

**PROBLEMS IN TEACHING AND LEARNING MATHEMATICS IN
MULTICULTURAL CLASSROOM**

**A
THESIS
BY**

MANJU ARYAL

**A THESIS PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE DEGREE OF MASTER OF EDUCATION**

SUBMITTED

TO

DEPARTMENT OF MATHEMATICS EDUCATION

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS, KIRTIPUR

KATHMANDU, NEPAL

2022



त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date:

Letter of Certificate

This is to certify that **Mrs. Manju Aryal** a student of academic year **2072/73** with campus Roll No. **261**, exam Roll No. **7228323**. Thesis Number **1467** and T.U. Registration No. **9-2-246-105-2011** has completed this thesis under supervision and guidance of Prof. Dr. Bed Raj Archarya during the period prescribed by the rules and regulation of Tribhuvan University Kirtipur, Kathmandu, Nepal. The thesis entitled on "**Problems in Teaching and Learning Mathematics in Multicultural Classroom**" has been prepared based on the result of her investigation conducted during the prescribed period under the department of mathematics Education Central Department of Education University Campus, Kirtipur, Kathmandu, Nepal. I recommend and forward that her thesis be submitted for the evaluation as the Partial Requirement to award the degree of Master of education.

Date: 24th June, 2022

.....

Prof. Dr. Bed Raj Acharya

(Head)



त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date:

Letter of Approval

This thesis entitled "**Problems in Teaching and Learning Mathematics in Multicultural Classroom**" submitted by **Mrs. Manju Aryal** to partial fulfillment of the requirement for the degree of master of Education has been approved.

Viva-voice committee

Signature

Prof. Dr. Bed Raj Acharya
(Chairman / Supervisor)

.....

Dr. Rajendra Kunwar
(External Examiner)

.....

Mr. Loknath Bhattarai
(Member)

.....

Date: 3rd July, 2022



त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date:

Recommendation for Acceptance

This is to certify that **Mrs. Manju Aryal** has completed her thesis entitled
"Problems in Teaching and Learning Mathematics in Multicultural Classroom"
under my supervision during the period prescribed the rules and regulations of
Tribhuvan University Kirtipur, Kathmandu, Nepal. I recommend and forward her
thesis to the department of Mathematics Education to evaluate in final viva-voice.

Date: 24th June, 2022

.....

Prof. Dr. Bed Raj Acharya

(Supervisor)

©2022

Copyright

By

Manju Aryal

This document is copyright material under the law. No parts of this document may be reproduced without the expressed permission of the researcher.

Defense Date:

All Right Reserved

Declaration

This thesis contains no material which has accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

Date:

.....

Manju Aryal

Dedication

I want to dedicate this thesis to my Father Mr. Balaram Aryal and Mother Mrs. Muiya Devi Aryal. They have always been a source of inspiration in my life who have spent their whole life to transform me from nobody to somebody.

Acknowledgements

I owe my deepest gratitude to my supervisor Prof. Dr. Bed Raj Acharya, Department Head of Mathematics Education, Central Department of Education, T.U, Kirtipur, Kathmandu for his invaluable suggestion, guidance and help throughout this study. It is an honour for me to complete this study under his guidance.

I am also indebted to many of my teachers, friends and students for their valuable time for interviews. This study would not have been possible without their help and support.

Last, but not the least, I would like to express my gratitude to my parents and husband without their support it would not be possible to complete my Master in Mathematics Education from Tribhuvan University.

.....

Manju Aryal

Abstract

This study is about "Problems in Teaching and Learning Mathematics in Multicultural Classroom ". The main objectives of this study were to explore the problems faced by mathematics teachers in teaching mathematics in multicultural classroom, to explore the problems faced by students while learning mathematics in multicultural classroom and to explore the ways forward to solve the problems of teacher and students in multicultural classroom. It is a qualitative ethnographic research design focused on the problems in teaching and learning mathematics in multicultural classroom. Ten students and four teachers were selected by using judgment of purposive sampling. The major tools of data collection were interview, classroom observations and focus group discussion. The study site was Nuwakot district where I can find variety in language and culture. The collected data were analyzed with the help of theories and related literatures. It was found that the problems faced by mathematics teachers in multicultural classroom were communication problems, teaching overload, lack of professional training, teaching without contextualization and irrelevant teaching methods .The problems faced with students in multicultural classrooms were language, appropriate teaching method and materials, learning environment and interaction between teacher and students. The way forward to solve the problems of teacher and students in multicultural classrooms were use of teaching materials, use of discussion method, use of modern technology and teaching mathematics joyful ways.

Table of Contents

	Page No.
<i>Letter of Certificate</i>	<i>i</i>
<i>Letter of Approval</i>	<i>ii</i>
<i>Recommendation for Acceptance</i>	<i>iii</i>
<i>Copyright</i>	<i>iv</i>
<i>Declaration</i>	<i>v</i>
<i>Dedication</i>	<i>vi</i>
<i>Acknowledgements</i>	<i>vii</i>
<i>Abstract</i>	<i>viii</i>
<i>Table of Contents</i>	<i>ix</i>
 Chapters	
I INTRODUCTION	1-6
Background of the Study	1
Statement of the Problem.....	4
Objectives	4
Research Questions.....	5
Significance of the Study.....	5
Delimitation of the Study.....	5
Definition of the Related Terms	6
II REVIEW OF RELATED LITERATURE	7-20
Empirical Literature Review.....	7
Theoretical Literature Review	15
Burner's theory	15
Cultural discontinuity and difference theory	16

Social critical learning theory	18
Vygotsky's learning theory	18
Conceptual Framework	19
III METHODS AND PROCEDURES	21-24
Research Design.....	21
Study Site	21
Selection of Participants	22
Tools	22
Classroom observations	22
Interview schedule	23
Focus group discussion	23
Data Collection Procedures.....	23
Data Analysis and Interpretation Procedures.....	24
IV ANALYSIS AND INTERPRETATION OF DATA	25-48
Section- I Problems Faced by Teachers in Multicultural Classroom	26
Communication problems	26
Teaching without contextualization.....	27
Lack of professional training	28
Teaching overload.....	28
Irrelevant teaching methods.....	29
Section -II Problems Faced by Students in Multicultural Classroom.....	30
Language.....	30
Teaching methods and materials.....	30
Learning environment.....	31
Interaction between teacher and students	32

Respondent A from school X.....	32
Respondent B from school.....	34
Respondent C from school.....	35
Respondent D from school.....	36
Classroom observations episodes	36
Teacher's and learner's view on language in the multicultural classroom	39
Teachers understanding in multicultural classroom	41
Student's motivation and encouragement in multicultural classroom	43
Section -III Way for Addressing the Problems of Teacher and Students in	
Multicultural Classroom	45
Use of modern technologies.....	45
Use of teaching materials.....	46
Use of discussion method	47
Teaching mathematics in joyful ways.....	47
V FINDINGS, CONCLUSIONS AND IMPLICATIONS.....	49-51
Findings.....	49
Conclusion	50
Implications.....	51

References

Appendices

Chapter I

INTRODUCTION

Background of the Study

Mathematics is emerged from the origin of human civilization and developed as the development of society and culture. As it is said that necessity is the mother of invention, people of ancient period developed many mathematical concepts in order to solve their daily life problems. In the beginning, mathematics was easy and limited to solve simple problems faced by human beings. It has become to the broad, complex and often abstract discipline today.

Mathematics has different areas and structure such as analysis, algebra, higher arithmetic, geometry etc. Mathematics has linkage with many disciplines without which they will be in-complete. Thus as Roger Bacon said it is the gateway and key of all sciences.

Mathematics is a scientific study of measure, structure, space and change. Mathematics reveals hidden patterns that help us understand the world around us. Mathematics today is a diverse discipline that deals with data, measurements and observations from science with inference deduction and proof and with mathematical models of natural phenomena of human behaviour and of social system.

Mathematics is the branch of philosophy. It is an old, broad and deep discipline in the field of study. There are two different views of mathematics; absolutist view and fallibilistic view. Absolutist view of mathematics refers that mathematical knowledge is objective knowledge, unquestionable, unchangeable and everywhere the same. It consists of three different school of thoughts; logicism, formalism and intuitionism. Fallibility believes that mathematical truth is corrigible and can never be regarded as absolutist view.

Paul Ernest has proposed social constructivism as an inclusive views on philosophy of mathematics giving an alternative way to absolutist philosophy. According to this, the nature of mathematics is not absolute or unchangeable but it has fallible and historically shifting character. In the social constructivism, social phenomenon is taken as the main source of mathematical knowledge. Cultural, public and collective knowledge and not as personal private or individual belief nor as external and absolute (Acharya, 2072 p.17).

Culture has been defined as an organized system of values which are transmitted to its members both formally and informally. Mathematics education as cultural induction has been well researched over the last twenty years and it is clear from this research that values are an integral part of any mathematics teaching and a range of levels (Gates, 2001).

About the aspect of teaching Bhatia & Bhatia (1997) said "Teaching is establishing a harmonies relationship between teacher, pupil and subject". So that three dimension of teaching are pupil, teacher and subject. It is giving useful information it is causing the child to learn. It is the stimulation and direct of learning. It is helping for the child to make effective and easily adjustments, it is guiding for the pupil activity and it is training of his emotions.

The importance of teaching mathematics as an integrated subject is recognized everywhere. But still we are sticking on to the idea of 'teaching mathematics'. It is better to move from 'teaching mathematics' towards mathematics education, though educating the pupils mathematically is more difficult, challenging and complex than teaching them some mathematics.

The values of mathematical culture are providing different dimensions and directions to mathematics teaching at school level. Greenfield and Bruner (1966),

offer the idea that "some environments push cognitive growth better, earlier and longer than others. What does not seem to happen is that different cultures produce completely divergent and unrelated modes of thought". Since the time of the Egyptian and Hellenistic civilisations rationalism, logic and reason have become basis for mathematics education. Rationalism, with its focus on deductive reasoning challenged the trial error pragmatism and inductive reasoning. The main aim of mathematics ideas are developed by proofs, extensions, examples, counter- examples, generalisation and abstraction.

Nepal is a multi-cultural, multi- lingual, multi religious country with various languages. There are 125 casts, 123 languages and 10 religions in the country which invites the multi-cultural nature of culture (CBS, 2011). Nepalese society is ethnically diverse and complex. The varied groups were evolved into distinct pattern over time. There are many ethnic groups such as Brahmin, Magar, Tamang, Newar, Gurung, Sunuwar, Limbu, Tharu, etc. So, a teacher must know special instructional issues to accommodate students from different cultural background. Students enter mathematics classrooms with wide range of background knowledge, experiences and dispositions. These differences which arise both before they come to school and while they are in school create different orientations and learning experiences. For some students their experiences will help them in their learning of mathematics, for others considerable input will be needed to support their learning. How teachers work with this diversity is informed by their own ideologies of how differences come to exist. Some teachers will see the differences as something biological or innate in the student whereas others will see such differences as something constructed and reified through school practices. These two extreme positions represent the nature/ nurture poles of one of the most enduring and perennial debates in education.

In our educational institutions, many children from different cultural background come to acquire education. A major goal of multi-cultural education as stated by specialists in the field is to reform schools, colleges and universities so that students from diverse racial, ethnic and social- class groups will experience educational equality. Another important goal of multi- cultural education is to give male and female students an equal chance to experience educational success and mobility (Acharya, 2070).

A school is the reflection of the society. Students of different ages, races, cultures, gender, and cognitive structure can be found in the school. Consequently the classroom naturally becomes a multi-cultural. Therefore, it is self-explanatory that each student in a class is a different in terms of socio-economic background. After analysing above mention views we can come to realize that culturally diverse classroom reflects the rich diversity of the students. Thus it is not an easy task to teach mathematics for the students of culturally diverse classroom in order to attain the desired outcomes.

Statement of the Problem

This research mainly intended to identify and analyse the problem faced by mathematics teacher and learner in teaching and learning mathematics at secondary level of Nuwakot district.

Objectives

The objectives of this study are:

- i. To explore the problems faced by mathematics teachers in teaching mathematics in multi-cultural classroom.
- ii. To explore the problems faced by students while learning mathematics in multi-cultural classroom

- iii. To explore the ways forward to solve the problems of teacher and students for teaching and learning mathematics in multicultural classroom.

Research Questions

-) What are the current problems faced by mathematics teachers and students in teaching and learning mathematics in multi-cultural classroom?
-) How is it possible to make students to learn and teachers to teach mathematics effectively inside a multi-cultural classroom?

Significance of the Study

Language plays a vital role during the teaching and learning process of mathematics. The problem faced by the teachers and learners due to the multicultural nature of the classroom is the main demand of this research. This study not only plays a vital role in seeking various problems faced by teachers and students but also helps to bring the solution of those problems in teaching and learning in mathematics. This study explores the present context of teaching and learning mathematics. This study is useful to bring contextual reform in education sector.

Delimitation of the Study

The delimitation of the study were as follows:

- i. The study considered only schools from Nuwakot district.
- ii. This study covered only two schools, four secondary level teachers and ten students who learn mathematics.
- iii. This study carried out in only two private schools which had problems for teacher and learner in teaching and learning mathematics in multi-cultural classroom.

- iv. This study was concerned only with classroom teaching-learning problem faced by secondary level mathematics teachers and students in multicultural classroom as well as their remedies.
- v. The sample schools were chosen randomly by the researcher.
- vi. This study was based on qualitative paradigm.

Definition of the Related Terms

Multi-cultural classroom. Multi-cultural classroom refers as a class where the students are present from different cultures. This means the class which contains students from different cast and different society.

Private school. The schools that are established by person or non-government sides.

Problem. Problem in mathematics refers as things that are difficult to deal with or understand during teaching and learning mathematics. In this study problem of teachers in teaching and learning mathematics are the difficulties to understand and explain the topics.

Secondary level. The level containing grade nine to twelve in Nepalese school system.

Students. Students means those people who are learning mathematics in secondary level schools.

Teacher. Teacher means those people who are teaching mathematics in secondary level schools.

Teaching-learning. An activity done inside a classroom for gaining and sharing of knowledge based on a fixed curriculum.

Chapter II

REVIEW OF RELATED LITERATURE

A review of related literature is the source of the further study of research task. It provides the knowledge to the researcher in making his problem more realistic, precise, researchable and meaningful. It helps to contact the research program and gives a better idea of research then it guides towards conclusion. Thus the review of related literature is an important and essential of research planning. This chapter dealt with the study of the literature related to this study. Mainly the literature included previous thesis, books, journals and internet web sites.

Empirical Literature Review

Nepal (2010) conducted a thesis entitled "A study on the problem faced by mathematics teacher in teaching mathematics at secondary level of Palpa district". He focused on identifying the problem and cause of problem on teaching mathematics. He concluded that there is lack of classroom management for the mathematics training due to the large number of students, lack of moral education, books are not available in time and students are interested in political program. This study also carried out that insufficient mathematics teaching materials, not using available materials by the teachers, lack of participatory approach of both students and teachers in classroom, lack of confidence of teacher, lack of regularity of homework checking, lack of appropriate teaching method, mostly used lecture method, etc. are some of the problems that the difficulty is faced while teaching and learning geometry, arithmetic, probability and algebra.

Lamichane (2001) has conducted a research study entitled "A study of problems faced by the secondary level mathematics teacher in teaching mathematics in Kaski district". He concluded that several problems, up in the eyes of teacher such

as inadequacies of text book and teacher guide, lack of instructional materials, irrelevancy of teacher's training, lack of supervisor's help, lack of physical facilities etc. Further he concluded that the lack of motivation to learning mathematics is poor on the parts of students.

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

Bhatta (2012) has also compiled an M. Phil case study research on the topic "Classroom practice at primary level: a multicultural perspective". The site of the study was Gram Sewa Higher Secondary School of Kathmandu district. He selected

participants by using purposive random sampling method. His study was focused on ten teachers, twenty-four students and six guardians concerned to Gram Sewa School. He used both questionnaire and interview to collect data from the participants to fulfill the objectives of his study. The main objectives of his study were to identify the situation of primary school students from multi-cultural perspectives and to find out the practices of teaching in multicultural classroom setting. He found through his study that teachers have applied individualized teaching rather than group teaching to address the issues of multi-cultural setting. He further found that the teachers were unable to address all the student's equality through extra-curricular activities and they have been applying the traditional way of classroom setting. In a nutshell, he found that classroom practices at primary level were not culturally responsive and relevant.

Gautam (2009) described a thesis entitled "A study of problem faced by higher secondary school teacher in mathematics". The research design was qualitative. The population for the study was considered to be all mathematics teacher, who have been teaching mathematics in the Nawalparasi district in the grade XII. Eight teachers were chosen as a sample from 8 different colleges, 4 colleges were from rural area and 4 from urban area. The teachers were chosen by purposive sampling method. A questionnaire consisting of fifty two items developed by the investigator was finalized in consultation with mathematics experts and supervisors as a tool of data collection. The collected data were analysed and interpreted by the statistical tools like mean weightage. He concluded that the prescribed curriculum and the existing textbooks are not well managed, not much applicable or appropriate, they are neither analytical nor numerical in nature, objectives are good but the others classroom activities are poor. Language problem, poor economy, lack of refreshment training, examination oriented teaching, quality and size of blackboard, sequence of presentation and

mathematics laboratory were the burning problem faced by mathematics teachers in their teaching profession. Comparing those problems between public and private college teachers in mathematics, it was found that public and private school teachers faced similar kinds of problem.

Bell (2008) carried out the Ph. D entitle "Cultural Diversity and White Teacher Scaffolding of students self-regulated learning in Algebra-classes". The purpose of this study was to examine the way in which teacher use classroom discourse for teaching and learning mathematics, developing self-regulated learning and engaging culturally diverse students, in meaningful classroom interactions. The design of his study was qualitative with case study approach. Three classes participating in the classroom connectivity in promoting mathematics and science achievement research study were selected as cases for in- depth investigation each case included a white teacher and culturally diverse students. Information were collected through videotaped of classroom observations, observer notes and demographic data reported by students. Data were analysed to create descriptive narratives of classroom interaction for each case. Cross-case analysis was used to identify continuities and discontinuities for the purpose of understanding teachers and students use of classroom discourse for learning mathematics with understanding and developing strategic learning skills in culturally diverse learning communities.

Then it was revealed that several aspects of teacher led classroom discourse have potential to support learning mathematics with understanding and developing self-regulated learning skills. First, social and analytic scaffolding helped students know how to participate in discussion and to explore the mathematics more deeply when the relationships between classroom participation and learning were made explicit. The productive scaffolding observed involved pressing for student's

expression of understanding and providing feedback. Furthermore, relating difficulty with problem solving to opportunities to learn with deeper understanding set norms for open discussion and created a safe atmosphere for taking risks, aspects of learning that are particularly important for students of colour and students with fixed entity theories of intelligence. Explicit instruction in academic discourse supported communication in content specific registers of language and may have increased engagement in dialogic discourse. In one case, student agency and the development of academic language were supported by highlighting student's contributions to classroom discourse, which stimulated dialogic discourse. Additionally, student's personal /cultural social discourse was described as the lubricant that keeps the conversation going in the class where students expressed the most mathematical reasoning. This has important implications for how engaged learning is defined in classrooms with culturally diverse learners. Finally, the use of technology to support learning along with the intention of addressing inequalities has potential to support dialogic discourse. A teacher's philosophy and approach to teaching and learning may be more important than technology in addressing issues of equity with incorporation of technology. A teacher's stance on what it means to teach and learn appears to work in correct with incorporating technology to create more equitable learning environments for culturally diverse students.

Adhikari (2006), Conducted a research on "Cultural discontinuity and learning difficulties in Mathematics: A case study of primary Dalit school children". The main objective of this study was to identify the cause of difficulties in learning Mathematics of Dalit children of school and to identify the influencing factor in learning mathematics for the Dalit children at school. This study was focused on all the grade five students of Banibilas secondary school of Chapagaon V.D.C. in

Lalitpur district. He used in depth interview, observation for the data collection procedures. This study found that there is discontinuity between silence culture and forwarded culture. He also found that Dalit children have poor language ability and they cannot concentrate in their study due to their involvement in household works.

Shrestha (2016) carried out a research entitled "Cultural diversity and difficulty in learning mathematics". His aim was to identify the causes of difficulties in learning mathematics of culturally diverse students at school and to explore the relation between culture and learning mathematics. He raised the research question: Do they feel difficulties in learning mathematics at school? In which area of mathematics, they feel more difficulty? Do 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? He used qualitative research design and ethnography and the tools were observation, in-depth interview and document analysis. He concluded that pupil weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, family's socio-economic status, discrimination in classroom and home-school mismatch are causes of difficulty in learning mathematics of culturally diverse students at school.

Ghimire (2017), carried out a research entitled "Problem faced by mathematics teachers in teaching mathematics at secondary level". The main objectives of the study were to identify the problem faced by secondary level mathematics teachers in teaching mathematics and to analyse the causes of arising such problems faced by mathematics teachers in teaching mathematics at secondary level. He raised the research question: What are the current problems faced by mathematics teachers in teaching mathematics at secondary level? What are the causes that the mathematics

teachers faced in teaching mathematics at secondary level? He used qualitative research design and the tools were questionnaire, interview guideline and classroom observation. He concluded that there are numerous problems faced by teachers such as classroom management, teaching method and materials, school administration, mathematical content and student background characteristics.

Kanth (2009), conducted her study entitled "A study on the problems faced by the teachers and students in mathematics class at primary level". The main objectives of the study were to identify and analyse the problems faced by the primary level mathematics teachers and students in mathematics class. She concluded that students are not getting proper environment in mathematics learning. Mathematics learning depended solely on the lecture method; mathematics curriculum that students are learning could not support the day to day problem of the students. More than fifty percent teachers did not satisfy in the case of job security, promotion, salary to maintain family, class control and students motivation are difficult for teachers.

Acharya (2015) carried out the Ph. D on the topic, "Relevance of Primary Level Mathematics Education in Nepal: A Cultural Perspective". He raised the research questions: To what extent are the existing primary school mathematics curricular materials student's cultures friendly? How are the pedagogy used by the teachers in multicultural classroom culturally relevant? What challenges/problems are faced by teachers and students while teaching- learning mathematics in the multicultural classroom? What vision do mathematics educators, mathematics teachers, educated cultural group people and curriculum planners have for making primary mathematics education culturally relevant? In dealing with research question based on the above themes, he used ethnographic methodology under interpretive paradigm to explore the multiple realities through the methods of observation, documents analysis

and in an interactive or dialectical manner. The data have been analysed using a sequential process of transcribing, coding, categorizing and themetizing. The phenomena have been visualized from multiple theoretical perspectives and the researcher's own reflections or insights. He found that contents of primary mathematics curriculum were related to the everyday problems of human life to some extent. However, these were not sufficient to solve practical problems related in various dimensions of daily life. Further, the existing pedagogical practices were less appropriate to address the multicultural classroom environment. There was a huge gap between the practice and the theory of culturally responsive teaching learning process. Moreover, the medium of instruction was found to be a key challenge in the multicultural classroom teaching learning process. Decontextualization of mathematics teaching learning activities, incompetent teachers in teaching mathematics in multicultural situation, mono-cultural pedagogies, and contents dominated by ideologies of western culture were found challenges of mathematics education.

He also found that the application of fallibility approach rather than absolutistic one in teaching learning activities, mother tongue based primary education, incorporation of local mathematical knowledge in the curriculum; culture friendly pedagogy and continuous assessment system are the major approaches to make mathematics education culturally relevant in primary level. Likewise, 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.

Theoretical Literature Review

Burner's theory. "Burner thinks that the process of education is more important than product". The main statement of Burner's theory gives more emphasis on process than subject matter. He priorities the importance of environment during learning process.

The important aspects of Burner's theory is that the learners learn the things according to the previous structure of the mind. Burner's theory of instruction is expected to address four different aspects. The first aspect is predisposition towards learning whereas the second is structure of knowledge the third aspect is sequencing the presentation of materials and the fourth is providing rewards and the reinforcement. For Burner the importance of the background of the student is very important. The learning and instructional theories can be used in a various ways inside a classroom.

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

The third characteristics of mental development is the increasing ability to use words and symbols to represent things which have been done or will be done in the future. The forth characteristics of the mental development is formal discussion with next person whereas the fifth is to use and understand high level language. The final characteristics of mental development according to Burner are informal representation and discrimination of similar subject matters (Bell 1978 p.140).

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

Cultural discontinuity and difference theory. In the cultural discontinuity theory (Ogbu, 2001) deals with the problems in children's learning caused by the difference and discontinuity between the cultures 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 better learning achievement. Similarly, the children with unmatched and dissimilar home cultures with school culture do not have enough attention in 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. Ogbu emphasized learning not only the product of the cultures and language minority. Disadvantaged and dominant groups control the school system through implementing curriculum and using languages as the only means of instruction.

Ogbu (2001) emphasized on two types of cultural difference i.e. the primary cultural difference of voluntary minorities and the secondary cultures difference of involuntary minorities. His study suggests involuntary minorities faced more difficulties in school learning, participation and performance due to big 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 furthermore elaborated that primary cultural differences may create

problems in interpersonal and inter-group relation as well as difficulties in academic work for several reasons. Among them, most important reason as children with different cultural backgrounds start schooling assuming different cultural word and human relations in school but they get a vast different reality in school. Next lack of necessary concept and skill in their own cultures may obstacles their learning. Finally, differences in teaching style and learning strategies may be important reason that affect in teaching learning activities.

Ogbu (2001) argues that the secondary cultural discontinuity is evolved after member 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 convince and benefits e.g. their norm, value and aspiration in the curriculum , medium of instruction and teaching / learning approaches that suit to them. But the dominated group gets on unfamiliar and unrealistic curricular content and their cultural resources do not matched with overall education system so that they face difficulties in learning / teaching and participation that leads to their flier, dropout and exclusion. Due to collective instructional discrimination and display like school system, they tend to exclude from the mainstream with social and economic problem that leads lives to miserable condition. In addition such sub ordinate groups under caste stratification with discrimination do not get opportunity and accesses to privileges, reward or position considered as perspectives of dominant group because of already fixed socio-cultural systems or mechanism which are made by the dominant group. Therefore the children from disadvantages cast tend to develop coping behaviour and articles that are different to school culture that obstructs their learning and teaching.

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

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

Vygotsky's learning theory. Lev Vygotsky's cultural- historical theory of cognitive development is focused on the role of culture in the development of higher mental functions, such as speech and reasoning the children. His theory is sometimes referred to as having a socio- culture perspective, which means the theory emphasizes the important of society and culture for promoting cognitive development in an intentional a systematic manner by encouraging them in challenging and meaningful activities. Vygotsky's zone proximal development (ZPD) has many implications for those in the educational milieu. One of them the idea is that human learning presupposes a specific social nature and is part of a process by which grow into the intellectual life of those around them. According to Vygotsky, an essential feature of

learnings is that it awakens a variety of interacting with people in his environment and in cooperation with his peers (Vygotsky, 2009).

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

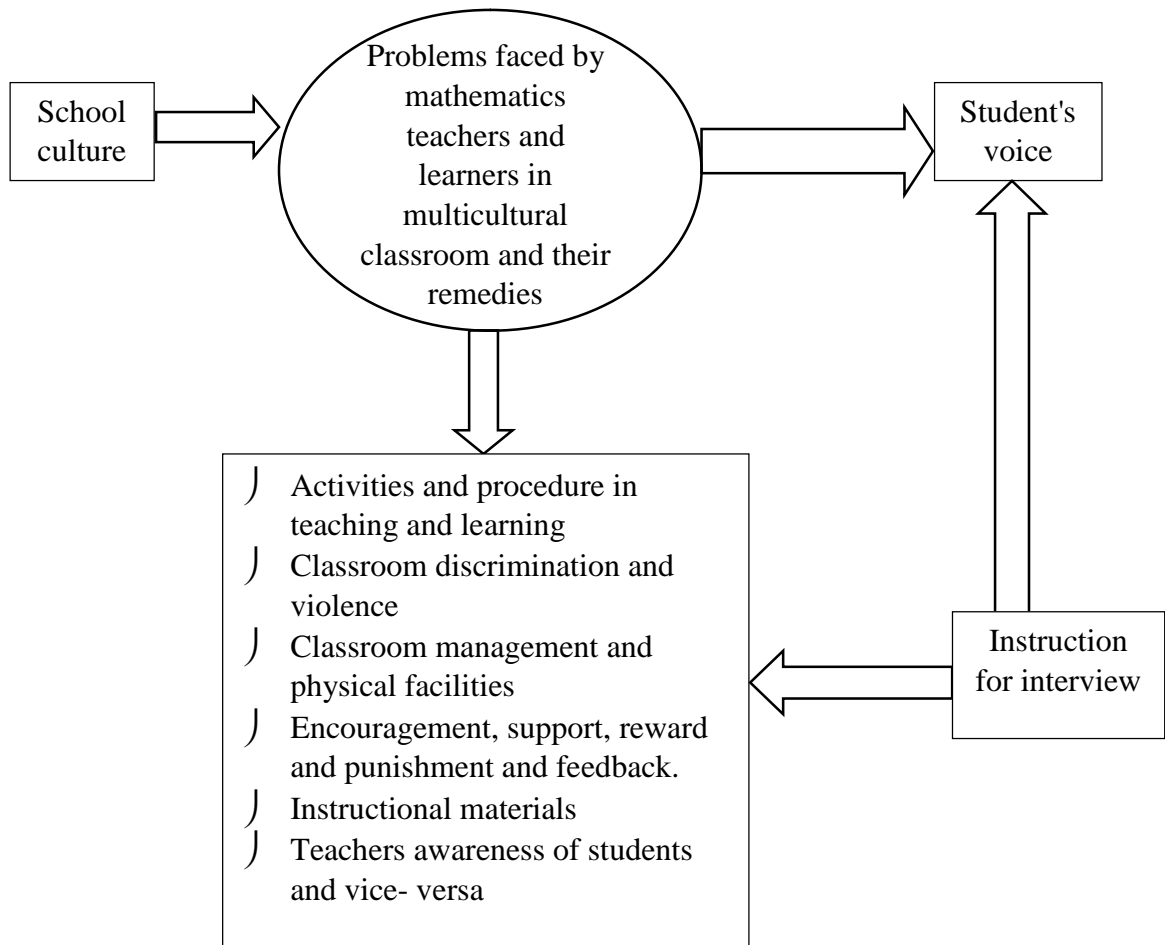
A multicultural classroom that makes the best use of all its students ZPD should follow the following guidelines:

1. The multicultural classroom should be set up in a group work and student collaboration in order to allow students to take on the role of instructor with their peers as the master the skills at hand.
2. To effectively scaffold students with their ZPD, teacher should also have an awareness of the different role students and teachers assume throughout the collaborative process. The role roughly resemble the following:
 -) Teacher fading out instruction.
 -) Student imitating the teachers behaviour
 -) Teacher modelling behaviour for the student.
 -) Student practicing reciprocal teaching until the skill is mastered by all students in the multicultural classroom.

Conceptual Framework

The conceptual framework devised through the literature studies facilitated to attain research work. Analysing various literatures in relation to problem faced by mathematics teachers and learners in teaching and learning in multicultural classroom. To find out the study I drew from the collected data and related literature by using qualitative methodology of data analysis and interpretation. Researcher used both observation and instruction for interview for the students as well as teachers to collect

data. Researcher developed a conceptual framework for the study, which is given below:



The conceptual framework which I mentioned in above fig 2.1, is the important part of this study. School cultures and needs and expectation of the children are different. Only the teachers can be able to address the need of the students after he/ she has a good knowledge of the student's culture. As well as the students who have knowledge of the teacher's culture can only understand better. The pedagogical strategy, teaching materials and the physical facilities plays the significant roles in learning. The chart focuses on the bad aspects like classroom discrimination, violence which hamper the learning and equally on the other hand encouragement, support, reward, punishment and feedback plays a positive role in learning. The tools of the research were instruction for interview and classroom observation.

Chapter III

METHODS AND PROCEDURES

This chapter describes how the purpose of the study was conducted in course to achieve the objectives and answering the research questions. The method applied in this study is discussed in the following sections: research design, study site, selection of participants, tools, data collection procedure and data analysis procedure.

Research Design

Research design is an important, systematic, logical plan that provides the necessary guidance to accomplish the objectives. Research design was the plan, structure and strategies of investigation conceived so to obtain answer to research question and to control variances. This study was based on qualitative research design. Qualitative research is interpretive in nature and theoretical base is subjective reality truth a real knowledge (Sharma, 2011). A research design is the document of the study. Research design is the framework that had created to seek answers to research question.

Qualitative research is multi method involving an interpretative, naturalistic approach to its subject matter. Qualitative research involved the studies and collection of a variety of empirical materials, case study, personal experience, life history, interview, observational, historical, interaction and visual texts that describes routine, problematic moments and meaning in individual's lives (Dinzing and Lincon, 1994; as cited in Adhikari, 2006).

Study Site

According to the purpose of the study, I selected two private schools from Nuwakot district. The site selection task is very important for the study in order to obtain easily access, establishing immediate rapport with information and gathering

data directly related to research objectives. I selected Shree Souvenir Boarding High School and Orchid Academy School from Nuwakot district.

Selection of Participants

The participants of this study were four secondary mathematics teachers and ten secondary mathematics students. I used purposive judgemental sampling to select the participants for my study. I had only selected the participants those I found to provide data for my present study.

Tools

Research tools are the most important parts of the study in data collection. There are three major tools of the research which are data collection, interview, focus group discussion and classroom observation. I used interview guidelines for teachers and students as well as class observation form to observe teachers and students activity during teaching and learning mathematics.

Classroom observations. The concept of observation indicates that data should enable the researchers to enter and understand the situation that is being described (Patton, 1999). Observations is a way to gather data by watching people, events or nothing changed by physical characteristics in their natural setting. Observations concerns the recording of what is being observed. It was the most useful tool for data collection in any kind of research. At first, I met principles and took the permission to observe the class of secondary level. I observed that class for thirty days at Nuwakot district. I had noted the qualitative data for the observation form. The main theme of observation was to find the problems in teaching and learning mathematics in multicultural classroom.

Interview schedule. Face to face interview was conducted for selected students and teachers. In this research the researcher had used interview schedule with respondents. The researcher had taken the interview on the on the basis of objectives that is to explore the problems faced by mathematics teachers in teaching mathematics in multicultural classroom, to explore the problems faced by students while learning mathematics in multicultural classroom and to explore the ways forward to solve the problems of teacher and students in multicultural multicultural classroom. The interview was designed on the basis of problems in teaching and learning mathematics in multicultural classroom. Interview was taken with the selected ten students and four mathematics teachers. This was helpful to the researcher to draw the actual information about problems in teaching and learning mathematics in multicultural classroom.

Focus group discussion. A focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic of interest. It is a form of qualitative research where questions are asked about their perceptions attitudes, beliefs, opinions or ideas. The researcher had discussed in group with selected participants for the actual information about the problems in teaching and learning mathematics in multicultural classroom.

Data Collection Procedures

The aim of the study was to investigate the problems of teaching and learning mathematics in multicultural classroom. Therefore, collect the qualitative data from the classroom observations form, interview guidelines and focus group discussion with the help of supervisor was regarded as the main tools of the study. At first, researcher had constructed the observation form form to collect the necessary qualitative information. The researcher went to each sample school with tools to

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

Data Analysis and Interpretation Procedures

Data interpretation is the systematic process of presenting and showing its effect. The analysis of data is important thing while we prepared research reports. 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 primary data are presented and analysed. The collected data from primary source by using interview, observation form, analyzed and interpreted. The obtained data analysed with the help of theories and literatures described in the literature review section. The researcher used social critical learning theory, Bruner's learning theory, etc. to find the real problems and their possible solutions inside a multicultural classroom.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

This is qualitative research related to find out the problems in teaching and learning mathematics in multicultural classroom. This part deals on sorting and establishing the connection of the different concepts and themes. The data were collected from the teachers and students as a main source of the study. During the study, I conducted different class observations, interviews and focus group discussion. Direct observations were done in classroom and watched in classroom activities. Interview had taken with key teachers and students with the help of semi-structured interview schedule. A focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic about their perceptions, attitudes, beliefs, opinions or ideas. My objectives of this study were to explore the problems faced by mathematics teachers in teaching mathematics in multicultural classroom; to explore the problems faced by students while learning mathematics in multicultural classroom and to explore the ways forward to solve the problems of teacher and students in multicultural classroom. In this study, I have addressed my research questions; what are the current problems faced by mathematics teachers in teaching mathematics in multicultural classroom? And how is it possible to make students learn mathematics inside a multicultural classroom?

Systematically, In order to answer first research questions, the qualitative information was collected for answering the research questions related to problems faced by mathematics teachers. I reached the respective sample schools and necessary information was taken during the time of classroom teaching. Different periods of different classes were observed and taken interview with the teacher participants. For answering the second research question, I observed the classroom teaching and also

conducted an interview with the students and the teacher participants. The interpretation and analysis of the collected data were carried out by using different theoretical perspective as explained in literature review section. In this chapter analysis and interpretation of the collected data were organized into two sections. Section-I discussed about the problems faced by mathematics teachers in teaching mathematics in multi-cultural classroom. Section-II discussed about the possible ways to make students learn mathematics inside a multi-cultural classroom.

Section- I Problems Faced by Teachers in Multicultural Classroom

Communication problems. Communication is the exchanging of information by speaking, writing or using some other medium. Without meaningful communication, no effective delivery of content is possible in the classroom situation. Therefore, gleaning information between teachers and students was a key dilemma in teaching and learning mathematics in multicultural classroom. One of my participant T1 shares his view as

"Mostly I teach in Nepali and English language but there are multilingual students in the classrooms. Those students who came here from primary level they become familiar in multicultural classroom but those groups of Kumal, Tamang, Magar, Rai, Newar and Dalit (Sarki, Damai ,Kami) students who came me from their society in kinder school to here in the above classes they have language problems. For those students to teach mathematics is quite difficult. In classroom, when I gave them for group discussion they were gossiping or discussed about the topics which makes me in confused".

From the above information of my participants, it indicates that those students who came on multicultural classroom from their primary level can desist the problems

to be familiar with multicultural environment up to secondary level. But those who came later, they might have problems for sometimes.

Teaching without contextualization. Contextualization is using the terms of the language in a meaningful context which helps the teacher to acquire new knowledge and skills. Contextualized teaching and learning engages students in active learning while facilitate them to make meaning out of the information they are obtaining. I observed the classroom situation and the students' context of teaching learning activities, the teachers were found ill-matched in their delivery process. When I entered into the grade X of Shree Souvenir Secondary School in Nuwakot, I observed that the teacher was teaching the topic 'Area of Triangles and Quadrilaterals' of Geometry. He wrote some formulae related to finding the area on the board and entered into the exercise. He did not explained what does area of the different shapes represent, how was those formulae derived, what is the use of finding area of these shapes in our daily life etc. One of the participants T₂ shares his view as

"Generally I teach the students what is there in the book. I have not taught many other irrelevant matters in the classroom which are not important for the examination point of view. I let them to do the exercise whatever given in the book. I have taught many other practice books."

From the above information of my participant, teaching of mathematics was not associated or embedded with their culture and cultural practices. Moreover, it has been guided by the notion of absolutistic philosophy of mathematical knowledge consisting of certain unchangeable truth and the unique area of certain knowledge with certain algorithms rather than fallibility philosophy. Therefore, I have viewed that this phenomena is a major problem in teaching mathematics in the multicultural classroom.

Lack of professional training. Professional training is the building skills, knowledge and ability in individual and group which is related to their works. I have found most of the teachers had been trained. However they were largely untrained on how to teach in the multicultural classroom situation. One of my participants T₃ shares his view as,

"I have taken many training but I cannot participate in training on how to teach in multicultural classroom in practical way. So, I am feeling confused while teaching them. At last he told teacher must be trained about how to teach in multicultural classroom. "

From the above information of my participant, the teachers of private schools weren't trained in teaching in multicultural classroom but the government claimed that there were more than ten thousand teachers who were already trained in multicultural perspectives in total private and public schools. However these teachers were lack of adequate training on multilingual education and multicultural classroom. Therefore it seems to me that those teachers need more relevant training and implementation and strategies in Nepalese context.

Teaching overload. Teachers should teach six/ seven periods per day in private schools. It creates a problem to give individual feedback, individual support and made individual guidance difficult. In my own experiences, I also feel that the private school teachers are overloaded in teaching activities engaging about five / six hours in a day. One of my participants T₄ shares his view as

"Our experience isn't sufficient for uploading the knowledge of mathematics to acquire the role of school. Teachers have lack of sufficient time to create teaching materials for daily. At least, school should help in reducing the

number of periods and cooperate the teachers to make teaching materials, libraries and Internet facilities. "

From the above information of my participant, the teachers are suffering to reduce their working hours so as to devote their time in accessing and planning the students. A teacher need to teach only 5/6 periods per day and they can manage their time to prepare the materials, courses for another classes and assessing the students. The students in the class were overcrowded and time is also not sufficient for individual care so teachers cannot give individual care in the class.

Irrelevant teaching methods. Teaching and learning are the two sides of a coin. The main concern of quality teaching learning is the suitable teaching method for successful learning of mathematics. When the teaching method is irrelevant, they often mean either that it does not meet the needs of the students or that the subject matter should be modified. One of my participants T₁ shares his view as,

"Generally I use problem solving, memorizing and questions answer methods for mathematics teaching. I always think about my students and try to get new ideas for good teaching and learning. I think my methods are productive for students for learning mathematics. I ask questions sometimes and I gave the students to do the problems on the whiteboard. I understand the position of my student's learning from the given task. There are a lot of weakness in teaching-learning process in mathematics. The teacher asked students to memorize the formula and remember them. Also they ask the students to use formula while they are working on the problems. "

From the above information of my participants, I have come to realize that students are forced to memorize the mathematical concepts without practical knowledge. Productive learning is rooted on the appropriate methods used by

teachers. But there are a lots of drawbacks in the teaching mathematics in the observed classroom. Classroom mathematical discourse plays a central role in shaping mathematical capability and dispositions.

Section -II Problems Faced by Students in Multicultural Classroom

In this part, the problems faced by students in learning mathematics in multicultural classroom are discussed as follows.

Language. Language is not merely a means of communication but it is also a vehicle of understanding. Language is major component for learning. Mostly Kumal, Tamang, Rai, Magar students tried to speak Nepali language with teachers and other friends. One of my participants S₁ shares her view as

"Most of the teachers in our school are not from our community. They speak English and Nepali language. Especially our math teacher speak Nepali language for all students to learn better but I feel it is also difficult for me. I feel hesitation to ask the question directly to the teacher when I don't understand. Algebra and geometry are difficult for me. I can memorize the formula but I cannot use the formula while using it. So I cannot solve the problems".

From the above information of my participant it is concluded that language was the major factor of the problem for learning mathematics. They speak mixed language which is difficult to understand. Due to the mixed language used by students teachers did not understand the mathematics problems raised by the students.

Teaching methods and materials. Teaching methods and materials are the main tools of learning. Teacher is a key person to make teaching and learning activities more interesting in the multicultural classroom. Teacher seems as a guider, counselor and facilitator. One of my participants S₂ share his view as,

"Mathematics is the hardest subject for me. Unitary method and verbal problems are difficult for me. Teacher told us to copy this questions and he didn't use to talk more definitions, examples or formula about the topics he wants to do the question quickly. I think he want to finished the course while we learn or not".

From the above information of my participant, it is concluded that students may have a problem by teaching strategies applied by the teachers. Teacher should use examples related with their topics and explained briefly and not only course should be finished but also students should understand.

Learning environment. Environment is the surrounding in which a person lives or operates, the totality of the educational atmosphere at home and school. Home is regarded as the first school where they learn to behave and how to co-operate to each other. School is the second home where teachers, students and guardians co-operates and interact each other. The environment of school reflects the belief and tradition of the school community. One of my participant S₃ share her view as,

"My parents are illiterate. They forced me to do household works and to help in the field. They said me that we should not engage more time for study. Mathematics is difficult subject for me .I can't draw the different angles by using compass and protractor. I cannot practice more time in home also and no one helped me in my learning. So, I want to leave my school".

From the above information of my participant it was concluded that there is no sufficient time at home for learning mathematics. The learning opportunities at home were not sufficient for the student. They had to engage on their household work. To achieve better result it needed more practice. Parents should support to help their children learning at home.

Interaction between teacher and students. Interaction is the social activities that can be within persons and between persons. Inter-individual interaction means sharing co-operation and adjustment between two or more persons. Within person interaction means to the mental activities with his or her mind and soul. One of my participant S₄ share his view as,

"I loved mathematics because it is in our real life. I am practicing mathematics not only assignments but I can't obtained good marks in exam. When I asked question to the teacher he became angry and told me not to disturb the class. I cannot interact with friends and teachers in the classroom.

From the above information of my participant it was concluded that there was no proper interaction between teacher and students (Tamang, Kumal, Rai, Magar etc.) in mathematics classroom. Teacher did not response students and students always feel dominated in the language. So, sharing co-operation became difficult in learning mathematics in multicultural classroom.

For my research, I took class observations, interviews and focus group discussion to the students and teachers. In classroom observations, some of the student's response:

Respondent A from school X. Respondent student was 15 years old girl. She lived in Kimtang, Nuwakot with her grandparents and brother. There were seven members in her family. Her father was educated man, he was Indian army and mother works in field and housewife. Their grandparents used their mother tongue language Tamang and followed Buddhist religion. They were aware of Tamang culture so she always feel easy to talk in their mother language and followed their own traditions. She believed their grandparents too much and she believed that Hindu culture interference in our community. She was a regular student and always participate in

extra-curricular activities. She could not use formal language in school. So, the teacher didn't care her for learning. One of my participants S₁ shares her view as

"Most of the teachers in our school are not from our community. They speak English and Nepali language. Especially our math teacher speak Nepali language for all students to learn better but I feel it is also difficult for me. I feel hesitation to ask the question directly to the teacher when I don't understand. Algebra and geometry are difficult for me. I can memorize the formula but I cannot use the formula while using it. So I cannot solve the problems".

She had difficulty in mathematics but she couldn't ask the question to the teachers which she didn't understand. But she asked to her friends in her language. Teacher and students was not close interaction. She had enough time to study and practice at home but the language and culture discontinuity were found the main cause of learning difficulty. She did assignments given by the teachers but mistakes were found in her works. The standard measurement unit used in books had no practical use in her house mana, pathi were frequently used in her society. They had used mana, pathi, murietc which she had learnt at home had no matched in school curriculum. Thus cultural differences and discontinuity faced the learning difficulty in mathematics.

From the above information of my participant, I had concluded that the mathematics teachers should make friendly environment in the class, fruitful examples by using sufficient concrete / instructional materials. The learner was directly with her culture and society. According to the social cognitive theory, learning takes place through observing other in the social environment. According to

Bandura, (1986), "*Behaviours are cognition and other personal factors and environment events all operate and interacting determinants of each other.*"

Respondent B from school. Respondent B was 15 years old boy. He lived in Sera, Nuwakot. His family followed Christian religion. He was medium student and he participated in every extra curriculum activities. His father was business man and he became busy in his work. And her mother was housewife. His father went to school and consult his study with the teachers. He told his son was interested in study but he didnot attempt good result. He couldn't participate actively in the class for his work or he mistake while writing in his copy. According to him the reason might be the cultural differences, language and adequate parent's help. He had good learning opportunities in home also. He felt some difficulties in mathematics. One of my participants S₂ share his view as,

"Mathematics is the hardest subject for me. Unitary method and verbal problems are difficult for me. Teacher told us to copy this questions and he didn't use to talk more definitions, examples or formula about the topics he wants to do the question quickly. I think he want to finished the course while we learn or not".

From the above information of my participant, it is concluded that students may have a problem by teaching strategies applied by the teachers. Teacher should use examples related with their topics and explained briefly and not only course should be finished students should understand .The teacher should use the Ausuble's theory of meaningful verbal learning according to while the lectures type session can made more meaningful if the student have positive attitude to learn, he is likely to learn in meaningful way. The teacher had to emphasis on real life situation, fed with

enough examples related to the real world rather to teach the exercise of the textbooks.

Respondent C from school. Respondent C was 17 years old girl. She lives in Battar, Nuwakot. She had very weak economic conditions to go to school .One of the Co-operative helped her for study .Her father worked in field and she had step mother. She had to help her parents in the field and household works like cutting grass, care of animals, cooking foods and other household works. So she don't have time do her assignment also. Every day she reached the school late and teacher punished her. Only she engaged in her study. When her teacher said have you done your work? She said "*Sabaita aayena kasari hunchha vandinuna ma garchhu ailyenai*". Teacher became angry with her language and he didn't care her. So, she could not asked the question to the teachers. She did not used respective language to the teacher so it is difficult for her. One of my participants S₃ share her view as,

"Mathematics is difficult subject for me .I can't draw the different angles by using compass and protractor. I cannot practice more time in home also and no one helped me in my learning. So, I want to leave my school."

She told me that she got difficult in learning mathematics. Her parents measured the length by sticks or hands in her house. So, she had to face theoretical knowledge instead of practical knowledge in school. When she asked to buy the instrument box parents told her measure by stick it is expensive how can we buy .Her one friend gave her for use. Always I have to ask my friend to help me so I want to leave my school.

From the above information of my participant, I had concluded that the interaction between teachers and students had closed. Teacher should teach them with examples related in real life. There was a problem in learning at home and school too

for her because teacher didn't listen her problems. She had language differences in learning too. So, learning environment and learning was related with the opinion of the students made good.

Respondent D from school. Respondent D was 14 years old boy. He lived in Bidur, Nuwakot. His parents were educated and he was active in study. One of my participants S₄ share his view as

"I loved mathematics because it is in our real life. I am practicing mathematics not only assignments but I can't obtained good marks in exam. Our teacher repeated the topics and questions which was already done for weak students. But I feel bore in that time. We can't interact with friends in the classroom."

If he had difficult in his assignment. His father helped him easily. So, he felt his parents and teachers help us to learn but how my friends became weak? Teacher teach well but repeating the chapter make the course uncompleted on time. So, tuition class is necessary for us.

From the above information of my participant, I have concluded that the mathematics teacher should maintain the learning environment in the classroom. Teacher should made fruitful class using instructional materials and courses should be completed on time. For the weak students, group should be divided and free tuition should be provided from the school. So, learner could directly connected with their teachers.

Classroom observations episodes. Observations enhances acquired knowledge through empirical test of facts, triangulation of data and participation with event, communities and persons. It is the first step of behavioural research. The communities and persons are the best and reliable source of knowledge by which

everybody is socialized and educated. It is the fundamental basis of all types of research (Adler and Adler 1994 cited in Angrosino 2005).

Episode-I. My first class observations was on Shree Souvenir Higher School. Facilitator was Mr. X. When the teacher entered into the classroom, all the students greet him. I also entered the class with the permission of Head teacher and mathematics teacher. Teacher wrote the topic of the lesson on the whiteboard 'Geometry Construction'. The teacher showed some examples of geometrical shapes and asked students to identify their name and later he wrote their name on the whiteboard. The teacher introduced the steps of construction and used scale and compass to demonstrate the detailed steps to construct geometrical shapes. He gave an idea of constructing the triangles, parallelogram etc. The teacher gave the task in group and he observed their work randomly and he gave same work at home.

Teacher presented the class in interesting way with motivating students and he regards collaborative learning. He defined each steps so students became clear in each steps. He revised the concepts regarding Geometry. So, it became best part for all students for learn.

Episode-II. My next class observation was on Orchid Academy School. Facilitator was Mr. Y. As usual teacher entered the class and student greet the teachers. Teacher took a text book from a student and wrote the topic 'Trigonometry' on whiteboard. He defined sin, cos, tan, cosec, sec, cot are known as trigonometric ratios and wherever these come that is Trigonometry values and formula of Trigonometry.

After finishing Multicultural and values he didn't clear the rules or how they came he cleaned the board and wrote one question from book and solved it and he ordered to students to look at the book for answer. Then teacher told to students for

solve the questions. And students were going to solve the problem. Teacher observed only the students of first row and column. Students stopped their pen to write and teacher gave hints to all students in whiteboard. Only two students showed the copy to teacher. And students were gossiping with each other for that answer but teacher again gave hints for them and gave assignments.

Teacher used child centered method at teaching. There was a lack of participatory approach of both students and teachers in multicultural classroom. There is a lack of preparation and confidence of teacher.

Episode-III. I think one of the best class while I observed the class. The mathematics teachers entered as usual way and students greeted the teachers and he permit them to seat. He wrote the topic "Volume of cylinder and sphere" on whiteboard. First he defined the concept of cylinder and sphere. Then he solved the questions describing to the students. He made the pictures of sphere, cylinder, formula chart etc. in the whiteboard and as well as in chart paper for group wise and distributed for students. And all students got two minutes time for that to read. Then he solved another question from the book it was different .The solution was copied by all students and one student asked about the solution and again he replied the same question. Teacher gave similar questions for the classwork. Most of the students able to do the work and show to the teacher. Only some of few students were rest to do the work. At last teacher gave exercise as assignments and went out with their copies to check their assignments.

The teacher applied the practical aspects rather than the theoretical aspects which made students to learn better. Teacher used various teaching materials which attract the students to learn. So, learning for students was fruitful. Students feel easy to learn and only some had problems in understanding for some minutes.

Teaching method was student centered method rather than teacher centered. From the observations, the teacher is very skillful and sensitive in teaching process. He used practical and considerable about the linguistics problems inside the classroom. He gave more examples which made all students cleared. Students were also actively participated in the classroom activities.

Teacher's and learner's view on language in the multicultural classroom.

The language is not merely a means of communication but it is also a vehicle of understanding. "Language is an important aspect that directly affects the understanding and clarifying the concepts of each other. The mother tongue is regarded as the easy language for communications. For example there are a large number of people who only understand their local language clearly and have no knowledge of Nepali language. What types of results can we expect from them when we use only Nepalese and English medium as a means of teaching? That is why language should be considered as a main issue in teaching learning process "(Upadhaya, 2070), Exploratory Teaching Mathematics, p.137). From the above explanations we can come to the point that language is one of the most significant aspects in teaching learning process as Vygotsky's clearly states "A clear understanding of interrelation between thought and language is necessary for the understanding of intellectual of the child" (Dahl, 2004).

Response of the teachers and learners based on the issues of language in the multicultural classroom. Bernstein theory shows how the language of people use in everyday conversations both reflects and shapes the assumptions of a certain social group A says" Kumal, Tamang, Magar, Newar, Rai have their own language. Mostly they used their mother language. So, they didn't speak Nepali. They feel difficult to learn mathematics that teacher faced same problems to teach effectively. "From the

above view difficulty in the communication gap between teachers and learners can create a mess inside a classroom and hamper their learning. The teacher will definitely get stressed to reach the problem of the students and unable to provide feedback too.

One of my participants T₂

"Some of the learners can understand the language of the teachers while other takes time to understand and they asked for me and repeated the chapters again they are misunderstanding. But some of them said yes sir only."

The language of the teacher too become a problem sometimes due to his voice, tone and speaking style.

One of my participant S₁ share his view as,

"Students as well as teachers faced the problems equally to have a classroom practices."

One of my participants S₂ share his view as,

"Since Kumal is my mother tongue, I feel easy in my language but Nepali and English are difficult for me."

In this regard, Acharya (2013) writes, the language other than mother tongue has created a challenge to the students who are from culturally different community. Nepali language used as a medium of instruction may have a barrier to understand the mathematics learning to non-Nepalese speaking students. It seems to me that English may have become more difficult to these students I learning mathematics. However, the above results show that it has become a prime barrier in learning mathematics (Issues 34, p.31).

The teacher T₃ had the problems and reached the solution too but he said,

"All the subject matter cannot teach in their mother tongue language but sometimes I try to teach. If I had managed the students in groups with their caste/ language which makes me easy for teach and learn for them".

The teacher have a good idea for the background of different cultures and then students got enough support in their own language in group work or activities they can improve their learning. In this regard Bernstein clearly states, " Forms of spoken language in the process of their learning innate, generalize and reinforcement special types of relationships with the environment and thus create for the individual particular forms of significance" (Class, codes and control 1971).

Teachers understanding in multicultural classroom. The teachers should teach children to respects their cultures and values of others, promote the development of a positive self-concept, help the children learn to function successfully in a multicultural society, encourage children to view people of diverse cultures as unique parts of a whole community.

Teacher should be culturally responsive to conduct teaching and learning activities in multicultural classroom. To be a culturally responsive teacher, teacher should have following characteristics:

-) Culturally responsive teaching strategies
-) Learning about students
-) Constructivist view of learning
-) Respects cultural differences
-) Socio-cultural consciousness
-) Commitment and skill to act as an agent of change (Bhatta LD,2012,p.75)

From the above context, all mathematics teacher from the sample school have serious about the lingual, gender and cultural diversities of the students in the

multicultural classroom. From them, they answered the main problem is language inside the multicultural classroom.

Regarding the weak and slow performance of the students from economically poor. One of my participants T1 shared his view as,

"Afraid with the name mathematics subject, lack of guidance and practice and lack of basic knowledge makes trouble for students".

From this, it is concluded that the students don't have sufficient time to practice in their home, guardians can't guide them properly. In this regards another teacher B says, " Problems in language, low economic conditions of the family, sometimes discriminative behaviour of the teacher, poor performance of the students".

The conclusion of the research to find the problems regarding the poor performance of the culturally diverse students to analyze the answer of the teachers that the poor economic conditions and education status of family hampered the guidance and regularity of the students. The students don't have support of the family to study but students should support in household works.

In this context, it takes Vygotsky's constructivism thought of learning. Vygotsky's terms experience means background of the student that play a vital role in teaching learning process. Here the problems of learners inside a culturally diverse classroom is clear that their family background is playing as significant obstacles.

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

The researcher concluded that teacher should be culturally responsive to become a successful teacher inside a culturally diverse classroom.

Student's motivation and encouragement in multicultural classroom.

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

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

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

One of my participants S₁ share his view as

"Mathematics is not a boring subject but the way of teaching and the interest of students make it interesting, attractive and productive."

From this it conclude that mathematics is an interesting subject which helps to inspire him to learn and the method of teacher is also reinforcement for the learning mathematics in multicultural classroom.

One of my participants S₂ share his view as

"I feel fun in mathematics class to learn and it is interesting for me". It conclude that mathematics is creative and interesting part of education which inspired and encouraged students to learn it".

One of my participant S₃ share his view as

"Students are encouraged to help and share their problems with each other and discuss with their friends ".

From above teacher believed that the group discussion and cooperation between students can make better to understand and effective classroom activities. Students discuss and ask their difficulties among them and teachers should guide.

One of my participant T₁ share his view as

"The teaching style is different from others, I divide the group of students who are able to understand are group leader of that group and others too. I want to teach equally for all students so students are positive with me."

In this regard cooperation among students and group discussion are the modern education techniques and way for collaborative learning. A contemporary application of Vygotsky's theory "reciprocal teaching" is used to improve student's ability to learn. In this method, student and teachers collaborate in learning and practicing for key skill summarizing, questioning, clarifying and predicting" (Upadhaya, 2070 p.153).

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

One of my participant T₂ share his view as,

"We should teach in group and encourage the students praised their work."

He takes tool as reward and praise for the motivation of school.

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

Section -III Way for Addressing the Problems of Teacher and Students in Multicultural Classroom

Nepal is a rich country of languages, cultures and ethnics groups where we get diversities with territories. Students and teachers come from many different backgrounds, experiences and ethnicities. So, teachers and students faced many problems in teaching and learning process in the multicultural classroom. To solve the problems of teachers and students in multicultural classroom it is not easy work in Nepal. Some of them are described below:

Use of modern technologies. Technology is very important because it is used for almost everything. People cannot live without technologies such as mobile phones, computers, televisions, Internet and others. Modern technology takes innovation and creativity to next level. It makes work easy for human beings and fast too. The use of modern technology helps in better teaching and learning.

One of my participant T₁ share his view as,

"Technology makes students creative and skill full which helps to teach students easily and learner can learn with the help of Internet. It creates new materials and other things for daily use".

In this line of my participant S₁ share his view as

"While using technology our time remain safe to learn but we don't have sufficient internet facilities to do work in our home and school too. It makes us fun to learn and teachers also use techniques from there."

From the above information of my participants, technology helps the learner and teacher to create their skill, knowledge and creativity. Mobile phone and Internet which can be taken with us is the perfect example of modern technology. According to Wallace and Londen (2003), the use of educational media such as computer assists to improve the effectiveness of the instruction (Khanal, 2015, p.53). The computer solves complex computation tasks by dividing them into a large number of very simple subtasks. It have inspired new ways of thinking about fundamental concepts in mathematics. Such as notations of proof and mathematical knowledge. Today, without technology we cannot live

Use of teaching materials. Teaching materials are the main tools of learning and most important things in classroom. The use of teaching materials should be attractive in mathematics classroom. The local materials used in classroom makes learning interesting. Teaching material mainly consists of knowledge, skill and attitude that must be learnt by students to achieve the objectives.

One of my participant T₂ share his view as,

"Materials used in the classroom should be useable and local materials which can learnt by students easily. Students attract to look at the materials and feel interesting in learning activities. Materials helps in both learning and teaching."

From the above information of my participant, teaching materials has an important role in learning process to achieve the target determined in every subject.

Teaching material is a source and guide. Materials used in the classroom helps to learn the students interestingly and attractively.

Use of discussion method. The means by which people share their experiences, ideas and attitudes which is enable to engage in verbal interchange. It is two way communication between participants. Discussion method is more active learning experiences for the students than the lecture method. One of my participant T₃ share his view as

"In my class, I divide my students into different groups and gives the topic to each group for discussion. While they discussed and achieve the goals of objectives to learn. Students have opportunity to criticize and evaluate the problems. Students actively participate while using this method".

From the above information of my participant, by using discussion method students are more active and actively participate in practicing mathematics in multicultural classroom. Teacher gave guide for students and students can draw their experiences. So, to be active learner discussion method is useful.

Teaching mathematics in joyful ways. When teacher uses simple to complex methods for learning that is joyful for students and they are motivated to learn actively. Positive thinking gives energy to the students for learning. Teaching activities should be attractive and interesting for learners

One of my participant T₄ share his view as

"I teach my students in attractive and interesting way for better. The performance of my student's in better while using this methods. When I used Frank with my students then they asked me as a friend for their problems to solve. We have to be friendly environment with them. I think I have to teach mathematics in joyful ways for the better performance of the students."

From the above information of my participant, positive thinking gives energy to the students for learn. To be interesting and attractive for learner teaching activities from the teacher should be interested as learner. Teacher studies child psychology of the students to engage them in learning. Teacher should connect their teaching strategies with their daily life. When teacher uses joyful learning methods through simple to complex and focuses on creativity in mathematics; students are motivated to learn actively.

Chapter V

FINDINGS, CONCLUSIONS AND IMPLICATIONS

In this chapter, I have drawn findings, conclusions and implications of my research.

Findings

This study entitled "Problems in teaching and learning mathematics in multicultural classroom." The main objectives of my study were to explore the problems faced by mathematics teachers in teaching mathematics in multicultural classroom, to explore the problems faced by students while learning mathematics in multicultural classroom and to explore the ways forward to solve the problems of teacher and students in multicultural classroom. The design of the study was qualitative and ethnography approach. The tools were used interview, classroom observations and focus group discussion. The respondents of the study were four teachers and ten students from two schools. The major findings of the study were

Finding Related with Problems Faced by Mathematics Teachers were:

-) Communication problem
-) Teaching overload
-) Lack of Professional Training
-) Teaching without contextualization
-) Irrelevant teaching methods

Finding Related with Problems Faced by Mathematics Students were:

-) Language
-) Learning environment
-) Teaching methods and materials
-) Interaction between teacher and students

Findings Related with the Ways forward to Solve the Problems of

Teacher and Students were:

-) Use of modern technologies
-) Use of teaching materials
-) Use of discussion method
-) Teaching mathematics in joyful ways

Conclusion

It is challenging to teach mathematics in multicultural classroom. To make effective teaching learning environment language and materials are the most important things for them. Teacher should be well trained which can make the interaction and promote to all the students. Due to discrimination and bias some teacher seemed to focus talented and interested students only. Due to the lack of training to teach in multicultural classroom. The teachers should give equal opportunity and priority to the students in the classrooms.

Communication problem, teaching overload, lack of professional training and irrelevant teaching methods are the main problems for teaching in the multicultural classroom. Professional training is most required to have effective teaching learning process and to get optimal output. Teacher should be reduced overload periods to make teaching materials and new techniques for teaching.

The problems in learning mathematics in the multicultural classroom are language, teaching methods and materials, learning environment and interaction between teacher and students. Language was the measure factor for creating learning difficulties.

The ways of solving the problems of teaching and learning mathematics in multicultural classroom are teaching materials which are used in local area or real life.

Use of modern technology also helps in better teaching and learning activities. Group work, discussion and interaction help in collaborative learning that can increase innovation teaching materials and build up the concepts. Training and technology helps in promoting teaching and learning activities effectively. It provides guidelines for group discussion to create an environment where students feel safe voicing their opinion

Implications

The implications of the research for effective teaching and learning inside the multicultural classroom are given below:

-) Training program for the teachers; trained teacher are needed to improve the performance and participation of the students from diverse culture.
-) Curriculum should emphasize the integration of learning skills and multicultural education which expose biases, stereotypes, inaccuracies and marginalization of under-represented groups.
-) Strategies like cooperative learning social constructivism, motivation, reinforcement, the group discussion are essential.
-) Teacher should behave friendly environment.
-) Used student centered approach.
-) To enhance classroom practices in teaching mathematics in culturally diverse classroom.
-) Making a teaching- learning fun and interactive matters.
-) Use of modern technology helps in better teaching and learning.
-) Classroom teaching activities should be attractive and interesting for learners.
-) Group work, interaction and discussion help in collaborative learning that can increase innovation teaching materials and build concepts in the students.

References

- Acharya, B.R. (2013). "Problem encountered in teaching-learning mathematics in multi-cultural classroom". *Mathematics Education Forum*, 2(34), 26-33.
- Acharya, B.R. (2015). *Relevance of primary level mathematics education in Nepal: A cultural perspective*. Unpublished dissertation of Degree of Doctor of Philosophy in Education, Tribhuvan University. Kathmandu.
- Acharya, B.R. (2013). *Studies in mathematics education*. Kathmandu: Dikshant Prakashan.
- Acharya, B.R. (2015). *Foundations of Mathematics Education*, Kathmandu: Dikshant Prakashan.
- Adhikari, S.K. (2006). "*Cultural discontinuity and learning difficulties in Mathematics: A case study of primary Dalit school children*". An Unpublished Thesis Submitted to Tribhuvan University Nepal.
- Bell, C.V. (2008). "*Cultural Diversity and White Teacher Scaffolding of students self-regulated learning in Algebra-classes*". Unpublished dissertation of Degree of Doctor of Philosophy in the Graduate school of the Ohio state University.
- Bell, F.H. (1978). *Teaching and learning mathematics in secondary school*. USA: Winbrow C. Brown Company Publishers.
- Bernstein (1971). *Class, codes and control*, London & Boston: Routledge and Kegan Paul.
- Bhatta LD, (2012). "*Classroom practices at primary level: A multicultural perspective*". An Unpublished M.phil Thesis Submitted to Tribhuvan University Nepal.
- Dahl B. (2004). *A Synthesis of different Psychological Theories, Piaget and Vygotsky*. Troidhem: Norwegian Center for Mathematics Education.

- Gautam, S. (2009). "*A study of problem faced by higher secondary school teacher in mathematics*". An Unpublished Thesis Submitted to Department of Mathematics Education, Tribhuvan University Nepal.
- Ghimire (2017), "*Problem faced by mathematics teachers in teaching mathematics at secondary level*". An Unpublished Thesis Submitted to Tribhuvan University Nepal.
- Kanth, L.K. (2009). "*A study on the problems faced by the teachers and students in mathematics class at primary level*". Master's Thesis, Department of Mathematics Education, T.U. Kirtipur.
- Khanal, B. (2015). *Learning strategies of mathematics students*. Unpublished PhD dissertation, Tribhuvan University Kirtipur, Nepal.
- Lamichane, H.N. (2001), "*A study of problems faced by the secondary level mathematics teacher in teaching mathematics in Kaski district*". An Unpublished Thesis Submitted to Department of Mathematics Education, Tribhuvan University Nepal.
- Maharjan, H.B., Paudel, L, Upadhyay, H.N. (2068). *Teaching mathematics in Secondary School*. Kathmandu: Buddha Publication.
- Nepal, M. (2010). "*A study on the problem faced by mathematics teacher in teaching mathematics at secondary level of Palpa district*". An Unpublished Master's Thesis Submitted to Department of Mathematics Education, Tribhuvan University Nepal.
- Ogbu, J. (2001). *Understanding cultural diversity and learning*. In Bradley, A.U. Levinson, et. al. (EDs.); *Schooling the symbolic animal*, (p-190-206). Oxford: Rawman & Littlefield Publishers, Inc.

- Sharma, G. (2015). Relation between motivation and learning mathematics. –
Journal of Mathematics Education, 5(3), 22-26.
- Sharma,L.N.(2011). *Qualitative Research*. Kathmandu:Paluwar Prakashan Pvt.Ltd.
- Shrestha (2016), . *Cultural Diversity and Difficulty in Learning Mathematics'*. An
Unpublished Master's Thesis Submitted to Department of Mathematics
Education, Tribhuvan University, Kirtipur, Kathmandu.
- Upadhaya, H.P., UpadhayaM.P.,LuitelSarala (2070),"Models of instructional
strategies", *Exploratory Teaching Mathematics*, 5 (9), 22-26.
- Uprety, S. (2006). *Classroom Management from Multicultural Perspective*. An
Unpublished Master's Thesis Submitted to Department of Mathematics
Education, Tribhuvan University, Kirtipur, Kathmandu.
- Vygotsky, L.S. (2009), *Zone of Proximal Development*. ([http:// Vygotsky and
language acquisition, htm](http://Vygotsky and language acquisition, htm)).

Appendices

Appendix-A

Classroom Observations Guideline

School's Name: Address:

Teachers Name: Grade:

Total No. Of students: Date:

The researcher will observe the classroom under following criteria:

Classroom Management and environment

) Classroom environment

) Instructional materials

) Seat plan

Teacher's activities in classroom

) Regularity & Politeness

) Revision of course

) Use of instructional materials

) Use of reinforcement

) Level of motivation

) Encouragement to students

) Classwork and assignments checking

) Teaching method

) Interaction with students

) Providing extra classes

Student's activities in classroom

) Language of conversation

) Participation in classroom discussion

) Cooperation among students and teachers

) Sharing problems with teachers and their friends

Appendix-B

Interview Guideline for Students

School's Name:

Address:

Student's Name:

Grade:

Date:

The researcher asked the respondent students to give information about the following questions.

-) Do you use instructional materials?
-) Do you finish your work on time?
-) Do you feel difficult to understand your teacher's language?
-) Do you get equal chance in participations of classroom discussion?
-) Do your parents encourage you to study or not?
-) Do you get sufficient time for doing your assignment?
-) Does your teacher ask questions?
-) Does your teacher check your assignment regularly?
-) Do your teachers behaviour towards you is different from others?
-) Does your teacher motivate you for practicing mathematics problems?
-) Does your teacher discriminate you?
-) Does your teacher give you any special techniques?
-) How is your relationship with your mathematics teachers?
-) What are the problems you faced while learning with friends of diverse class?

Appendix -C

Interview Guideline for Teachers

School's Name:

Address:

Teacher's Name:

Date:

The researcher asked the following questions to get the information.

1. Do you use instructional materials while teaching?
2. Do you feel difficult to teach in multicultural class?
3. How can you encourage the students to learn in multicultural classroom?
4. How is your relationship with the students?
5. Do you give assignments regularly and check it on time?
6. Do you motivate for practice mathematics problems?
7. What is the most useful techniques that you have been applying in culturally diverse class and why?
8. Do you think what sort of behaviour is suitable for students in multicultural classroom?
9. Does your students get sufficient time to do their assignments?
10. Do you feel that their behaviour towards you is different?
11. Does your school conduct extra classes for weak students?