

MAINTINING EQUITY: A CULTURAL DIVERSITY IN MATHEMATICS

CLASSROOM

A

THESIS

SUMMITTED

BY

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FOR THE DEGREE OF MASTER OF EDUCATION

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Letter of Certification

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Assoc. Prof. Laxmi Narayan Yadav

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Letter of Approval

This thesis entitled "**Maintaining Equity: A Cultural Diversity in Mathematics Classroom**" submitted by Mr. Bikram Dhakal in partial fulfillment of the requirement for the Master's Degree in Education has been approved.

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Recommendation for Acceptance

This is to certify that Mr. Bikram Dhakal has completed his M. Ed. thesis entitled "**Maintaining Equity: A Cultural Diversity in Mathematics Classroom**" under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize final viva-voice.

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Assoc. Prof. Dr. Bed Raj Acharya

Supervisor

Date :

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Defensed Date: June 2, 2019

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Dedication

Honestly dedicated

To

My parents

Bhuvananda Dhakal and Bhoma Dhakal

Declaration

This thesis contains no material which has been 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:

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Bikram Dhakal

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May, 2019

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Bikram Dhakal

Abstract

This study focus on “Maintaining Equity: A Cultural Diversity in Mathematics Classroom” .The objectives of this study were to explore the practices of mathematics in maintaining equity in cultural diversity mathematics classroom and to explore challenges faced by teacher to maintain equity in cultural diversity classroom. For this study, I applied qualitative research and case study design. Similarly, to collect and explore the data I used different types of tools such as class observation form, semi-structure interview for student and teacher.

One government school (i.e. Kirtipur Secondary School, Kathmandu) was selected from Kathmandu district and eight students from grade VIII and IX were selected on the basis of purposive sampling. For this research, Five Mathematics teachers were also selected as a sample of the study from the different Schools of Kathmandu district. The collected data were analyzed with the help of theories and related literature review. Cross match or triangulation was adopted to maintain the validity and reliability of the results of the study.

The study concluded that there are practices of mathematics to maintaining equity in cultural diversity mathematics classroom, such as individual treatment, evaluation and assessment, social justice, child phycology and interest, affection and encouragement, teaching stratified and technique. This study also found that there are different types of challenges faced by teacher to maintain equity in cultural diversity classroom. These are time management, lack of prior knowledge in student, individual treatment, different social cultural background and economic status, different levels of mental ability, lack of skill in ICT, lack of equity approaches in professional training, language problem and teaching overload. Thus maintaining the equity in cultural diversity mathematics classroom a big challenges which should be resolved on time.

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Chapter-I

Introduction

Background of the Study

The issue of equity in mathematics education is one of the major issues in the context of Nepal. Nepalese society is diverse or a multicultural, multilingual, multi religious with various languages. In this sense, the mathematics classroom has different types of students from different cultural background. In the context of Nepali society, people say that mathematics is the hardest subject the girls cannot study optional math in school level. This tradition of thinking and this is the example of Nepali culture toward the mathematics. Similarly, the people assume said that mathematics subject is suitable only for teaching occupation. It cannot be useful in other sectors. So, this is also the main difficulty in learning mathematics due to the negative thinking of people.

In all classroom teaching each student cannot get equal opportunity in the classroom because of number of students and teacher's use failure to diverse pedagogical approaches. The application of traditional pedagogy teacher can't help to work with all students.

Equity refers to providing equal opportunity to the students in the classroom. Educational equity referred to as equity in education is a measure of achievement, fairness and opportunity in education, the study of education equity is often linked with the study of excellence and equity. Equity is the main tool of inclusive. Panthi (2007) view that equity is defined as the equal opportunity the recent form the decision, policies, that and practices that given our classrooms. Then teacher should focus an empowering marginal students in the classroom while many classrooms might have appeared on the "one size fits for all" principle which is not always

equitable. There might be the diversity. In our school, there are the student of diverse cultural groups. There are various problems of teaching-learning mathematics in the culturally diverse classroom of students. So many problems are occurring frequently. That is way I chose to carry out systematic study on the topic “Maintaining equality: a cultural diversity in math mating classroom in the context of Nepal. So, I have been thinking that how a single teacher can address all students problem without equality approach. What types of difficult faced by teachers? What types of techniques/method/ strategies are used in cultural diversity classroom? What is the relation between culture and learning mathematics? How to teach effectively in culturally diverse classroom? These questions are challenges for all who are related to mathematics teaching. Therefore, I am motivated to select the topic for the inquiry.

Statement of Problem

Nepal is a multilingual, multicultural, and multiethnic and divers country where different types of traditional and rituals are followed. Likewise every school of Nepal contains same type of diversity inside the classroom. There exists diversity in ethnic, language, economic status as well as student mental ability, age, need and interest. Thus from the different background students enter the classroom and teacher needs to facilitate as per student's interest. But, while teaching by applying equity approach there might appear great challenges and difficulties. Therefore, in this context I want to research to find out the answers to these question to maintain the equity in cultural diversity mathematics classroom.

- Why was use equity approach in cultural diversity mathematics classroom?
- How was the teacher use strategies to maintain the equity in cultural diversity mathematics classroom?

Objective of the study

The main objectives of the study are

- To explore the practices of mathematics in maintaining equity in cultural diversity mathematics classroom.
- To explore challenges faced by teacher to maintain equity in cultural diversity classroom

Significance of the Study

This study has the following significance;

- It helps to know the perception of teacher on equity based approach teaching in diversity classroom.
- It enables teacher to use strategies in diversity classroom.
- It equally assists the policy maker to design the policy.
- It allows us to find out the challenges faced by teacher and student on diversity classroom.
- It helps teacher address different type's problem of student in diversity classroom.
- It is helpful to promote the equity in diversity classroom.
- It is helpful to make the classroom inclusive.
- It helps to reduce the discriminant in diversity classroom.

Delimitation of the Study

Each study is not perfect and free from limitation. This study has some limitations which are as following:

- The study considers only Kathmandu district.
- The study would be select only one government school which deals with equity maintaining techniques in cultural diversity mathematics classroom.

- The study was concerned with those students who are studying and these teachers who are teaching mathematics in secondary level.
- The sample school was taken purposively by researcher.
- The study was conducted on the basis of interview, observation forms.
- The study based on only qualitative paradigm.

Definition of Key Terms

Equity. The way of treating on the basis of ability level.

Cultural diversity. Cultural diversity is the existing of varieties of culture or ethnic groups with in a society

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

Public School. The schools that are established by government are called government schools.

Teacher. Teachers referred are mathematics teachers from secondary level

Students. Students referred are secondary level students of government school including different ethnic-group, cultural and society.

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

Chapter-II

Review of Related Literature

Review of Empirical Literature

A literature review is a written summary of journals articles, books and other published and unpublished documents that described that past and presents condition of information on the topic of research study, with so more information available searching and locating good literature on the topic of research study can be challenging (Cresswell, 2007) the previous studies cannot be ignore because they provide the information to the present study, the following empirical research will reviewed in the study.

Acharya (2013) carried out a study entitled “problem Encountered in Teaching –Learning Mathematics in Multicultural Classroom”. His aim was to explore the problems faced by students in learning mathematics in multicultural classroom at primary grades, and to explore the challenges faced by teachers in teaching mathematics in multicultural 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 problem between teacher and students at mathematics classroom. The teacher were found incompetent in teaching mathematics in multicultural situation as that 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 problem in mathematics teaching learning in the classroom. He also concluded that the present primary level mathematics curriculum Martials should be revised. It should be better to introduce inclusive curriculum for

every cultural group. The knowledge of learners is silent receiver of the prepared knowledge. The lesson are not contextualized. So we must change this scenario of Education system in Nepal.

Adhikari (2006) carried out the study entitled “cultural discontinuity and learning difficult in mathematics; A case study of primary dalit school children”. Her aim were to identify the cause of difficulties in learning mathematics of dalit children at school, to identify the impact of home environment of the dalit children to learn mathematics at school. She raised the research question: How do dalit children feel difficulties to learn mathematics at school? Do other children influence dalit children while learning mathematics? Do the teacher’s behavior influence dalit children to learn mathematics at school? Do the school environment support their mathematics learning at school? And do the home environment of dalit children support their mathematics learning at school? She used qualitative research design and tools were participation observation, in-depth interview. She concluded that cast system in Nepal appeared to be focal point that has affected the everyday lives of people. That also affected their way of talking and behaving to other people, their relation, experience and perception towards other thing and other people. It is the caste system that determines peoples’ everyday lives and their occupation. Similarly, children adopt different learning strategies. Cast system seems to be influencing factor for perception and thinking towards other people. The dalit have developed a dominated nature. In every field whether it is in the home/community or in school, they have to be dominated ,humiliated and oppressed due to their culture and poor language's they do not match with other experiences and everyday lives in learning mathematics .Cultural Discontinuity was the main cause of learning difficulties in mathematics.

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

Acharya (2015) carried out the PhD on the topic Relevance of primary level mathematics education in Nepal: A cultural perspectives. He raised the research question to what extent are the existing are the existing primary school mathematical curricular materials students' culture friendly? How are the pedagogy used by the teacher in multicultural classroom culturally relevant? What challenges/problem are faced by teacher and students while teaching-learning mathematical 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 method of observation, documents analysis and in an interactive or dialectical manner. The data have been analyzed using a sequential process of transcribing coding, categorizing and theming. The phenomena have been visualized from multiple theoretical perspective and the researcher's own reflections or insights. He found that contents of primary mathematics curriculum were related to the everyday problem 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. He found there was a huge gap between the practices and theory of culturally responsive teaching learning process. Similarly, the medium of instruction was found to be key challenges in multicultural classroom teaching learning process. De/contextualization of mathematical teaching -learning activity, incompetent teacher in teaching mathematics in multicultural situation, mono-cultural pedagogies, and contents dominated by ideologies of western culture were found challenges of mathematical 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 mathematics knowledge in the curriculum; culture friendly pedagogy and continuous assessment system are the major approaches to makes 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 and promoting multiculturalism as well as culture friendly

assessment is to be other important aspects to make mathematics education culturally relevant.

Thus, from the above literature review, it can be noticed that the studies about the cultural diversity and difficulty in learning mathematics have not been done any researcher. I have chosen this topic for generating various causes of difficulty faced by diverse children in learning mathematics. I claim that, the topic is new and oriented in the research process.

Giri (2016) has conduct the research study entitled “Problem faced by teacher and students in multicultural mathematics classroom. The major focus of the study was to find the problems of teacher in teaching mathematics in multicultural classroom and to find the problems faced by students in learning mathematics in multicultural classroom. For this research use the qualitative design with case study approach. To collect data researcher use classroom observation and interview guideline were the main tools of this research. In the research use purposive sampling techniques in selecting the respondents. In the study research find that main problems forced by students in learning mathematics were heavy work load in home low economics status of parents locate of interview between the teacher and the students. Lack if linkage theoretical and practical knowledge parents can't teach their children at home and language problems. Similarly, a problem faced by teacher in teaching mathematics were the communication problems. Teaching without contextualization lack of professional training teaching related and interrelated teaching method.

He is also found that the application of fallibility approach rather than absolutistic one in teaching learning activities. Mother tongue based on primary education. Teaching learning mathematics is to be linked with the culture of student

and promoting multiculturalism as well as culture friendly assessment is to be the other important aspect to make mathematics education culturally relevant.

Panthi, Luitel, Belbashe (2018) studies on the topic “Teachers’ Perception of Social Justice in Mathematics Classroom” in the study they are used interpretive qualitative method for data collection analysis and interpretation through inductive process. they are used such type of tools that is semi- structured interviews to take the perception of three mathematics teachers about social justices in mathematics classroom at three public secondary school in Kathmandu. Researchers carried out multiple layer of thematic analysis and interpretation of the narrative forms the interview data. Altogether five themes on perception of social questions emerged from the analysis of the data. These themes were associate with equality, equity fairness social problems and coring students the result of the study will have main two implications that are policy implication and pedagogical implication.

Shrestha (2016) carried at the study entitled “Cultural Diversity and difficulty in treating Mathematics. The major focus of the study on this objective identify the difficult in learning mathematics of culturally diverse students at school and to explore the relationship between culture and learning mathematics. In the study, researcher use qualitative research design and ethnography approach to explore the multiple realities through the method of observation in depth interview and document analysis. Researcher way the government school selected from Kathmandu district and light students from grade VII and IX were selected on the basis of purposive sampling. Head teachers and two Math teachers were also select or sample of then study. The collected data were analyzed with the help of theories and received literature call match or triangulations was adopted to maintain the validity and reliability of the result of the study, the study found that there is culture diversity in

classroom. The culturally diverse students have many difficulties in learning mathematics, pupils' weak perception on mathematics lack of culture friendly curriculum materials and traditional teaching and learning activities. Family's socio economic status discrimination in classroom were the difficulties students at school. It concludes that mathematics teaching and learning ways from the schooling is not good. Existing school mathematics teaching learning practices seem failing to address social and cultural need of students.

Upretee (2006) has carried out a case study research on 'Classroom management from multicultural perspective'. The main objectives of his study here to find out the knowledge about multicultural perspective and to find out the actual situation of mathematical classroom management from multicultural perspective. This study was limited to the school with students from diverse cultural background in Kavrepalanchok district. The selected respondents were primary level students, head teacher and other teachers. They use different ways like observation from interview, guidance and school documents. This research was interpreted by using qualitative method. The major finding were teacher beliefs and understanding of multiculturalism directly affected the classroom and there were very for teachers knows to the fact of multicultural directly affected the classroom and there were very for teachers knows to the fact of multiculturalism and its effect on the classroom. The level of understanding of multiculturalism was higher in Brahmins and Chhetris in comparison to Newars.

Wagle (2018) has conducted the research study entitled "Classroom discourse in mathematics: A multilingual perspective." The main focus of the study how addressed text question, how are existing teaching strategies in classroom discourse as students friendly? To get answer of this selected questions design with case study

approach. The study was conducted at Kuleshwar school Kathmandu. In this research eight persons were participating and used purposive sampling to select the participants. Class observation and interview guidelines were the main tools of this study. She uses different theories to produce the information and draw conclusions on the study from the analysis of the data she was found to be theoretically. Therefore, well known about preparing lesson plans but practically he was unable to be proactive in the actual classroom teaching. Teachers were theoretically aware about student-centered methods that have to be used by teachers in mono-cultural practice in multicultural classroom situations. Teaching was more focused on the elaborate phase. Likewise, for making classroom discourse students used culturally based pedagogy using different strategies in teaching learning methodology in the classroom.

Theoretical Review

There are many learning and sociological theories, which can be used for the analysis and interpretation of data such as cultural reproduction theory and cultural difference/ discontinuity theory and so on. So for the analysis and interpretation of data, I used a cultural reproduction theory, cultural difference/discontinuity theory.

Cultural Reproduction Theory. In this theory, Bourdieu suggests that the major role of the education system of schooling is cultural and social reproduction of the culture of the dominant classes. He found that school holds the cultural capital of the controlling class and transmits it unevenly to children. Bourdieu (1977); argues that cultural capital through education can be converted into health and power. Students who are from the middle class and above have advantages because school is adopting their culture. Therefore the children from upper class take more benefit out of school than lower class counterparts. The skill and knowledge which is transmitted in the

classroom ,is alien to the lower class children and hence ,they usually fail. In other words ,the achievement of the student responds to the culture capital of the main reason for under achievement of working class children are the education system because it reproduced the culture of dominates class, which is based .This is way the children from the working class and the income poor do not understand more and learns specific skills .On the other hand , the school environment is comfortable for the middle class parents depend on the teacher to educate their children whereas lower class parents do not supervise and monitor educational progress of their children. It is also a part of culture. For parental background to engage in the social reproduction process via cultural capital, parental culture capital needs to be transmitted inter-generationally .But this requires four conditions :first ,a strong association between parental and pupil's culture capital must exist .second ,this culture capital must persist over time .Third, parental cultural capital must exert significant effects ,after controlling for other background factors, on an offspring's occupation must be significantly mediated by offspring's culture capital. For transmission translate itself into stratified educational outcomes .We need to know whether the effect of parental culture capital persists significantly on the offspring's educational outcomes before that offspring enters the labour force (Tzanakis,2011).

Cultural Difference and Discontinuity Theory. In the cultural discontinuity theory, Ogbu(2000) deals with problem in children's learning caused by the difference and discontinuity between the culture at home and school. He says that those children whose home culture is much similar to the culture of school can cope easily with the system that may result better learning achievement .Similarly, the children witch unmatched and dissimilar home cultures with school culture do not have enough attention their learning and do not get much recognition of their culture

and they have to work achieving learning outcomes compared to the children with good matched. Ogbu emphasized learning not only the product of the culture and language of minority, disadvantaged and dominant groups. The dominate group controls the school system through implementing curriculum and using languages as the only means of instruction.

Ogbu(2001) has emphasized on two types of cultural difference i.e. the primary cultural difference of voluntary minorities and the secondary cultural difference of involuntary minorities. His study suggests, involuntary minorities face more difficulties in school learning, participation and performance due to big gap between their culture and mainstream culture. For the, it is too difficult to cross culture boundaries in school compared to the voluntary minorities with the primary difference. He further elaborated that primary culture difference may create problem 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 culture background start schooling assuming different cultural world and human relation in school but they get a vast different reality in school. Next lack of necessary concept and skills in their own culture may obstacle their learning. Finally, difference in teaching style and learning strategies may be important reason that affects their learning.

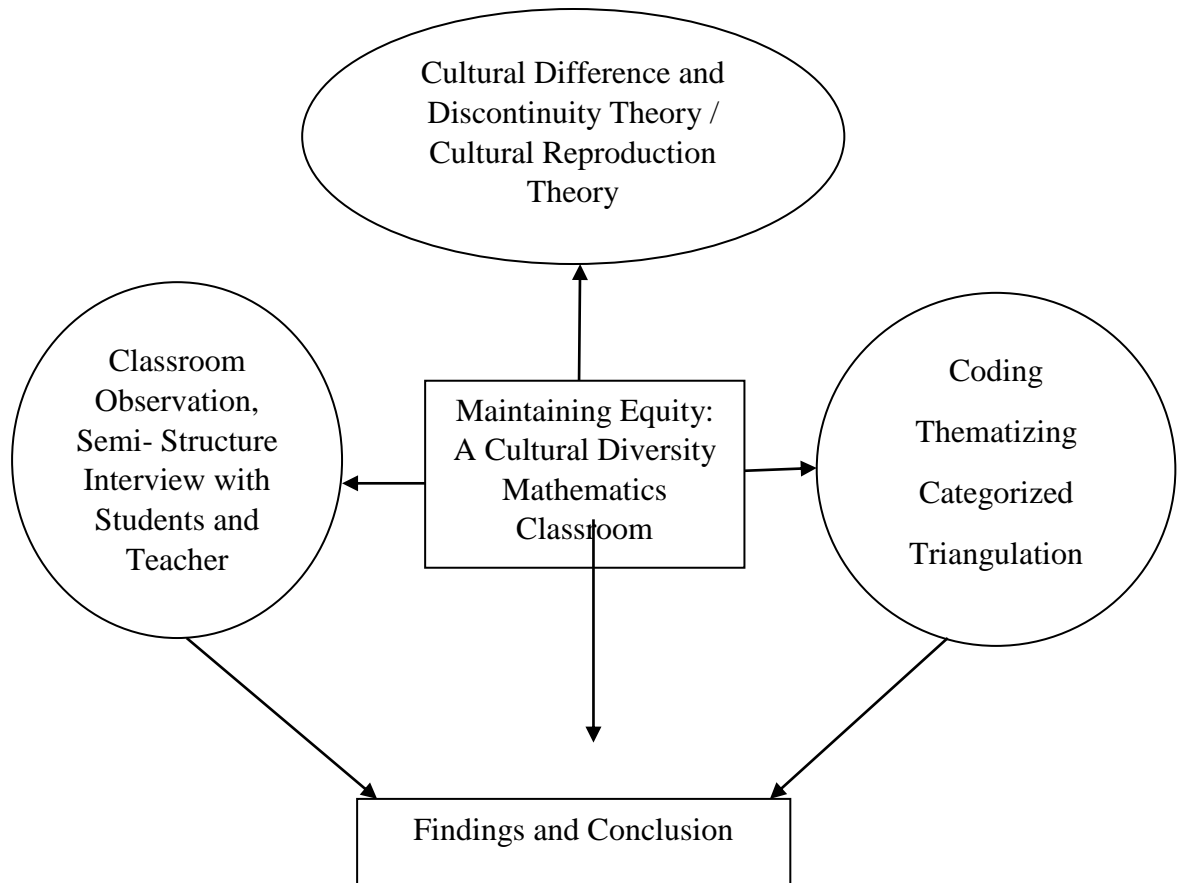
Ogbu (2001) argues that the secondary cultural discontinuity is evolved after members of two population groups with distinct cultural background have been in touch or they have started to participate in an institution like school which is controlled by another group, the dominate one. The dominate group sets school system in accordance to their own convenience and benefits e.g. their norm, value and aspirations in the curriculum, medium of instruction, and teaching/learning

approaches that suit to them. But the dominated group get on unfamiliar and unclear curricular content and their cultural resources do not match with overall education system so that they face difficulty in learning and participation that leads to their failure, and exclusion. Due to collective institutional discrimination and display like school system, they tend to exclude from the mainstream with social and economic problem that leads their lives to miserable condition. In addition such subordinate groups under caste stratification with discrimination do not get opportunity and accesses to privileges, reward or position considered as prerogatives of dominant group because of already fixed socio-cultural system or legal mechanism which are made by the dominant group. Therefore, the children from disadvantage caste tend to develop coping behavior and attitudes that are different to school culture that obstructs their learning. Secondary cultural discontinuities have difficulties to identify, point out and locate in school due to their diffuse nature with a deep root in the society. They are generally developed as a response to a contact situation involving the domination of one group by another subordinate group. The features of secondary cultural discontinuity are less specific, more diffuse and stylistic that creates difficulties in identifying and comprehending them. There are always dilemmas that the dominant group by saying difficult to know because of the multicultural existence of children in school/society. It is just an escaping trend and nature of the dominant group, the higher caste people from including the subordinate group or disadvantage group into the mainstream.

Conceptual Framework

Conceptual framework is an outline of the whole research that tries to associate the related branch and fields in itself. The conceptual framework devised through the literature studies facilitated to attain research objectives, get the answer of

research questions and carry out the research work as a whole smoothly (Acharya, 2015). Analyzing various literature reviews in relation to inclusive classroom practices and the relevant theory. I have developed a conceptual framework for the study. Which is given as below;



The conceptual framework, which I mentioned in above figure, is the important part of this study. Maintaining Equity: A Cultural Diversity in Mathematics Classroom was issues of the study. I have applied the qualitative research design and case study approach for carrying out this study. Different theories i.e. cultural discontinuity/difference theory and cultural reduction theory has used to interpret the data. This study has centered to explore the practices of mathematics in maintaining equity in cultural diversity classroom and challenges faced by teacher to maintaining

equity in cultural diversity classroom. Data collection analysis and interpretation process has been carried out by the help of different theories mentioned in theoretical literature review.

Filling the Gap

Few research works have been carried out on the “Maintaining Equity: A cultural diversity mathematics classroom” I review many books, article and previous research studies, they have not been discussed in this area, I noticed the gap between the reviewed literature and my title of the study. Thus, to fulfil this gap I am motivated to study on this topic. So, I believe my title for this dissertation is suitable for carrying out research.

Chapter-III

Method and Procedures

This chapter addresses the design of plan and procedure of study. It provides information on how to conduct the research. It helps the research to achieve the goals or objective of the research. This chapter further describes the study design, study area, sample of the study, tools, method for data collection and data analysis procedure.

Design the Study

The research design was qualitative with case study approach. The qualitative design is descriptive and exploratory in nature, (Acharya, 2015). Qualitative research is involving detailed verbal descriptions of characteristics case “people or systems obtained by interacting with interviewing and observing the subject (Denzin & Lincoln, 2000), qualitative research is multi method involving on interpretative naturalistic approach to its subject matters. This means that qualitative researcher study things in their natural settings and attempt to make sense of or interpret phenomena in terms of the meaning people bring to them (Denzin & Lincoln, 2000 as cited in Acharya, 2013 p. 28)

In this study, the researcher focus the study around the maintaining equity: A multi-cultural mathematics classroom.

Study Area

For the purpose of the study, I took government school from Kirtipur municipality of Kathmandu district because there are students from different cultural background coming to study. Study area selection is very important task for the study in order to obtain easy access taking information and gathering data directly related to

the research objectives. So, I was chose the Kirtipur Secondary school of Kathmandu district.

Participants of Study

In this study, the type of research is qualitative so the sample size in this study is not fix. According to Aerson there will not be rules for sample size in qualitative inquiry (Aderson 2001 p. 123 cited in Adhikari, 2007). Therefore, the sample size of the study based on the researcher and what he want to know, what the purpose of study, what can be credibility of the study. First, I went to school and met the head teacher. I took all about my study and I gave my research proposal. After that, the head teacher agree to give permission for me and he informed the teachers about my study. I took permission to observe Math class 8 and 9. After completing class observation, I chose 8 students from grade 8 and 9 among them equal number of boys and girls and five mathematics teacher also were chosen for the interview. The selection of this particular group students was based on different cultural background.

I used procedures sampling to select the participants for my study. In procedure sampling one pick up the case that are judged as typical on the basis of the need of researcher (Thakur, 1997 cited in Khanal, 2015).

Instruments

There are different methods for collecting primary and secondary data, the researcher collected secondary data from journals, articles, books, and other published and unpublished documents. The researcher used observation interview, photography video and audio record to get primary data. Creswell (2007) Visualized data collection as a series of interpreted activities aimed at fathering good information to answer emerging research question. On the basis of the data, we can study and analysis every aspect of the study. Research tools are the basis instruments to gather

data to seek possible situations for observed problems (Wikipedia). The main tools of the study are the class observation form, semi structure interview (teacher and student) and voice recorder.

The already design class observation form (Appendix; A) is used to observe the activities of teachers and students on the basis of principle of equity in cultured diversity mathematics classroom. I conducted two interviews in semi- structure form, (Appendix: B) were used for mathematics teacher in culture diversity classroom (Appendix: C) were used for students at the same classroom.

Quality Standard

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

Credibility. This concept replaces the idea of internal validity, by which researcher seek to establish confidence in the truth of their finding. To maintain credibility of my research I tried to spend as much time as the observation needed and engaged with different people with their work. After getting information I wrote notes, I asked similar types of question to other people and tried to find real practices from those information.

Transferability. Transferability replace the concept of external validity. This criterion refers to the applicability of finding is one context (where the research is done) to other contexts or setting (where the interpretations might be transferred).To maintain transferability I had expanded mathematical practices found in different community student briefly. I had tried to capture most of scenario by using tick description of observation, interview and my meaning making.

Conformability. A third standard is conformability, which refers to the quality of the results produced by an inquiry in terms of how well they are supported by informants who are involved in the study and by events that are independent of the inquiry. This is sometimes referred to as the audit trail (a record of how decisions were made throughout the study). I am also student. So to maintain conformability before concluding information I reviewed those information among my other students and friends before concluding information as well.

Data Collection Procedures

Data is the foundation of any research. Data collection refers to gathering information from vivid sources through the application of multiple data gathering method to attain the objective of the research under consideration (Niure, 2014) Therefore, data collected is the essential part of research. For this study the researcher visited the selected school and sampling of the students and teachers, I used the tools to gather the qualitative data. The researcher takes class observation behaviorally, with the students and teachers. At the same time I observe carefully recorded and list information each and every notable activity of students and teacher in the observation forms and also interviewing with math teachers and selected students with the help of interview guideline of the semi structured format. The researcher listed the responses of the respondents curiously and noted them in paragraphs.

Data Analysis and Interpretation

Presentation and analysis of the collected data is the core of the research work. In the study the data collected through above mentioned tools from interview into mobile recorder as translated in English the text stated the sentences from transcript of different respondents coded with specific terms. Similarly, the coded sentences expressed similar meaning segmented into common categories. After, category the

data were organized into specific heading for detailed analysis. Efforts were made to translate the information derived from classroom observation interview and theories to analysis the information and obtained the conclusion.

Chapter-IV

Analysis and Interpretation

This is a case study related to the practice of mathematics in maintaining equity in cultural diversity classroom and challenges faced by teacher to maintain equity in cultural diversity classroom at lower secondary and secondary level at Kathmandu district. In this chapter, I have addressed my research questions on why equity approach should be used in cultural diversity mathematics classroom and how teacher use strategies to maintain the equity in cultural diversity mathematics classroom.

In order to answer first research question systematically, the qualitative information was collected for answering the research question related to explore to the practice of mathematics in maintaining equity in cultural diversity classroom. I reached the respective sample school and necessary information was taken during the time of classroom teaching. Different episodes of different classroom were observed and taken interview with student and teacher participants. For answering the second research question I took the interview with mathematics teacher and classroom observation. The interpretation of analyzed data was done using different theoretical perspective as explained in literature review section .For this, this chapter is organized into two section. Section first discussed about exploring the practices of mathematics in maintaining equity in cultural diversity in mathematics classroom and section second discussed challenges faced by teacher to maintain equity in cultural diversity classroom.

Section First: Practices of Mathematics in Maintaining Equity in Cultural Diversity in Mathematics Classroom

In this section, I deal with the Practices of Mathematics in maintaining equity in cultural diversity Mathematics classroom. For this, I took interview to the student,

teacher and class observation of class Eight and Nine. The process of taking interview and class observation is presented below.

Teachers Role in Teaching Activity. The teachers are the facilitator for student in teaching learning activities. The role of teacher is to produce and explore the content toward students. The teacher should treat student according to their individual differences. In diverse classroom it is difficult for teacher to address individual needs of students. Meanwhile, I observed about practices followed by teacher to maintaining equity in mathematics classroom. I have found following responses from this class observation in order to maintaining equity in mathematics classroom.

Teacher entered the classroom and he started the lesson by attracting student's attention. He raised the content-wise question While teaching and listened students response. In the time of observation, I saw the teacher behaving equally with all students in the classroom. He attempted to create student friendly environment. The teacher was more focused on those who are slow-learner compared to other students and he tried to answer all queries of students. I had also seen that the teacher was motivating to all students participate in classroom interaction.

Finally I have found following responses from the representative students and teacher on this basis of semi-structured interview.

In this regard students says that,

Our teacher always treating same behavior for all classmates. He teaches to all friends without any discrimination.

Similarly, Teacher said,

My intention is that, every student should do better performance in result. For that, teacher should follow representative role which makes student friendly environment. A good teacher must address the individual treatment and interest of students and treat them as per student and the teacher can give better guideline for them.

From the above mentioned response of student and teacher and class observation, I have found that on the time of teaching in diversable classroom teacher should act as a facilitator for all students. All students raised own queries to the teacher regarding to content and students can raise questions openly for such type of teacher, who treat all students by equality approach. Thus, by active participation of students which remove the discrimination among students and it helps to promote equal access for all students inside the classroom.

Individual Treatment. Teacher enters the class in time with their objectives. There are different levels of students with different ethnicity. There is time-boundary for classroom teaching-learning process and most challenging work for teacher is to treat individual student but if teacher did not concern with student problem, they were out of the teaching-learning activities. In this regards I observed the classroom. The following results are generated through classroom observation:

Teacher teaches to different level of student by using different technique. The classroom is student centered. Teacher often asks the question about their understanding in a simple way. He focuses the student who can't give answer and give quick solution of question. But teacher did not give interest to know the students individual difficulties. If teacher listens and solves the individual student difficulties there can be equity in classroom.

As far as individual treatment is concerned, while observing classroom the following things are found from the teacher and student.

Student's response is that,

We understand some classrooms t, in this case we request sir and madam to make clear for the topic. Sir/madam tries to clarify us from the beginning of the problem. Then we are able to understand the problem.

In this way, Teacher said that,

To address student's difficulties individually, there is time-bound but by the long teaching experience we can easily know student's condition, so that we make a little bit concentration towards student. We haven't get any special plan for such condition. If students raise questions or problems in classroom, we solve problem in classroom individually.

Conclusion from the classroom observation and interview, it is found that teacher with teaching lesson plan couldn't be able to provide individual counseling for student but teacher provides their time to students if student are in difficult for solution and have desire to learn.

Evaluation and Assessment. Evaluation and assessment is an important tool for changing student's behavior and learning condition. It also provides feedback for student.

Nepal is a diverse country with different language, culture, costumes. On this perspective, we find the student with diversity and cognitive difference. It is most challenging work to address such diversity in evaluation and assessment process. In this context, it is very important to search about maintaining equity in classroom. I have done class observation which provides me the information of different practices to maintain the equity.

While observing the daily teaching learning activities in classroom the teacher has done different classwork and give home assignment too. The questions for classwork are different than the questions in classroom. Teacher has maintained the different levels of question as per student's knowledge level. For the assignment mostly teacher gives exercise from the book which is same for all students.

The following things are found from interview with student and teacher on the prospective of evaluation and assessment. In this regard, response of the student is that;

Teacher asks and gives different question as classwork but the question for home assignment is same from the book.

In this way, teacher's response is that;

While asking question in classroom and giving classwork we choose question as per the level of student so that it is easy for student to give answer. For homework we choose question from the exercise of book. So the question for homework is same.

In my understanding, classwork, homework and evaluation should be different as per the student level which maintains equity in cultural diversity in classroom. The practice of choosing question in diverse classroom for classwork as per student level is helpful but the same question for all students as home assignment makes a challenge to maintain equity because of the different cognitive level of students. Same work in same time can't be completed by all students. Talented students complete all the questions but poor student couldn't, which makes more gaps between talented and poor student.

Social Justice in Classroom. Social justice is honorable participation in all activities beyond any fear, discrimination and inequality. It provides co-operation, helpfulness and respectful behavior among students. The main responsibility of teacher is to maintain social justice and establish fairness. The behavior of student depends on teacher's knowledge and education.

The following things are found from observation with student and teacher on the issue of social justice in cultural diversity classroom.

Teacher checks homework individually after entering the classroom. After finishing the checking task teacher give feedback for all student. Teacher starts the class from remaining of the previous day lesson. The written things in whiteboard are visible and clear for every student and the teaching materials are prepared and used as maintaining equity. The language and tone of teacher is clear so student can hear and understand properly. Teacher use student individual name while asking question and ask question per as the level of student. Teacher respect both correct and incorrect answer from student. Teacher makes correction of answer and encourage to give answer of every question. Teacher gives individual feedback per as student level for classwork problem and didn't show any different behaviors to talented and poor student. It seems students get equal opportunity in classwork participation. There is child friendly-environment in classroom. Student can easily raise question to teacher. There is no any discrimination between students on any basis. To maintain equity the sitting strategies is rotation among benches and while participating in different activities there is no any discrimination and students feel equally valued.

In this regard, response from the student is that;

There is no any discrimination in school from teacher and friends. There is same behavior towards all student while on teaching learning activities, extracurricular activities and other school activities.

When asked based on it, teacher says that;

We haven't got any discriminative behavior with student at any cost. We all equally respect student's multicultural, ethnicity and gender.

From the above information it is found that there is equal behavior among student. The environment of school seems to be focusing on equity. The feeling of respectful behavior is found. There is respectful behavior from teacher and student. They equally respect other tradition, culture, custom, language and other things. There is no any discrimination while conducting school program, teaching learning activities, giving feedback, checking homework and classwork, punishment and discovering new knowledge, which address equity in school by neglecting discrimination. It seems that there is good learning environment on the perspective of social justice. In this regard, Panthi, Belbase and Luitel (2017) found that social justice help to promote equity by fairness and inclusion.

Child Psychology and Interest. Every child is born with own emotion. This is natural phenomena to have emotion like being happy, fear, interest and anger. Every student has such emotion which should be concentrated by every teacher. If the teacher can't be able to understand student's emotion then the teaching learning activities won't be meaningful. It is not an easy work to understand student's psychology but it is compulsory for every teacher. The things regarded with child psychology and interest on the behalf of maintaining equity on classroom is found while observing the classroom are:

The class is started as usual by checking homework. Teacher should start new topic; for that teacher ask about student's interest and start the class according to student's interest. Teacher is very careful about the student's interest and difficulties towards subject matter and gives his full effort to make child-friendly environment. If student feels boring in classroom, teacher manages the classroom to make interesting by conducting mathematical game and quiz competition.

In this regard, response from the student is that;

I have an interest to come school every day. Besides the teaching-learning activities there are many other interesting programs in school. Sometimes we feel so much boring in class. The other activities in class and school makes us desire to read and write well.

Similarly, response from the teacher is that;

It is not easy to understand child psychology but through the long time with them makes it easy to understand them. We can understand all emotion of students except some condition. We give more concentration, if there is different behavior with student we do the activities as per student's interests besides focusing in teaching learning activities.

Depending on findings from the classroom observation and interview, it is learned that there is child centered environment. There are many other extra interesting activities in school with student's interest, which helps to create student's attention towards teaching-learning activities. It creates equity by addressing student's diversity.

Affection and Encouragement. To know the condition of maintaining equity by addressing different diversity as cultural, language, gender, social and economic, the following practices are found while observing classroom:

There are lots of practices in classroom to get student's attention. Teacher shows their behavior with their love. The polite voice of teacher makes the student affective. For the difficult problems teacher give different types of stimulus to encourage student. Student always respects teacher so somehow there is fear of teacher in student's mind but the teacher who has spent some time for encouragement to student seems to close with student. Such teacher is successful to maintain equity psychologically in teaching-learning activities.

In this way, response from the student is that;

Teacher always shows lovely behavior with us. While we raise question in class teacher always gives us positive response and encourage to ask other question too. We always feel friendly with our teacher. The extracurricular activities in school helps us to understand our teacher. We can raise any question in classroom and outside from the school with our teacher.

After asking, the question teacher replied that;

In current status, the teaching- learning work shouldn't be done like before by showing fear, threats so we try to show friendly behavior. We wish there is no any negative effect in student from our behavior and student feel totally positive and friendly with us. We always use positive and encourage language while talking with student in both positive and negative bites.

By the class observation and taking response with student and teacher, we find that there is friendly behavior in classroom beside the different diversity. Teachers are able to maintain affection with student and give their full effort for encouragement

which directly helps to make equity in teaching learning activities. In the conclusion, it seems that the affection and encouragement plays vital role to maintain classroom equity.

Teaching Strategies and Technique. Teaching strategies and technique are those tools which enable to promote best teaching learning activities for teacher. Through the different teaching strategies teacher can maintain equity among students by providing the knowledge according to student's level. There may be lots of difficulties in teaching-learning process like family condition, economic status, student's interest and learning achievement which should be considered by teacher. It is not possible to provide knowledge by one way. So teacher should take different strategies and technique. The following things were found while observing the classroom on the prospective of teaching strategies and techniques to maintain equity:

Classroom lesson is started with checking home assignment. The problem of student was known through assignment and use strategies of teaching.

Teachers are using different types of teaching strategies in teaching learning activities as picking student to solve question in whiteboard and use mutual discussion to check the answer. Group work is done to solve the book exercise problem as classwork. Mostly, teacher using student centered method and do lots of classroom discussion. Teachers try to solve the problem relating to daily life by giving example. Student are used to check up the classwork and teacher play the role of supervisor. Sometimes different activities related with mathematics are done in classroom. There is mathematical lab in school for visualization, that mathematical lab is used twice a week.

Similarly the student remarked,

Teacher conduct quiz, group work and question answer in classroom.

Different examples are used to make lesson clear the lesson and sometimes tell to solve question in whiteboard. There is a mathematical lab in our school where we spend every two days in a week to learn mathematical concept.

In this regard, the teacher further said that;

There are no any fixed teaching strategies for classroom teaching, it depends upon subject matter and student's condition. We think that student should be more active then teacher by making group work, using mathematical lab, by cross-checking and make them to solve the problem in white board. Sometimes we make them practice in mathematical lab. Different competitions are held in school and by the prize we try to encourage students towards teaching-learning activities.

Through this classroom observation and interview with student and teacher, it can be concluded that there should be different teaching strategies in teaching-learning activities concerning with diversity, subjectivity and accessibility, which helps all the students learning process and maintaining equity.

Section Second: Challenge Face by Teacher in Cultural Diversity in Mathematics Classroom

Time Management. Time management is most important aspect in every field. In teaching field too we should be most careful about time management. By managing the time, we should get more learning achievement. In the diversity classroom it is very important and challenging work for managing time to address the equity.

While observing community school on the prospective of time management classroom is a place where we can find different kinds of diversity as

language, ethnicity, culture, customs and different learning condition.

Learning condition of student is different as per their background which is diverse in different aspect. Teacher has time boundary of 40 min in classroom.

There are 15-20 students in classroom. Teacher should check home assignment, give feedback, obtain teaching-learning activities, classwork and evaluate the learning achievement. For these work the time (40 min) is limited and create the challenge for teacher. The main reason behind the limited time is student cognitive level of diversity through this teacher should teach as student cognitive level.

After this I have concluded that it is very difficult to manage time in classroom teaching-learning activities. For this, I had short interview with teacher. The following things were found in the interview with the teacher interview on the prospective of teacher's time management in classroom.

In this regard, after asking the question teacher replied that;

Yes, there is lots of diversity in our classroom. It is not an easy task to teach in such classroom. I spend only 40 min in classroom by interacting 15-20 students mind through single mind. Inside this time bounded I should check homework and give individual feedback which takes some time. After that teaching learning activities should be done with the cognitive diverse student. After completion of teaching-learning activities, evaluation should be done and if students feel difficulty on learning the teaching-learning process should be repeated until bell rings for my period. In few days I have experience of not giving homework because of time bounded. It is very difficult to complete whole course in time.

In conclusion, it is most challenging work for all teachers to manage time. The classroom is time limited and should address different cognitive and cultural diversity. On the other hand, it is compulsory to cover the course in time. Through these things we can say that if the time is managed correctly, it is helpful to maintain equity.

Lack of Prior Knowledge in Student. In my observation, there are different students from different communities. On teaching-learning activities, there is no any common ability in student's learning capacity. Some student can learn in first attempt although some students can't learn in many attempts. There are lots of students who have problem in previous class lesson which are so common that make teacher to start lesson from basic concept which takes much time. As teacher focusing in small concept of small level in every class, there is problem on completion of course. Without the prior knowledge few students can't give attention on teaching-learning activities. Sometime, it is most challenging and difficult to control classroom which makes obstacles in teaching-learning activities.

On this basis, after asking question, teacher said that;

There are lots of diverse student in our classroom. As the policy of Nepal Government's Continuous Assessment System (CAS) it is compulsory to upgrade student higher class which makes that some student in higher level has no any basic knowledge. Such students create more challenge in teaching learning activities because the teaching-learning activities should be start from basic (prior) knowledge which takes more time. Talented student easily know the topic and weak students can't understand because of not having prior knowledge.

After this, I have concluded that there are some students who lack of prior knowledge. Such students create obstacles in teaching-learning activities. Teacher

faced the challenges to combine the talented student with weak student whereas talent student feel boring on basic concept although it is compulsory for weak student, which leads the time problem and create difficulties to maintain the equity.

Individual Treatment. In my classroom observation there is no any individual treatment for student but it seems practice in classroom as teacher give answer of question which is raised by student. This only is not enough for maintaining the equity in classroom. Teacher gives his attention to student's problem as individual in few times. Through this, we can say that it is most essential thing to address individual treatment for student to maintain equity in classroom.

In this regard teacher says that;

I have holistic view about the lesson before starting the teaching learning activities. There are different individual problems with student. If the problem with student is same, it is easy to solve but many times there are different problem with student. Limited time creates challenge to solve individual problem as individual treatment. Sometimes I try to solve student problem individually but it is not possible for all days in this condition I tell student to ask for their friend. As we have lesson to cover in time, it creates problem to treat student individually. Someday, leisure time is used for individual treatment.

It seems there is somehow use of individual treatment in classroom but it is not possible to provide individual treatment for all students at all time. The time-bounded class and fixed course of content are the main causes to provide individual treatment, which leads more challenging problem for teacher.

Different Social-cultural Background and Economical Status. Student in classroom are from diverse culture and society also their family and economic

condition is different. These things economic and family condition also affect teaching learning activities. The observed classroom is also full of diversity. By the discussion with teacher and student, I know that the economic condition of student is different. Mainly in the context of Nepal, the school education is little bit unstable than other country. Behavior and tone of student are different as their culture and customs. The student from somehow civilized society give respected behavior with teacher and friends. Their pattern to ask question- answer and classroom discussion seems to be different that the student from backward society. Economically, civilized family student come to school by proper dresses, they take extra class and tuition to be talent but the student from weak economic family can't afford these things.

In this way, response from the teacher is that;

In this school, most of the students are from poor economic family. Their families aren't educated. They should work for daily survival. So, they can't care their children towards study and they can't provide good teaching-learning materials.

It is clear that we should have lots of money to get school education although Nepal government has declared free education up to secondary school. The student from poor family status can't spend more money to their children's education by buying educational materials. In this condition, it is challenging work for teacher to maintain equity in classroom where students come from different diverse society. In this regards, Bourdiues Cultural reproduction theory verified above mentioned responses as like the school environment is comfortable for the middle class parents depend on the teacher to educate their children whereas lower class parents do not supervise and monitor educational progress of their children.

Cognitive Level of Student / Different Level of Mental Ability. There are different cognitive levels of students in classroom. The teacher is responsible to

provide the education as per student's mental ability. If the teacher can do this, then s/he is able to maintain equity. Most of the classroom are important to understand student's psychology, which helps teacher to provide the correct ideas and way of delivering knowledge to student. Student's different cognitive levels are also taken as a problem to maintain equity, while observing the classroom.

There are different cognitive levels of student. Teacher starts class with checking home assignment, it seems only few students have done complete assignment, few of them have half solution and rest haven't done the assignment. The student who haven't completed their assignment says, that we don't know, we have trouble to understand lesson. In classroom interaction some students give correct answer, some of them give wrong answer and rest of them don't say anything. It seems that there are different cognitive levels in learning, some students are clear in first attempt, some of them take time and few students pretend as they understood. Teacher faces the challenge to maintain equity as the students have different cognitive levels.

Similarly the teacher replied that;

There are different cognitive levels of student in classroom. It is not fair to teach same way for all students. Also it is not possible to teach different ways to student as their cognitive level. Few of the students are low cognitive level then we can't make them clear if we spent whole period to them. Such different cognitive levels of student make us problem in classroom although we are trying to give best way of knowledge.

In conclusion, there are different cognitive levels of students in classroom. For these types of students different teaching-learning strategies should be followed but limited time and different cognitive levels make difficulty which doesn't address the

cognitive difference of student. As a result, the talented students always an talent and weak student always an weak in teaching-learning activities and it creates a great challenge to maintain equity in classroom through the cognitive difference.

Lack of Skill in ICT. This is 21st century, which is the age of modern technology. Teaching is a noble profession and where ICTs should be used for good learning achievement. The world activities can be easily known through the communication. Modern discovery and construction of new knowledge can be easily obtained through using ICT. So, in teaching-learning field this also is useful for classroom activities. By the use of ICT students can expand and easily get concept toward lesson. It is most useful for talented students to expand different knowledge and weak students to get concept easily. This is modern trends of using ICTs based tool in every field. So, it should be used in teaching learning field. The following things regarding use ICT in classroom are found while observing the classroom.

There are normal benches in classroom. Teacher is using whiteboard for classroom activities. It seems that the teaching learning method and materials are old but teacher use mathematical lab twice in a week. The materials of mathematical lab aren't used properly and teacher also seem to be having basic knowledge about using mathematical lab. With the unequipped and lack of knowledge in teacher makes problem on using ICT tool in school challenging which takes a way the chance of student in learning mathematical ICTs knowledge in school.

After asking the question teacher says that;

This time is modern technology which provides easy way to teach student. To teach through ICTs it is compulsory to maintain basic infrastructure, good economic condition and equipped manpower. In our school there are some

ICTs based tool but there is no any equipped manpower to operate. So, we can't give basic knowledge about this. If we are equipped and we have an equipped manpower, we can give the knowledge about ICTs to all student.

ICT is the most powerful weapon for discovering new knowledge. Students who use ICT in teaching-learning activities seem to be best in the world. Here on the context of Nepal, most of the school having ICT based classroom, but there are no any equipped manpower for it. As result, the teacher should be trained and make ICT based. If the teacher can use ICT properly it is easy to maintain equity in classroom because it provides more ideas for weak student.

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

I have taken many training provided by the government. But no trainings have been taken on how to teach in the classrooms of diverse ethnic or culture groups. In our country there are many diversity and our teaching learning system is old. The training and education system doesn't give any idea to maintain equity. Therefore, in brief I don't know about this.

The vision of the teacher was absolutely justified with his teaching activities in mathematics class which was observed by me during my class observation. Thus, the teachers of public schools were not trained in teaching in multicultural classrooms, through the government claimed that there were about ten thousand teachers who already trained multicultural perspectives. However, these teachers were lack

adequate training on the multilingual education and multicultural classrooms.

Therefore, it seems to me that these teachers need more relevant trainings and implementation and strategies in Nepalese context.

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

Mostly I teach in Nepali language. There are multilingual student in the classrooms. I feel that some students who come from Nepali speaking family can understand the subject matter easily. Those students who came here from class one, they became familiar in multicultural classroom but those groups of newar students came from their society school to here in different classes they have attitude and language problem. For those students to teach mathematics is quite difficult. In classroom they used to talk with their friends in newari language which makes me in confusion that from other than Nepali language cannot understand in the same speed. They ask me questions many times. Sometimes, they feel embarrassed to ask questions in Nepali language. Therefore, I attempt to simplify my language so that they can easily understand in the classrooms.

From the above data, I realized that language was a major barrier faced by the teachers as a medium of instruction in the multicultural classroom situation. In this regard, Giri (2016) claim that A problem faced by teacher in teaching were the language and commutation. The teachers were not competent in mufti-languages as spoken by the students as the mother tongue. Therefore, it seems to me that the

multilingual education practices as envisaged by the government were ineffective in this case. Moreover, there is diversity among the students in the classroom in terms of language they speak. The schools with a total domination of single language instructional medium seems a barrier to learning mathematics. For me, a teacher's role, therefore, is to organize learning for all children to help them learn to the maximum according to their capacity.

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

Overloaded in Teaching. Teachers in public schools have got six or seven periods per day. It created a problem to give individual feedback, individual support, and thus, made individual guidance difficult. As per my field experiences, I feel that the public school teachers are over-loaded in teaching activities engaging about five to six hours in a day. In this regard, teacher replied that is;

Just our experience is not sufficient. Uploading the knowledge of mathematics to acquire, the role of school is indispensable. Financially, school should cooperate the teachers to make availability of teaching materials, library and Internet facilities.

Teachers lack sufficient time to create teaching materials. At least, school should help in reducing the number of periods of teacher so as to allow him to spend his extra time in planning and assessing students. Also, the number of students in the class should be reduced to controllable size so as to allow group work, as the teacher's voice we can describe that the teachers are willing to reduce their working hours so as to allocate their time in planning and assessing the students. Morning through evening

teachers is overloaded with number of periods. A teacher needs to teach 5 to 6 periods per day and as such they cannot manage their time in planning the future course and assessing the students. The students in the class over-crowded and as such teacher cannot give individual care in the class, nor do counseling out of school time.

Chapter-V

Findings, Conclusions and Implications

This chapter deals with the finding, conclusion and implications of the study. After the rigorous analysis and interpretation of collected data, the findings of the study have been derived and conclusions have been made based on findings. The implications have been forwarded in different levels. The followings were the finding of the study.

Finding Related to Practice of Mathematics in Maintaining Equity in Cultural Diversity Classroom

- In the context of Nepal, teacher plays vital role to make active participation in classroom which helps to remove all types of discriminations and promote to maintain equity.
- There are no any planned schedule for individual treatment in classroom but it seems that teacher were playing vital role for individual treatment as per student's desire and interest.
- The process of classwork and classroom activities were focused to maintain equity and home assignment. Teachers were choosing different questions as per student's cognitive level for classroom activities and same question for home assignment.
- There were good culture of social justice in Nepalese school by the help of respected behavior and positive thinking among student and teacher.
- Teacher in classroom were known about students psychology and interest which directly refers to equity maintaining practices by addressing student's Diversity.

- Affection and encouragement were the key to maintaining equity and the teacher in every classroom were able to make affection through the positive encouragement to student.
- The teacher of secondary level of Nepal were using different teaching-learning techniques and different teaching strategies were used to maintain equity.

Findings Related to Challenge Faced by Teacher in Cultural Diversity

Mathematics Classroom

- Time management
- Lack of Prior Knowledge in Student
- Individual Treatment
- Different Social-cultural Background and Economical Status
- Cognitive Level of Student / Different level of mental ability
- Lack of Skill in ICT
- Lack of equity approach professional training
- Language problems
- Overloaded in teaching

Conclusion and Discussions

There is no actual education policies to maintain classroom equity from the government side although the constitution of Nepal is agree with the multicultural, multilingual and multi religious country. The datas show that there are 125 castes and 123 types of language found in Nepal. In this perspective, we should be focused on maintaining equity by respecting and promoting diversity. To summarize in one paper, the maintaining equity in the cultural diversity mathematics classroom, there are mainly two things to mention here, one is the practice in teaching-learning

activities of school class and another is challenge that are faced by teacher of secondary level.

For the first one, there are different practices that can be found in classroom. Nepal is under developing country. The education sector of Nepal couldn't focus for technical area. The old types of teaching-learning activities are used in classroom. Teachers are only the main who are holding all the school curriculum and teaching learning activities without proper training and facilities. The process of addressing and maintaining equity is teacher's duty. Without the proper infrastructure teachers are providing their full effort in teaching learning process.

The less use of ICTs based tool is also another circumstance. Besides these all things, the school's classroom seems they are in equity based and oriented. This is only possible if teacher puts his full knowledge and effort towards it for that, all the qualities of teacher should maintain properly. There are different cognitive levels of students in classroom. The time boundary in classroom activities and fixed course of content make teachers to obtain classroom activities formally. It seems that if student has desire and interest to learn, teachers had been helping them which is the main milestone to maintain equity in classroom.

The evaluation and assessment system of schools has created few problems to maintain equity. There is good culture in classwork and classroom activities because teacher uses his mind to understand student level and choose proper questions individually. It is found that there is same question to all as home assignment which creates the mental gap and discourages weak students towards teaching-learning activities. There is good culture of social justice in Nepalese school by the help of respected behavior and positive thinking among students and teachers. It is very easy to learn in such collaborative environment.

On the other hand, there are lots of challenges due to different factors which are mentioned above. Time management, Lack of Prior Knowledge in Student, Individual Treatment, Different Social-cultural Background and Economical Status, Cognitive Level of Student, Lack of Skill in ICT, Lack of equity approach professional training, Language problems and Teaching Overload are the main challenges which are faced by the teacher while maintaining equity. We all can agree in one point of view, it is not an easy task to maintain equity in diverse classroom but we can promote and reduce the gaps of diversity, which specially should be done by the most of the teachers of secondary level in Nepal.

The equity principle can be applied by focusing on real life example in teaching mathematics, use democratic principle of interaction, valuing the marginalized student and judging their problem to solve, use multi method in teaching. The teacher's pedagogy should acknowledge the diverse culture, cognitions, ethnicity, race, gender from the perspective of social justice as equity in mathematics teaching in day to day classroom. The aim of equity is to strengthen democracy and social justice for all people. Equity is not obtained through the equal treatment only, it is unequal treatment for making equal. To maintain the equity in cultural diversity mathematics classroom we should consider on empowering marginal student, follow student's interest and experience, fairness in teaching learning, focusing towards weak student, empowering individual treatment, co-operation among teacher and student, focusing on local curriculum, applied the mathematics problem then theory, meaningful learning, and inclusive pedagogy in classroom.

Finally, the research study has noted a variety of areas in which more research and analysis could be particularly useful. A great deal remains to be learned about the

current situation and about the impacts of the various policies and programs that are being developed.

Educational Implications of the Study

Every research has implications in different sectors. The study entitled “Maintaining Equity: A Cultural Diversity in Mathematics Classroom” has educational implications, which are as follows;

- It concentrates to explore the practices of mathematics in maintaining equity in cultural diversity mathematics classroom.
- It is helpful to find out the challenge faced by teacher and students to maintain equity in cultural diversity mathematics classroom.
- It is helpful for every teacher to understand cultural diversity in classroom and apply culturally relevant teaching learning activities.
- This study can help mathematics teachers to make their preparation on culturally diversity mathematics classroom.
- This study can help to improve the mathematics achievement in multicultural classroom.
- It is helpful to make the inclusive classroom teaching.
- This study also helps to know the effects of individual difference in mathematics achievement.
- This study helps to teach using by equity approaches.
- It is helpful for teacher, student, researcher, institutions, educationist, and policy makers.
- It is help full to promote the equity in cultural diversity mathematics classroom.

- This study helps to reduce the discrimination using by equity in cultural diversity mathematics classroom.

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**Appendix- A
Observation Form**

Observer Name..... Date of Observation..... Observed

Time.....

Name of Observed College..... Period.....

Date.....

Items	Qualitative Information (Thick Description)
Development of learning objectives	
Objectives for the class are given(Verbally, written, or not at all)	
Objectives only discussed at the end of class	
Selection and use of instructional materials	
The text books are only materials provided to students	
Films, websites, and other audiovisual materials have a clear purpose	
Since the text may be pre-selected, thus the teacher provides support with reading or using the text, if necessary	
Educational climate for learning	
Students and teacher are interested and enthusiastic	
The teacher uses students names in the class	
Humor is used appropriately	
Teacher does not embarrass or belittle students in any way	
The atmosphere of the classroom is participative	
The teacher has eye contact with students	
Preparation for class session	
The teacher provides examples that are appropriate	
Students know what preparation(reading or other assignments) they should have completed prior to class	
Instructional Methods	
The opening attracted the attention of students	

The opening outlined the topics and purpose of the lecture	
The delivery was based on student's needs	
The teacher present materials or activity effectively	
The teacher summarizes the lesson and given assignments	
The teacher suggest an idea to consider before the next class	
The teacher could be seen and heard	
Key points were emphasized	
Explanation were clear to students	
Examples, metaphors, and analogies were appropriate	
The lecture was stimulating and thought provoking	
The teacher focuses small group work	
The teacher focus only whole class discussion	
The teacher evaluates the class such that the students would know his/her presentation	
The teachers groups the students according to their learning ability during class	
Opportunities for students participation	
The teacher encourage students to summarizes and add to other summaries	
The teacher helps weaker students to interact with others	
Individualization of instruction	
The emotional, physical, and intellectual needs of students are met	
The teacher solve the problems raised by individual students in the class	
The teacher promoted awareness of students prior learning and experiences	
The teacher offers “real worlds” application	
The teacher provides conversation among students of different ability	
Responsive to student feedback	
The teacher was paying attention to boredom and confusion	
The teacher encourage students questions	

The teacher provides students opportunities to mention problem/concerns with the class, either verbally or in writing	
Learning difficulties	
Students need assistance for a temporary or permanent disability	
One or more students are not motivated or unable to follow the class	
Students can see visual aids	
One group dominates discussion and hinder others participation	

Appendix -B
Interview Format for Teachers

Name:

Gender:

Qualification:

Caste:

Training:

Experience:

Religion:

Interview Guidelines:

Classroom Management

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

Student's Activities in Classroom:

- Do the student follow your instruction in the classroom?
- Do they bring all their textbook, copies and other related materials regularly?
- Do they complete their classwork and homework regularly?
- Do the same work to all on classroom and home?
- Do they feel difficult to understand secondary language?
- Do they participate in extracurricular activities?

Teacher's Activities

- Do you take equal time to all students?
- What are the strategies can be applied in teaching mathematics in cultural diversity classroom?
- What problem do you face while teaching in diverse classroom?

- How can the students be encouragement to learn in cultural classroom?
- How is your relationship with the students? Do you consider all the student equally?
- What are the factors behind ethnically diverse student's poor performance in mathematics?
- What is the most useful technique that you have been applying in cultural diverse classroom? And why?
- What types of obstacles and difficult have you encountered while teaching in cultural diverse classroom?
- What is the role of teacher to address equity?
- Do you give the time for the students for individual treatment?
- Do you think that your students get sufficient time for doing their homework?
- Do you think that it will be easy for you do teach if parents provided students extra classes in home?

Appendix-C
Interview Format for Students

Name:

Permanent Address:

Age:

Roll. No.:

Gender:

- Does teacher regular take your class?
- Do you feel relaxed while being in mathematics classroom?
- What are the problem you faced while studying with friends of diverse culture?
- What sort of punishment and rewards from your math teacher makes you learn better?
- How is your relationship with your mathematics teacher?
- How does your mathematics teacher calculate your learning?
- Which are the teaching method you like to most? Why?
- Do you feel difficult to understand the language in classroom?
- Do you feel difficult to asked question with teacher?
- Do you get equal chance in participation of classroom?
- Does your teacher give assignment regularly same to all?
- Do you feel that your teacher's behavior towards you is differently?
- Does your teacher discriminate you?
- Does your teacher ask question frequently?
- Does your teacher motivate you practicing mathematics problem?

- Is seat plan well managed?
- Do you get disturbed by your friends?
- Do you get sufficient time for doing your homework?
- Does your parent provide you sufficient instruction materials?