2009). Documents are standardized artifacts occurring in forms of notes, case reports, drafts, remarks, diaries, statistics, annual reports, manuals or experts' opinions (Wolff, as stated in Flick, 2006; as cited in Bajaracharya, 2009). In my study, research reports/dissertations various journals and articles were helped me identifying the guideline for observation and components for interview as well as arriving at the research objectives.

Data Collection Procedure

Data collection refers to gathering information from vivid sources through the application of multiple data gathering methods to attain the objectives of the research under consideration (Niure, 2014). For this study, the data and information were collected using tools as observation, in-depth interview and documents analysis and so on in order to collect information the respondents. To collect the primary and secondary data, class observation was used regularly during teaching learning

activities. I had observed, listening, interaction and recorded the essential data from the information on the basis of observation from classroom behavior, interest, and needs in mathematics learning. With the help of semi-structured interview schedule and questionnaire, the in-depth interview was chosen with key students, mathematics teacher and head teacher. Related documents were also reviewed and analyzed on the basis of need. The data from interviews consists of direct questions to people about their experiences, opinions, feelings and knowledge.

Data Analysis Procedure

Data analysis in qualitative research consists of preparing and organizing the data for analysis, then reducing the data into themes through a process of coding and condensing the codes and finally representing the data in figures, tables or a discussion (Creswell, 2007). In this study, the data collected through above mentioned tools from different respondents and sources were processed in different steps. First of all, I organized and edited to the collected information from interview and classroom observation then I generated the difference code according to the response of participants. I gathered those codes according their similarities and I had given the title for them which are known as theme. At last, I analyzed and interpreted those themes by using the theories and conceptual framework which I have developed in literature review.

Quality Standard

After completing the construction of the research tools, it is necessary to maintain quality standard. For quality standard, I had used cross match, triangulation, member checking, prolong stayed in the field. For quality standard, I had followed the following ways:

Credibility. To maintain credibility of my research I tried to spend as much time as the observation needed and engaged with different people with their work. After getting information I wrote notes, I had asked similar types of questions to others people and tried to find real practices from that information.

Transferability. Transferability replaces the concept of external validity. This criterion refers to the applicability of finding is one context (where the research is done) to other contexts or setting (where the interpretations might be transferred). To maintain transferability, I had explained mathematical practices found in different community students briefly.

Dependability. This is the third standard for judging qualitative standards and refers to stability or consistency of the inquiry processes used over time. To maintain it I had presented the logic used for selecting people and events to observe, interview and include in the study. I would try to maintain credibility and transferability to ensure dependability standard.

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

Ethical Consideration

If any kind of research that involves the person, special attention should be paid to the person's rights, dignity, freedom and privacy (Khanal, 2019). Therefore, I have considered some ethical issues in my research such as; I had observed the

classroom only to take the permission with head-teacher or teacher of related college, I had conducted the interview only after giving all the prior information to the participants about the study and getting their approval, I had not collected the data for my personal gain and my personal benefit, and also Respecting the diversity in colleges, I had collected data in a biased manner.

Chapter IV

ANALYSIS AND INTERPRETATION

This chapter deals about the summary part of the scatter data. In my study, classroom observation, in-depth interview and documents review were the tools of data collection. During the study, I have conducted classroom observation while teaching class nine and ten. I closely observed the teacher's and students' activities. My objectives of this study were to explore the causes of students' difficulties in mathematics learning of culturally diverse classroom, and to identify the teaching approaches used by teacher to promote the students' mathematics learning in culturally diverse classroom. In addition, research questions of this study were what are the causes of students' difficulties in learning mathematics of culturally diverse classroom at secondary level? What is the relation between culture and learning mathematics? How should we teach effectively in culturally diverse classroom?

The method used in this study was basically interpretive because this study analyzes and describes the promoting mathematics learning in culturally diverse classroom. The collected information of first was categorized according to the similarity responses of the respondent and then different themes were given in the text of interview of the observation note. These themes were considered as code and the similar code versions of respondents were collected together and explained in their respective. The base of this study was focused on family related factors, school related factors, and society related factors and personal related factors. These factors were respectively described in this chapter. Direct observation was used by classroom behavior was carefully observed and noted of the given result. The obtained data were analyzed and interpreted under the following sections;

Introduction of Sample School

Shree Amarkalyan Secondary School is located at Maijogmai Gaupali-1 Illam district. It was established in 2011 B.C. The school initially was started in 2011 BS from the name of "SwambhuSiddha Primary School" then in presents time it's called the Amarkalyan Secondary Schoon. According to the old teacher of this school, it was established with the great effort of local people and with the collaboration of the government. According to Amarkalyan Secondary School;

Swayambhu Siddha Primary School was established in 2011 BS under the leadership of Saint Balaguru. Today's Amar Kalyan Higher Secondary School is a developed form of that. The first principal of Swayambhu Siddha Primary School, which was established at that time, S. K. (Shyam Kumar) was Rai. Similarly, after the winter of 15 days of January, 2025 BS, Swayambhu Siddha Primary School was upgraded to class 8 and at the same time it was renamed as Shri Amar Kalyan Middle School. From 2025 BS to 2030 BS, the school had a staff of 5 teachers and was transformed into Shree Amar Kalyan Lower Secondary School. In the year 2030, the National Education System Plan 2028 turned this school upside down. Proposed from February 2036. Vs. For the first time in the year 2039 BS, the students were included in the SLC examination by conducting reading classes in class 9 and 10 in the course of increasing the number of classes. For the first time since 2039 BS, he managed to involve his students in the SLC examination. Now in this school, there are 14 students in pre-primary, 118 in primary, 275 in lower secondary, 187 in secondary and 79 in higher secondary.

The school mainly deposited from lower and middle-class family background. There are different castes living around the school. Such as Chhetri, Brahmin, Janajati and

Dalit etc. Their own native language having their own culture. Almost all people of this area depend on agriculture and some are busy on other professional work and some are in foreign country.

Classroom Observation Episode

Episode one



On 20/07/2021, I had observed the mathematics classroom of grade X. The teacher had entered in class with a text book and marker only. He hadn't any kinds of teaching materials to be showed to the students or to be displayed in the class rooms. He wrote the topic 'limit and continuity' on the white board and started to teach. He didn't review previous lesson. He had done two questions on the white board and go to the office. After some time, he come to the class and ask the student whether they understood one of the students said that he couldn't understand completely. Most of the students didn't seemed afraid with the teacher and class in very noisy but them afraid and heisted to ask the questions to the teacher. Students couldn't raise their hand to ask any question to the teacherTeacher even did not go up to the back benchers. He just made the students remind the formulas and ask them to resent at any rate. One of the students ask the teacher if there is an example to be

comprehended the formula easily. He didn't care much her but he told her to see the text book and find herself. The teacher said the students to do remaining exercise as the homework assignment and he said the class was over.

The above response shows that the class room is teacher dominated and students'-oriented class was totally deductive. The co-operative between teacher and student could not be established. Social constructivism theory emphasis on the teacher should help the learner to get to him or her own understanding off the content, teacher should previous guidelines and creates the environment for the learner to arrive at his or her own conclusions. The interaction in mathematics class room teacher and students may be whole class presentation and practicing problem solving investigation or projects etc., any of these approaches couldn't be seen in the observed class room.

Episode two



has taught them to respect the teacher. There were 34 students in the class, among them 19 were girls and 15 were boys. Teacher wrote down a problem on the blackboard and started to solve each step and he asked students whether they understood or not. Some of them answered that they can solve the problem. Mainly the students on the first and second bench were active where most of girls were

passive. Again, the teacher wrote another problem from the textbook on the blackboard and started to solve the problem explaining step by step. Teacher asked questions to student about the related question and also made them doing that class work. He solved those questions in which they were getting problem. He wrote a problem in the board and asked them whether they could do or not. At last he solves the problem in the blackboard. Then he told them to do the exercise at home.

In this episode, it can seem that the teaching method was based on lecture and practice oriented. The teacher behaved commonly to all the students. He did not focus all the students equally. Specially, weak students were passive in mathematics class. Only few some talent student seemed. Due to the lack of sufficient geometric instrument, this situation was created teacher were only three years learning experienced. Because of that they could not understand the psychology of students. It caused that teachers were getting problem in class management and students were talking and their concentration was out of the relative lesson.

Episode third



In third day, classroom observation, the class was clean and enough light. There were some posters hanging on the wall and benches had managed in two columns. The boys' and girls' students were sitting on different column. On this day, math teacher entered the class and what he was going to teach that day was taken from the textbook. The topic was Circle, which was the new chapter. First, he asked for students about circle, some of them had answered themselves. After than he wrote the definition of circle on whiteboard, and explain about it. He had made the figure of circle on board and explained himself. He defined about chord, diameter, radius, central angle, circumstance etc. He used English language for teaching and writing, which seeming difficult for some students. He was using lecture method mostly. The classroom was little a bit noisy and students were talking each other. He did not use any kinds of materials of circle. He was just telling about characteristic of circle orally. After describing about lesson, he said to students for read the book. After that, time finished then he went out.

From the above realities, I found that diverse culture and learning mathematics has mutual relation. Learning mathematics has affected by the different cultural factors; i.e. home environment, school environment, family" socioeconomic status, discrimination in home and school, languages etc. However, culture and learning mathematics has inter-relationship. Mathematics was for a long time regarded as a neutral and culturally free discipline removed from social values (Bishop, 1993; D'Ambrosio, 1990; as cited in Rosa & Oren, 2011). It was always taught in schools as a culturally free subject that involved learning supposedly universally accepted facts, concepts, and contents. This means that western or academic mathematics consists of a body of knowledge of facts, algorithms, axioms and theorems. Classrooms and learning environments cannot be isolated from the communities in which they are

embedded. Classrooms are part of a community with defined cultural practices.

According to Bishop (1993) some of these are mathematical concepts of the school curriculum are presented in a way that may not be related to the students' cultural backgrounds. So, all of above realities and views shows that, culture and learning mathematics has strong connection. Most of the cultural factors has shown as causes of difficulties in learning mathematics. So, it is clear that mathematics creates culture and culture creates mathematics.

Causes of Difficulties in Learning Mathematics of Culturally Diverse Students

First of all, I organized and edited the collected information from interviews and classroom observation then I generated the difference code related to reasons of difficulties faced by the students in learning mathematics according to the responses of the participants. I have adjusted that code based on their similarities and also, I have given the title for them which is known as a theme.

Lack of socio-economic background and parents' responsibility. Parents are the first teachers and home being the first school of every child. Parents' behavior plays vital role in their pupils learning. In these regards, I have asked a question for teacher, "What about the responses of parents towards their children in learning mathematics? Do they consult with you and how?" In these questions, teachers answered that,

"We conduct regular terminal exams as well as unit test and weekly tests then we provide the result with their answer sheets along with feedback about pupil's weakness. In that time, some parents are very responsible towards their children's marks and they consult with us. Those parents who are from strong economic background are responsible about their children's learning; these students are good in their position and their mathematical

level-wise achievement. Some parents become absent in result time of students; their children are comparatively weak in performance in mathematics learning."

According to cultural reproduction theory, cultural capital through education can be converted into health and power. Those students who are from the middle class then school are adopting their culture. So, the children from upper classes take more benefit out of school than lower class counterparts. In this context teacher also argued that,

"Lack of socio-economic background and parents' responsibility makes problems for teacher to address equity because we conduct extra classes for those students who have weak performance in formative evaluation. But in this extra class these weak students are not participants because the poor responsibility of parents, weak socio-economic status and lack of proper family environment which directly affects in students learning."

In these regards, Shrestha (2016) argued that, there is a mutual relation between culture and learning mathematics, pupils' weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, socioeconomic status of family, and discrimination in classroom and home-school mismatch were the difficulties in learning mathematics of culturally diverse students at school (Shrestha, 2016). From the above responses of teachers, it can be claimed that the role of parents, socio-economic status of family creates the problems to manage equity in classroom while teaching mathematics.

Traditional teaching learning activities. The traditional teaching methods are teacher-centered and include the use of lectures and discussions while the problem-solving element is presented by discussed with the instructor, the syllabus, the teaching materials and the student assessments are determined by the tutor and

transmitted to students in various lectures (Cotel & Millis, 1993; as cited in Shrestha 2016). Still now, we can see that, most of the teachers of Nepal are using lecturer method and rote learning while teaching mathematics.

In the class observation, I have seen that, the mathematics teacher mostly used lecture method. He given less chance for students in classroom, teacher doing problem on whiteboard and students are copying on their copy. However, sometimes they told for students to do yourself. But this is not enough for effective classroom teaching. I had asked to the teacher "why you do not give opportunity for students to do problem themselves?" In this matter, teacher said that

"I always wants to give more opportunity for the students to do problem on whiteboard, but by this process I won't finished course in time so it's made the problem for me. However, I am giving chance sometimes"

This shows that, still teachers have traditional belief on teaching learning activities. They feel easy to teach by using lecturer methods, but it is injustice for students. The traditional methods cannot give equity in classroom. In the classroom occupy with diverse students need multicultural classroom teaching. For this, teacher needs to understand the different views of different students who are come from different cultural groups. If possible, teacher needs to teach mathematics by connecting daily life of students.

In this regard, Vygotsky's (1978), as cited in Acharya, (2015) voice that the child's understanding of how knowledge develops requires and understanding of social and historical origins of knowledge and of changes in that knowledge. In this matter, Acharya (2015), also argue that the human knowledge originates in socially meaningful activity and is shaped by language. Banks & Banks (1995); as cited in Acharya, (2072) suggest that, Teaching mathematics requires addressing diversity

because it is needed for the people of different cultures. In the context of Nepalese schools, there is a vast gap between their practice and the theory of culturally responsive teaching in the school. To maintain this gap teachers, need to play important role for maintaining delicate balance between cultural entity and contents so that there is equity, equality as well as excellence in content knowledge. Teachers' teaching strategies have a significant role in promoting learning strategies and also classroom practices play significant role in promoting students' learning strategies (Khanal, 2016)

Less participation of students. Teaching learning activities depend on students' responses towards teaching. Without students' responses teacher cannot take effective strategies for teaching. Students should ask their problems with teacher without any hesitation and feeling of fear. Teacher should provide motivation for students in their practices and feedback for the correction of their mistakes. Meanwhile, I have conducted class observations and, in this concern, I got following responses,

"Back benchers' students are being passive towards teaching. They are only busy in copying the teachers note from whiteboard. Otherwise, they are engaged on gossiping with each another rather than asking own problems with teacher. I also focus on them while observing class. They are not able to do numerical given by teacher as a class work. Teacher has given attention towards these students even they are not responsible with teacher."

In this context, in the interview with students I have asked questions "How do you take mathematics class? Is it boring? Do you ask your confusion with teacher? while teaching?" Student replied that,

"Mathematics is boring subject for me because I never take pass marks in this subject. It is difficult subjects for me; I do not give any time for studying mathematics in home. I just copy note from my friends' note; to attempt homework without any understanding. I feel that if removed Mathematics and Science subjects from school course it will be better for me because my hobby is to become good cricketer from Nepal. I do not raise any question to teacher about my confusion rather I ask with my friends. While I remain in class, I think it will be better for me if teacher do not ask any question. I became nervous with mathematics teacher."

In this regard, (Beilock & Willingham, 2014) argued that; students with a high degree of math anxiety performs worse in math from elementary school through college, relative to their less math anxious counterparts. I have also asked a question for teacher, "How are students participating in your teaching time? How do you behave them?" In these questions, teachers replied that,

"I want to make my teaching strategies is more interactive and democratic. I have given opportunity for students according to their level of understanding. But the problem is here that is, I mainly focus for comparatively weak students those who have weak performance in formative test; but they are not interested to involve in learning. They are also not given proper time for studying mathematics at home and not raised any question for teacher while confused. I cannot be able to treat them properly due to their less interaction while teaching."

From the above responses, it can be concluded that to organize better teaching student need to engage in interaction with teacher while teaching. It helps for teacher to identify students' obstacles. Then, teacher can decide teaching strategy

for comparatively weak students in classroom which foster equity in teaching mathematics.

Pupil's weak perception on mathematics. Pupils have different attitudes towards mathematics. Most of the students found this subject different from other subjects in terms of its nature and difficulty level. Some of them are taking this subject as not too hard, but most of them are taking this subject as to hard subject. I found that, students have different views on mathematics at school. Some views of them are presented as follows; In the interview of students, I had asked a question, "What is your view on mathematics subject?" In this question, student replied that,

"Mathematics is most important subject, but it is difficult than other subject, we can use mathematics in our daily life as counting things, electricity bill, phone bill and buy goods. We use this to solve mathematical problems of our daily life. Geometry is difficult than other parts i.e. arithmetic, algebra, statistics etc."

This shows that students are taking mathematics subject as a hard and important subject. They have only known general use of mathematics. In the same question, another student from class X replied that,

"Mathematics is too hard subject for me. Geometry is very difficult for me, because there are many definitions, rules that I cannot do. We use math in count, to addition, subtraction, multiply and divide, we also use this in pay bill."

From this view of students, it can be said that views of school students about mathematics is weak, they are taking mathematics as difficult subject and they don't know about mathematical scope in other subjects. However, they know use of mathematics in their household work. Mathematics is essential for understanding any

other disciplines like economics, physics, chemistry and so on. Without the knowledge of mathematics, it is very difficult for better managing and solving any kind of daily problems of human being.

In this regard, Goff and Futter (1982 as cited in Acharya, 2015) states knowledge of mathematics is indispensable to our daily life; counting objects, reading and writing numbers are tasks most people perform in their life. A strong background in mathematics is necessary for almost all technical careers in society; competence in mathematics has been identified as a critical skill directly related to educational and occupational choice. Due to lack of sufficient knowledge about mathematics, students cannot do better in mathematics. They are also unknown about connection of their everyday life and mathematics. Thus, they are feeling difficult in learning mathematics.

Mathematics anxiety. Mathematics anxiety has been defined as feeling of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations math anxiety can cause one to forget and lose one's self-confidence (Tobias, 1993; as cited in Curtain-Phillips, 2015). In the data collection period, I observed the class and taken interview from students. While taking interview I asked a question, "why do you feel math difficult?" In this question, student A from class nine answered that,

"I am not good in mathematics, geometry is very difficult for me, I feel bored to proof theorem, so I cannot do this truly. there is no one to help me in my home while I am reading mathematics. I do not ask some question to the teacher because when I ask question, teacher also told me say yourself."

In same question, another student C from class nine replied that,

"All friends are weak in math as well as me, because we do not give more attention in classroom. I had listened that math is very difficult subject in higher level, so I do not want to study math in higher level. Our madam always teaches by using lecture method so, I do not understand clearly."

From this answer, I can say that more students are feel mathematics as difficult subject. Most of the students at school level are weak in mathematics. There are many reasons to be creating this situation. Traditional teaching learning methods is one of the main causes for this. Most of the teachers use lecture method in teaching mathematics, which is not relevant for students. Students learn best when they are active rather than passive learners.

In this regard, according to cultural reproductive theory (1977), argue that the main reason for under achievement of working-class children are the education systems because it reproduced the culture of dominates class, which is based. This is way the children from the working class and the income poor do not understand more and learns specific skills. Ogbu (2000), also argue that the children with unmatched and dissimilar home cultures with school cultures do not have enough attention their learning and do not get much recognition of their cultures and they have to work achieving learning outcomes compared to the children with good matched. And also, Smith (2004) state that, Math anxiety is caused by poor testgrades, inability to complete difficult assignments, negative predispositions of parents, and even that mathematics teacher. Teachers and parents that are afraid of mathematics pass that on to their students and children. It could be very difficult for students to like mathematics when their parents did not do well in mathematics themselves, and thus do not understand it or do not think it is important.

Lack of culture friendly curriculum. Curriculum should address the social, cultural needs and values. Students are interested to learn daily usable contents. If students know the practical fields of content then they are motivated to learning mathematics. In this regard, I asked question for teacher, "Is mathematics curriculum favorable to our socio-cultural needs?" Teacher replied that,

"All contents included in curriculum of mathematics are not favorable according to our socio-culture situations but some contents are very useful in our daily life. All contents mentioned in curriculum might have practical aspects in some specific field but we cannot claim every content to be equally piratical. However, I have given real life examples while teaching these types of contents as much as I can. Though, curriculum addressed all contents that are directly useful in our daily life problems and related with our sociocultural context that can make it easy to learn for all students. That can support to maintain equity approach in teaching."

I have asked questions for students, "what types of content should be included in mathematics subjects to make it more cultural friendly?" Student replied that,

"We don't know the application field of all mentioned contents except arithmetic mainly. All mathematics content should be contextual with our society. International standard content is not necessity to enroll in our syllabus."

In this regard, Shrestha (2016) claimed that mathematics teaching and learning ways from the schooling was not good. Existing school mathematics teaching learning practices seem failing to address social and cultural needs of the students. From these responses, it can be concluded that curriculum should be cultural friendly which can address every norm, values and needs of society.

Family's socioeconomic status. All people have not same socioeconomic status in society. Some people have high socioeconomic status and some have low socioeconomic status. In context of Nepalese society, there is diverse socioeconomic status (Khanal, 2015). In my research work, I visited mathematics classroom and I took interview from some students. I was asked them about their family's economic status, in this matter Student C from class X said that

"I am studying in this school from nursery class. Our economic status is no good, so I am studying in government school. My result of mathematics is medium because of parents' economic situation I cannot get chance to read tuition."

This reality shows that, due to the low family's socioeconomic status students cannot get more chance to read in private school where students can get good learning environment. They are unable to take tuition class and others curricular activities. In the same matter another student said that,

"My family's socioeconomic status is weak; my father is ill and he does small fancy shop. My mothers have job in garment. She has low income from her occupation, which is not enough for household work and father's treatment. Due to the low economic situation I cannot get chance to read tuition, study of school is not enough for me, mathematics is too hard for me, I cannot solve any mathematical problem myself."

This shows that, students whose family's socioeconomic status have not good are suffering in their schooling. Due to the low economic condition they could not get chance to study in good environment; they have lack of time in home for their study, they have a responsibility to care their parents, so they have poor achievement in mathematics.

In this regard, Bourdieu (1977) argue that, the achievement of the students responds to the cultural capital of the students, the rich have different cultural capital than poor students. The poor and the working-class children lack favorable situation and appropriate cultural capital. Hartas (2011) concluded that the effect of socio-economic disadvantage on children's development have been explained through parent's decisions about how to allocate arrange of resources, for example money, time and energy. Students from higher socioeconomic status, experienced greater parent involvement in their education, which enabled these students to receive the necessary skills, knowledge, behavior and values that were needed by their children for academic success. Children whose parents were better educated made more money, had higher-status jobs, and lived in two-parent families tended to attain higher levels of education than do other minorities (Ford, 2013).

Discrimination in classroom. The classroom discrimination refers that, discrimination between boys and girls, discrimination between talented and weak, discrimination in personality, discrimination in their achievement etc. (Shrestha, 2016). I am also felt that there is discrimination in Nepalese school, when I was observing mathematics classroom. On the classroom observation time, I have seen that, students who are weak in mathematics are seating in last bench, and talking with each other. They had not given attention towards whiteboard, while teacher is doing problem in whiteboard. After finished the class, I asked to the question for student, "why you were not giving attention on mathematics classroom?" "Do you have any problem in mathematics classroom?" In this question student A answered that,

"I am weak in mathematics; I don't understand anything. Madam always gives chance for first and second students, she always scolds us. She just told us to do homework daily but she never checks our homework."

From this answer, we can say that there is a discrimination in classroom. It shows that teachers ignoring weak students in classroom and they give more attention to talented students. Weak students are dominated by teachers and talented students as well.

Therefore, their achievement in mathematics is decreasing. In the same matter another student B from class X said that,

“I am medium in mathematics; I wants to make good in mathematics but cannot doing. Sometimes madam gives me chance to do problem in whiteboard but boys makes noise in classroom and they also told that I cannot do problem well. So, I feel uneasy in classroom. The boys always do debate with us in small reason, they always want to be upper than girls”.

It shows that, there is an inequality between boys' and girls' students in classroom.

The boys always dominate girls in classroom, and they are not ready to give position for girls. They always want to be upper than girls in every area. This is the effects of traditional culture where girls were always in second position. In the classroom observation, I have also seen that mostly teachers gave a chance for boys.

In this regards, Richman & Leary, (2011; as cited in Carter, 2013) argue that, the reactions that a teacher or peer might have can affect the student's perception and feelings towards themselves, their perception of others, and the quality of interpersonal relationships. Previous research has shown how fundamental attribution errors, and cognitive errors in general are due to stereotyping and prejudices, which can cause discrimination that can negatively influence the classroom environment, the students' academic performance, the students' academic achievement and the students' self-concept (Frontline, 1985; Schneider et al. 2012; as cited in Carter, 2013). So, classroom discrimination is the big cause of difficulty in learning mathematics.

Poor administrative co-ordination.Administrative teams care all

about activities around the school. As per the equity principle, it can manage extra class for socio-culturally disadvantaged students. In this regard, I have asked a question for teacher, "how does administrative teams help to your teaching? Is an administrative team responsible for all weak students?" In these questions, teachers replied that,

" According to nature of course of mathematics it takes more time. As I am mathematics teacher, for teaching mathematics from the perspectives of equity, it is not sufficient time according to administrative management.

Administrative should conduct extra class for teaching mathematics in every month which can be favorable for all students and can be addressed equity in mathematics learning. But the problem here is administrative teams no more create any opportunities for hard worker teachers."

In this regards, Adam's Equity Theory of educational implications which (Mosrikra, 2010) mentioned in his seminar paper verified with above responses of teacher that is the way people base their experience with satisfaction for their job is to make comparisons with themselves to the people (teachers) they work with. If an employee (teacher) notices that another person (teacher) is getting more recognition and rewards for his/her contributions, even when both have done the same amount and quality of work, it would persuade the employee (teacher) to be dissatisfied. From the above responses, administrative team should be responsible towards teacher's problems. Administrative team should coordinate with all staff for addressing the students' difficulties and problems.

Home school mismatch.For culturally diverse students, considerable inquiry

has focused on whether there are significant mismatches between their home and

school environments that may also influence achievement. These mismatches are often attributed to a lack of social or cultural capital- the various linguistic and cultural competencies that schools require for educational success. In the data collection period, I had asked a question for key students that "does yours's home environment affects you in school?" In this matter student C from class IX replied that;

"I am come from Solukhumbhu district, all members of my family are speak Maithili language. I have also habit in speak Maithili but in school all friends and teachers speak Nepali. So, it is difficult to understand for me because I have been confused in sometime. I am also weak in English, our mathematics teacher preferred English medium book, so I am feeling difficult in mathematics."

From this view, I felt that there is language problem between home and school for some students. In the same question another student B answered that;

"I have no more time to read in home, I read two hours in home. I have to help my parents in household work. I feel mathematics to hard because there are no one for help me on mathematics in home. Teachers never want to know my problem about home and my interest on mathematics."

This shows that there is different cultural background between home and school. The school is the community of culturally diverse students. Students are come from different cultural background, who have different languages, different socioeconomic status, different norms and values. But the school have following culture of dominant groups, but the minority groups students are suffering by this culture. Some culturally diverse students have their own mother tongue, they speak their own language in their home and society but in school they have to speak common language Nepali, so they are feeling difficult in learning in school.

In this regard, according to cultural reproductive theory Bourdieu (1977) suggests that the major role of education system of schooling is cultural and social reproduction of the dominant classes. He found that school holds the cultural capital of controlling class and transmits it unevenly to children. Students who are come from the middle class and above have advantages because school is adopting their culture. Therefore, the children from upper class take more benefit out of school than lower class counterparts. The skills and knowledge which is transmitted in the classroom is align to the lower-class children and hence, they usually fail.

Strategies for Promote the Students' Mathematics Learning in CulturallyDiverse Classroom

Culturally responsive teaching has been defined as an approach to teachingthat uses student's cultural knowledge as a conduit to facilitate the teaching learningprocess (Ladson-Billings, 1994; as cited in Ukpokodu, 2011). According to Ukpokodu (2011) recognizes the role and importanceof culture and learning as a socio-cultural process. Consequently, the organization hasdeveloped standards that include teacher's understanding of how students' cultural,linguistic, ethnic, racial, gender and socioeconomic background influencethem learning of mathematics and particularly, the role of mathematics in society andculture, and the contribution of various cultures to the advancement of mathematics.In this research, my third research question was "how teach effectively inculturally diverse classroom?" From the collected data the revealed themes are asfollows;

To motivation &providing opportunities.There are so many superstitions insociety towards mathematics subjects. For example, mathematics can only be studiedby talented persons, elites and male dominated subject etc. Motivation directs controlsand clarifies the human behavior. Some students seem naturally enthusiastic

about learning, but many need or expect their teachers to inspire, challenge, and stimulate them (Acharya, 2013). However, if family, society as well as school create proper environment by providing lots of opportunities then students can take better position in the field of mathematics. Motivations provide internal power to do something for learners. In this regard, I have observed class while looking at strategy of teacher in class X. In this observation it can be seen that;

Teacher struggled to manage classroom effectively by caring students' behavior and he also give attention towards back benchers too. Before starting to teach lesson, he has asked all students by using apple techniques; where we can use menstruation in our daily life? Then, teacher started lesson by saying; "our today's lesson is very easy but important and useful in daily life". Teacher was focused on student's attention towards lesson and he also motivate and helps for students to say something which can provide opportunity for students to express internal efficiency of every pupils. He also informs about practical field of contents. Thus, students were motivated to acquire this content knowledge.

Yetkin (2006) claimed that students were given opportunities to experience success by engaging with the tasks and activities through multiple representations during collaborative, co-operative as well as individual learning activities. In this regards, Teachers' response was,

All students have different capacity, their interests are also different. If teacher could be able to show proper guidelines and provide opportunities, then students will become motivated to do something. Students themselves are able to solve own problems if they took root of knowledge. Thus, to maintain equity,

I properly provide more opportunities and motivation rather than providing readymade prepared solution.

In the same case, educators suggested that motivation and encouragement help students for learning new aspects. Teacher always should respect to all students' views regarding in related contents which helps for students to produce individual experiences and obstacles. In this context, Herman (2007) argued that teachers need to use all forms of representation equally and not show bias towards a certain form and students will pick up on this preference and tend to favor the form chosen by the teacher. From the above responses, it can be concluded that each and every student can learn mathematics if they get opportunities, motivation and proper environment.

Arranging extra class. All students cannot grab all content equally.

Behind this, there are many reasons such as students' interests, choices and needs. During the teaching, teacher should accomplish prescribed curriculum standard. In this regard, in the time of interview, I have raised question for teacher, "how do you address all students while students are not able to achieve goals from the single period of class?" In this question teacher replied that,

Single period is not sufficient to complete full course of mathematics by addressing individual differences of students. Meanwhile, we need to conduct extra class for especially English, Mathematics and Science. In the time of class evaluation, all students cannot give proper answer. For that type of students, we have suggested to attain extra class in these subjects for their deeper and better learning. In extra class, I teach these contents which are taken as difficult by students.

Socio- cultural difference is the main reason to create classroom diversity. Diversity creates problems for teacher to organize proper teaching. To address individual differences of students we need to manage more time except specified time. That is why extra class becomes a key solution for taking students' difficulties which help to promote equity. From the above responses, extra class makes effective learning for those students who are deprived from single period of school standard class. If students get lots of chance and opportunities, then it helps to maintain equity.

Integrate culturally relevant content. Integrating culturally relevant content into mathematics teaching is very challenging for teachers (Shrestha, 2016).

Ukpokodu, (2011) explains integration of multicultural content to mean the use of examples, metaphors, and perspectives from different cultural frames when examining concepts, theories, paradigms, etc. Doing culturally responsive teaching involves integrating culturally relevant content into the mathematics curriculum. The research identified specific ways to integrate multicultural or culturally relevant content. In this perspective Head teacher shared his views as;

"My long experience as a teacher that teacher need to be familiar with students. We need to be like a friend with students in teaching learning activities, and we have to share our cultural perspective, also we need to know students' cultural and social background. When we teach by knowing students' cultural background than students can do their problem easily. If we teach by collecting different content relevant to students' culture and social values than the teaching learning activities will be effective. By collecting and connecting with culturally relevant content and issues we got success."

This view provides that, teacher is not only the teacher s/he is also the friends and family of students. So, teachers need to teach by connecting students' family

background, linguistic background, social activities, job opportunities of parents, leadership positions, sports and businesses in their community.

Acharya (2015) argue that teaching learning mathematics is to be linked with the culture of students, associating it with the real-life situation, mitigating the existing dilemma of making culture unfriendly curriculum and promoting multiculturalism as well as culture friendly assessment is to be the other important aspects to make mathematics education culturally relevant. Excellence in mathematics education requires equity- high expectations and strong support for all students. Achieving this goal requires raising expectations for students' learning, developing, effective methods of supporting the learning of mathematics by all students, and providing students and teachers with the resources, they need. All students, regardless of their personal characteristics, backgrounds or physical challenges, must have opportunities to study and support to learn mathematics. While teaching mathematics, there are students from varieties of cultural groups. Therefore, while giving the examples, they must link with their culture. In this way it is easy to learn mathematics, there are also opportunities to integrate the mathematics and science curriculum with ethnic and cultural contents.

To use co-operative learning strategy. Students can grab knowledge, skill and attitude from their choice by engaging mates as well as subjects' teacher. It is difficult to precisely define cooperative learning because of the large variety of learning settings that are regarded as facilitating cooperative learning and the differences among them (Davidson, 1990). Diversity cannot be interpreted by class teacher only by relying on books. Much information about different cultural and ethnic heritages cannot be attended through reading books (Kranoff, 2016). Teacher should create this type of democratic environment to all students. In this regard, I had

taken interview with mathematics teacher about "why co-operative learning method is necessary in teaching/learning mathematics classroom?" In this question the teacher replied that;

In the classroom we can find much diversity in teaching learning process. Some students are gain contents logically and some are from rote memorization. I always try to teach and opine that mathematics can be learned without memorization. It is a logical subject that is why we can learn mathematical content process by process. So, I suggested that they should share different ideas with their friends that make them strong in learning for long term. I consider another unique strategy that is the mobilization of fast learning students in every bench and they mentor for slow learner and I monitor them at the same time.

Above responses of teacher verified with Vygotsky's theory that is social interactions and participations of group members play a key role in developing knowledge. So, the teacher should create different group of students in classroom for better learning. In this regard's educators argued that,

Teacher should provide opportunity for all students in classroom according to their understanding level. To make classroom attractive teachers should address students' daily life problems from their society and culture. So, students can take content easily as their understanding level without any rote memorization.

In the same concern, (Wagle, 2017) also claimed that in same concern as mentioned above; for making classroom discourse students friendly through: culturally based pedagogy, by using different strategies in teaching-learning mathematics in the

classroom, by replication of communities of practice in the classroom, by avoiding rote memorization, by implementing co-operative learning.

Addressing individual difference. Students are not able to grab all content equally. Each student has queries regarding contents and the time teacher should take response from students. The task of teacher is that, he/she should address students' problems individually. Teachers should be democratic towards students' queries by taking extra-curricular activities. The learners would make active participation in the lesson and the individual differences could be supported by increasing the experiment and school trips (Kubat, 2018). Teacher's teaching becomes successful and effective only when his/her students feel confident of the contents they are taught. In this regard I have conducted interview with students and teachers (see appendix C). Student's response was;

Our teacher gives a lot of time to teach all students in class. But sometimes he provides time for us as individually according to nature of course.

Teacher suggests to be asking any queries while we face problems and then we ask our problems with teacher.

It is an important for teachers to know variables such as physical characteristics, intelligence, perception, gender, ability, learning styles, which are individual differences of the learners. An effective and productive learning-teaching process can be planned by considering these individual differences of the students. Individual differences are important for determining the learning styles of students (Kubat, 2018).

From the above view it can be say that, students identify their individual differences with the help of test, homework and activities during the teaching and learning process and in order to design the learning-teaching process appropriate to

the individual differences of the learners, the learners would make active participation in the lesson and the individual differences could be supported by increasing the experiment and school trips (Kubat, 2018).

Improve school's policies for mathematics learning. School's policies play great role in the learning process. A critical study of all aspects such as administration, commodity, relations, students' performance, staff's relation etc. and development of operational policies can reduce all the problems that can be observed at school. The following are some of the representative responses of head teacher, math teacher, parents and students in respective question for school's policies for learning mathematics in the day to come. I had asked the question (see appendix C & D) and noted them in their respected voice of teacher as follow;

"I have provided a tuition class for weak students. And also, the school has provided extra class in the morning at minimum cost".

Especially, the school provided the extra class to support for learning mathematics. So, the students are getting happy to pass the SEE exam. For this the parents are sending their children in time at school and supporting by financially. The above views indicated that a lot of improvements will be done for this year and the processes of improvements are still continuing. The result as well as learning of mathematics cannot be no more analyzed due to the beginning of the implementation, but the visions of school are clearly mentioned by head teacher, teacher and parents.

At last from above overall mentioned study, I concluded that when communicating mathematically, students enhance their understanding of mathematics, establish shared understanding of mathematics, become more active learners, learn in a comfortable environment, and assist the teacher in gaining insight into their thinking. Teaching is most effective when the teacher and learner have a healthy relationship.

Exchange of knowledge one another is the basis of cooperative learning in mathematics. Cooperative learning strategies is the effective culturally responsive pedagogy in mathematics.

ChapterV

Finding, Conclusion and Implication

This chapter includes that a summary of the whole study. It also includes findings and conclusions derived from the analysis and interpretation of the previous chapter and finally recommends how these findings can be used in the academic field. This chapter concerns in the following sections;

Findings

This study entitled “Promoting mathematics learning in culturally diversity classroom” is the emerging field in mathematics education in Nepal. The main objectives of this study were to explore the causes of students' difficulties in mathematics learning of culturally diverse classroom, and to identify the teaching approaches/strategies used by teacher to promote the students' mathematics learning in culturally diverse classroom. The design of this study was qualitative and ethnography approach. Observation, in-depth interview, and documents analysis were used in collection data. The respondents of the study were four mathematics students from grade nine and ten, two mathematics teachers, and head teacher. The following were the major findings of this study;

- This study found that, lack of socio-economic background makes less responsibility of parents towards their pupils' study is the cause of students' difficulties in mathematics learning of culturally diverse classroom.
- This study found that, different cultural background brings variation in the understanding level of students is the cause of students' difficulties in mathematics learning of culturally diverse classroom.
- Cultural diversity, pupil's weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning

activities, family's socioeconomic status, discrimination in classroom, and mismatch culture of home and school are the main causes of students' difficulties in learning mathematics of culturally diverse classroom.

- This study found that, curriculum is failure of to address diversity of all society and culture that create problem to in select the medium of instruction according to student's language, ethnic and culture.
- It is found that there was mutual relation between culture and learning mathematics. Classroom and learning environments cannot be isolated from the communities in which they are embedded is the cause of students' difficulties in mathematics learning of culturally diverse classroom.
- Student's low achievement in mathematics from basic level as per desired objectives as mentioned in level-wise curriculum is the cause of students' difficulties in mathematics learning of culturally diverse classroom.
- This study found that, teachers connect cultural phenomena with mathematical contents for engaging students from all socio-culturally background for promote the students' mathematics learning in culturally diverse classroom.
- This study found that, to enrich students' performance in mathematics learning, teachers suggested administrative team for managing extra class for promote the students' mathematics learning in culturally diverse classroom.
- This study found that, the main effective teaching approaches in culturally diverse classroom are integrate culturally relevant content and social issues, utilize culturally responsive instructional strategies, and use cooperative learning in teaching mathematics.

Conclusion

In this study, on during the classroom observation time I had seen that teachers were facing many problems while managing mathematics classroom. For example, teachers are facing problem in selection of appropriate medium of instruction according to student's language, ethnic and culture; different cultural background causes variation in understanding level of students that create problems for teacher to address this diversity. Student's low achievement from basic level and student's weak performance according to desired objectives as mentioned in level wise curriculum also affects to manage equity. In that time, teacher needs to spend more time to treat low performer students which creates another problem for teacher to complete full course on time according to specification table. Parents are seemed to have negligence with their pupil's study and they are not helpful for teachers and school to arrange extra classes and careless about creating appropriate learning environment for students.

There are different causes of difficulty in learning mathematics of culturally diverse students. In this study, I have found that pupil's weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, family's socioeconomic status, discrimination in classroom, and home-school mismatch are causes of difficulty in learning mathematics of culturally diverse students at school. Due to lack of practical knowledge of school mathematics, students do not find the connection between their real life and the mathematical knowledge they have learnt. So, they do not see the importance of mathematics in their future and do not study mathematics in higher level. Culture and learning mathematics have mutual relation. Culture of home and school directly affect in learning mathematics. Most of the schools are following

culture of dominant group in society. So, it difficult to adjust for the minority groups students. Achievement in mathematics of children has affected by family's socioeconomic status. I have also concluded that mathematics teaching and learning ways from the schooling is not good. Existing school mathematics teaching learning practices seem failing to address social and cultural needs of the students. There is lack of use of effective teaching learning activities in mathematics classroom. School mathematics is totally based on rote learning and lecture methods. Teaching learning process fails to connect the link between mathematical theoretical knowledge and the students' real life.

Implications of the Study

From the above findings and conclusions, the researcher would like to suggest some implication for the improvement of mathematics learning of the mathematics.

- It is useful for those teachers who are a beginner in teaching career they may take benefit from this research.
- It helps to identify the students' difficulties in learning mathematics of culturally diverse classroom.
- This study helps to mathematics teachers for effective teaching.
- This study helps to minimize failure rate in mathematics.
- It is helpful the curriculum designers to design the curriculum according to the need, level and ability of learner.
- It is helpful for mathematics teachers, students, researchers, curriculum planners, textbook writers, educationists, and students themselves.
- It is helpful for every teacher to understand cultural diversity in classroom and to apply culturally relevant teaching learning activities.

- The teacher should be culturally responsive to accommodate students from culturally and linguistically diverse classroom.
- It helps to teach by using culturally relevant approaches.

Recommendations and Suggestion for the Further Study

In the context of Nepal, many students fail in mathematics and the trend is still in continue due to this, there were the less participation in mathematics. They include pedagogical change, tutorial support, development and distribution of model female's rosters, interaction between teachers, parents and students, gender sensitization, incentive, lab and library support, collegial monitoring and counseling and project work to accommodate practical experiences of the students. Besides, the study has developed an action plan to address the mathematical specific issues, identified action strategies and pointed out the responsible agency to implement intervention indicatives. These intervention initiatives include action as well as programs to address socio-culturally oriented gender biased mindset, school-based encouragement scheme for mathematics students. Thus, after analyzing the conclusions and implications of the study has made the following recommendations or suggestions for the further study to variable study's findings:

- This study was done only in Illam district. For generalization of the result of the study, similar study should be done in a wide scope and large sample.
- This study was limited to only for secondary level. A similar study can be done other undergraduate level.
- A similar study can be done as a survey type.

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Appendix-A

Classroom Observation

Name of School:

Name of Subject Teacher:

Subject:

- Resource available in the school for classroom purpose.
- Interaction between students-students, teacher-students in classroom.
- Teacher collaboration and discussion in subject matter.
- Participation of students in classroom activities as well as in extracurricular activities in terms of gender, caste, religion etc.
- Learning environment in home especially of key respondents.
- Teachers behave towards students in teaching learning process.

Appendix-B

Interview Format for Head Teacher

Name.....

Date:

Qualification:

Gender:

Experience as a principal:

Religion:

Interview Guidelines

- Ways of planning and decision making.
- Educational activities of teachers and students.
- Professional development of mathematics teacher.
- Learning opportunity for cultural deprived children.
- Perspectives on cultural diversity.
- Evaluation of student's learning difficulties and progress.
- Instructional leadership.
- Relation with students.
- Policy of school.

Appendix- C

Interview Format for Teacher

Name:

Gender:

Qualification:

Caste:

Training:

Experience:

Religion:

Interview Guidelines

- Relation with students.
- Impact of culture in learning mathematics.
- Learning opportunities.
- Languages problem in instruction process.
- Special treatment provided to culturally deprived students.
- About individual differences.
- Problem in teaching mathematics.
- Motivation to learn mathematics of different caste, cultural and religious students.
- Role of teacher in increasing the good learning culture in classroom.
- Students learning habit.
- Reward and punishment.
- Relation between culture and learning mathematics.
- Effective teaching methods.

Appendix-D

Interview Format for Key Students

Name:

Permanent address:

Temporary address:

Age:

Roll No:

- Family background (members, education, social values, economic status, occupation, participation in social works).
- Reading opportunity at home.
- Learning opportunity at school.
- Views about mathematics.
- Views about school environment and teacher's behaviors.
- Parent support in learning.
- Mathematics learning style.
- Teaching methods.
- Views about peer group.
- Homework and classwork.
- Difficulties in learning mathematics.
- Cultural perspective.
- Participation in extracurricular activities.

Appendix - V

Model Question Set

Name of Campus: Level:

Name of Teacher/Student: Gender:

The interview with mathematics teacher, mathematics students and students' parents were conducted on the basis of following structure & semi-structure questions format.

1. What about the responses of parents towards their children in learning mathematics? Do they consult with you and how?"
2. Why you do not give opportunity for students to do problem themselves?
3. How do you take mathematics class? Is it boring? Do you ask your confusion with teacher? while teaching?"
4. How are students participating in your teaching time? How do you behave them?
5. What is your view on mathematics subject?"
6. Is mathematics curriculum favorable to our socio-cultural needs?"
7. What types of content should be included in mathematics subjects to make it more cultural friendly?"
8. Why you were not giving attention on mathematics classroom?" Do you have any problem in mathematics classroom?"
9. How does administrative teams help to your teaching? Is an administrative team responsible for all weak students?"
10. Does yours's home environment affects you in school?
11. How teach effectively in culturally diverse classroom?"

12. How do you address all students while students are not able to achieve goals from the single period of class?"
13. Why co-operative learning method is necessary in teaching/learning mathematics classroom?"