

**GIRLS' PERCEPTION OF SOCIAL JUSTICE IN MATHEMATICS  
CLASSROOM**

**A  
THESIS  
BY  
SARITA PARAJULI**

**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
MASTER'S DEGREE OF EDUCATION**

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त्रिभुवन विश्वविद्यालय  
शिक्षा शास्त्र केन्द्रिय विभाग  
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### Letter of Certificate

This is to certify that **Mrs. Sarita Parajuli**, a student of academic year 2072/2073 with Campus Roll No. 86/2072, Exam Roll No 7228391, T.U.Regd.No.9-2-53-221-2009 and Thesis No 1437 has completed her thesis under supervision of Dr. Bed Raj Acharya during the period prescribed by the rules and regulation of Tribhuvan University, Nepal. The thesis entitled “**Girls’ Perception of Social Justice in Mathematics Classroom**” embodied the result of her investigation conducting the period 2019 at the Department of Education, University Campus, Kirtipur- Kathmandu. I hereby, recommended and forward that her thesis be submitted for the evaluation as the partial requirement to award the Degree of Masters of Education.

.....

Assoc.Prof. Laxmi Narayan Yadav

(Head)

Date: May 9, 2019



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**Letter of Approval**

A

Thesis submitted by

Sarita Parajuli

Entitled

“Girls’ Perception of Social Justice in Mathematics Classroom” has been approved in partial fulfillment for requirement of the Degree of Masters Education.

**Committee for the Viva-Voice**

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Assoc.Prof. Laxmi Narayan Yadav

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Date:

### Recommendation for Acceptance

This is to certify that **Mrs. Sarita Parajuli**, has completed her thesis entitled “**Girls’ Perception of Social Justice in Mathematics Classroom**” under my supervision during the period prescribe by the rules and regulation of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward her thesis to the Department of Mathematics Education to organize final viva-voce.

.....  
Dr. Bed Raj Acharya

(Supervisor)

Date:.....

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## **Dedication**

This Study is

Dedicated to My Affectionate Parents

Who Gave Me Grandeur Opportunity to

Step in This Earth

and

All My Respected Teachers

Who Have Contributed to

Arrive Me in This Position

### **Declaration**

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

### **Acknowledgement**

First of all, I would like to express my deep gratitude to my respected research supervisor Dr. Bed Raj Acharya, Professor of Department of Mathematics Education for his regular and constant guidance and suggestions. Similarly, my profound gratitude goes to Assoc. Professor Laxmi Narayan Yadav, Head of Department of Mathematics Education, T. U., Kirtipur, who extremely helped me by providing his valuable time, ideas, techniques and information during the research work from beginning to the end. His enthusiasm, patience, kindness and generosity are ever memorable.

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I am very grateful to all the participant educators, teachers and students for their great help during data collection. I would like to give special thanks to my friends who support me during this work. I heartly remember my parents forever for their precious support for completing my study. Also I would like to give thanks to Mr.Taranath Adhikari for his help for completing this work.

.....

Sarita Parajuli



## Abstract

This study focused on “Girls’ Perception of Social Justice in Mathematics Classroom”. The objectives of this study were to explore the girls’ perception of social justice, to find out the challenges faced by the teachers to maintain social justice and to find out the strategies for reducing the challenges of maintaining social justice in mathematics classroom. In dealing with such objectives, I applied interpretive qualitative research design and ethnography approach to explore the multiple realities through the methods of open-ended interview, observation and as a research tools. Five girl students were selected from the Central Department of Education, Department of Mathematics Education Kirtipur , Kathmandu through purposive sampling. Three mathematics teachers and two Math educators were also selected as a sample of this study. The data analysis went through multiple layers of thematic analysis and interpretations of narratives from interview data. The collected data were analyzed with the help of theories and related literatures.

I found that girls understand social justice in mathematics classroom as equity, equality, fairness, social process and caring marginal students. Teachers seemed to provide equal opportunities and access to their students to socially just classroom. The challenges for creating socially just classroom include: diverse students, gender gap, cultural differences, insufficient teaching materials, student absenteeism, different interests of students and marginal students. Thus, the teachers need to apply different strategies such as counseling, group work, linking mathematics on daily life, enjoyment, demonstration and encouragement for reducing the challenges to maintain social justice in mathematics classroom. Such strategies are likely to give new and practical ways to understand the issues of social justice in mathematics classroom. Also make the mathematics classroom more inclusive and justifiable.

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## Chapter I

### Introduction

#### Background of the Study

Social justice is the equal access to wealth, opportunities, and privileges within a society. Planas and Civil (2009) take the definition a step further, defining social justice as “equal access to opportunities to participate in social construction of reality, and access to opportunities to improve the living conditions of individuals and groups” (p. 392). The goal of social justice is full and equal participation of all groups in a society that is mutually shaped to meet their needs. Thus, teaching for social justice refers to the application of “good teaching strategies” to support all types of students in a classroom with an expectation of success for all students, irrespective of their gender, social and economic background, level of intelligence and ability (Acharya, 2072).

Tanko (2012) defines social justice as ways of teaching that helps learners to understand their world better; it includes issues of equal opportunities for jobs and income, and civic participation, information and support to their lives. Social justice in education also refers to equity, justice and fairness in teaching and learning. In other words, it refers to a situation in which all students have equal right or equal treatment. And the social inequality is the condition of unequal access to the benefits of belonging to a society.

Social justice advocates hope to build a society in which individuals have equal access to resources and receive equitable treatment regardless of their race, gender, religion, sexuality, income level or disability. Enabling conversations about these issues empowers students to voice their concern and question unfair situations in their lives or in the lives of those around them. To help students examine systemic

inequality, teachers can have them consider questions such as: Who make decisions and who is left out? Who benefits and who suffers? Why is given practice fair or unfair? What is required to create change? Answering these questions, students can start to recognize injustice existing at the micro and macro levels (Panthi, 2016).

If we relate the concept of social justice to the classroom, it refers to a class in which all students' voice are equally heard, they are treated equally, their views are respected, and they get equal opportunity to learn, suggesting that it has equity. Furthermore, social justice has two dimensions: fairness and inclusion. Fairness involves individual and social situations such as socio-economic status, gender or ethnic origin should not be obstacle to succeed in education. Inclusion is taken as a notion in providing education to all (Ministry of Education and Education International, 2014).

The classrooms in Nepal have great diversity in terms of students' background. That means, there are students of different ethnic groups along with gender differences and their socio-economic status and physical disability .The diversity of student population has raised the issue of inequality in mathematics classroom. Therefore, teachers need multicultural education. Teachers applied very hardly single way of instruction to different students. It is challenging to change traditional instructional techniques and adopt multicultural techniques for teaching and learning mathematics. So the issue of social justice is always burning. Globally, there are very few studies on social justice issues in mathematics classrooms, and it is very rare in the Nepali context. Therefore, it is hoped that this study contribute to this field. Teachers need to be encouraged to try a new or innovative teaching method in their own context and integrate social justice principles more fully into their own

training programs. So, I have tried to study about the social justice in mathematics classroom on the perspective of girls.

### **Statement of the Problem**

In my experience, there is always low participation of girls in mathematics classroom, boys receive more academic helps and teachers are more likely to accept boy's ideas or opinions during classroom. Also the other academic field boys are in first priority for involving there. Educators also noted that girls had low self-confidence regarding their performance with mathematics. Thus, I think girls may view mathematics as a male dominated subject that is difficult to reconcile with their sex-role identity.

School is also a miniature society, it may not be an exception from forming any type of biased manner and behavior to all students. Social justice might also include provide equal access to curriculums, resources and good teachers. Thus, the maintaining social justice has been one of the major issues in education in general and mathematics education in particular. Being a mathematics student, I am motivated to carried out the research entitle "girls' perception of social justice in mathematics classroom".

This study attempted to seek the answer of the following research questions:

- How do girls' perceive social justice in mathematics classroom?
- What are the challenges faced by the teachers to maintain social justice in mathematics classroom?
- What strategies can be applied to reduce the challenges of maintaining social justice in mathematics classroom?

### **Objectives of the Study**

The main objectives of this study were as follows:

- To explore the girls' perception of social justice in mathematics classroom,
- To find out the challenges to maintain social justice in mathematics classroom,
- To find out the strategies for reducing the challenges of maintaining social justice

### **Significance of the Study**

The result of this study provides important knowledge that enables teachers, parents, society members and school family to eliminate social injustice in mathematics classroom. Social justice principles have even a great significance in terms of teaching and learning mathematics by creating socially justice classroom practices. Social justice in mathematics classroom promotes learning of individual or group and it contributes to equitable ways of achieving equitable outcomes recognizing disadvantages. It makes girls and other marginalized students feel that they are equally valued.

Social justice provides engaging, empowering, and authentic learning contexts for students in which mathematics skill can come alive and transcend the traditional limit and probe into abstract operations that have isolated and discouraged many students. As teachers are made more aware of the attitude of their students, they should be able to focus on the causes, effects, and consequences of the attitude and ways to address them in their teaching .This study helps to manage pedagogy for creating girls' positive attitude towards mathematics learning. Also, it helps the other disable, weak and marginalized students. Thus, the importances of this study are as follows:



- This study made aware to mathematics teacher about gender issues in teaching and learning process that support to improve integrated education system.
- This study helps mathematics teachers to provide equal opportunities and access to the students in the mathematics classroom.
- This study also helps to increase women's participation in science and technology field.
- This study helps to focus on the social variables that obstacles student for the further enhancement.
- This study helps the school administration to create appropriate school environment for all kind of students.

### **Delimitations of the Study**

This study has following delimitations:

- This study was limited to the Central Department of Education, Department of Mathematics Education Kirtipur, Kathmandu .
- This study was limited to five girl students, three teachers and two educators in mathematics education only.
- This study was limited to maintain social justice in mathematics classroom.

### **Definitions of Related Terms**

**Social justice in mathematics classroom.** Social justice is the equal access to wealth, opportunities, and privileges within a society. Social justice in mathematics classroom refers that all students' voice is equally heard and they are treated equally.

**Girls' perception.** This refers to the views of girl students on social justice in mathematics classroom.

**Gender difference:** Gender differences are variances between male and females that are based on biological adaptations that are the same for both sexes

## **Chapter II**

### **Review of Related Literature**

Review of related literature is source of further study for the research task. The review of the related literature is also an essential part of research for the researcher because literature helps and guides research to meet theoretical way for the study. Literature provides strong knowledge and it facilitates to select appropriate research problem. The main purpose of review of related literature is to find out what have been done in the field of the research. It helps to conduct the new research in a systematic manner by providing the general outline of the research study and avoids unintentional replication. Through studying related research, investigators learn which methodologies have proven useful and which seems less promising. So, I have reviewed the following empirical and theoretical literatures related social justice.

#### **Empirical Literature**

A brief summary of the previous researches and writing of recognized experts provide evidence that the researcher is familiar with what is already known and untested. Since effective research must be based upon past knowledge, this step helps to eliminate the duplication of what has been done, that provides useful suggestion for significant investigation. Several types of related literature were reviewed in this study which helps to make the concept clear for the study and also direct to analyze and interpret the data with this assumption, some related literature are reviewed as follows:

Colquitt (2014) studied on the topic “Social justice in mathematics education”. The purpose of this study was to explore the perception of teachers on social justice in

mathematics classrooms. A survey in five successful tenets of multicultural education gathers the perception of twelve mathematics teachers of grades 6-12. Survey responses, in conjunction with the small-group interview, conversation of two teachers, illuminate the issues pertaining to establishing a socially just classroom. Results indicate a strong desire of teachers to reach all students but not many teachers are familiar with preparation of teacher education programs to equip teachers for the diverse students they are expected to teach as well as professional development opportunities to support teachers of diverse learners.

Rupakheti (2017) did a study on “girls’ participation in mathematics at University level”. The main objectives of his study was to explore the causes of low participation of girls in mathematics at University level and to find out the socio-cultural dimensions influence the participation of girls in higher level mathematics education. This study is based on qualitative research design and Auto-ethnography approach was used to explore the multiple realities through the methods of interview, observation and as a research tools. One University Campus was selected from Kathmandu district and five students from B.Ed. and M.Ed. were selected on the basis of purposive sampling. Two mathematics teachers were also selected as a sample of this study. After analyzed of data he found that the girls’ students have many difficulties in learning mathematics. They are early marriage, parental belief system, public image of mathematics, traditional teaching learning activities family’s socio-economics status and discrimination in classroom were the main causes of girls low participation in mathematics at University level. It was concluded that mathematics teaching and learning approaches from the schooling is not good. Existing school mathematics teaching learning practices seem failing to address social and cultural needs of the students.

Shastri (2014) studied on the topic “Gender Inequality and Women Discrimination”. The main objective of this study was to find out the various forms of discrimination in women. Men and Women are two wheels of a cart. Female of our country have faced the discrimination throughout the ages and still to be continued in various forms. Usually, discrimination is influenced by cultural norms and tradition, religion, region etc. Biologically and sociologically both are assigned to different role. Physically a female role is to look after house, children, family and relatives and on the other hand men are made for bread earner, for hardship and for struggle for earning. All these thinking made our women weaker and deprived of basic things. Both are equal in human right. Women are discriminated in this male dominating society. As a result most of women are unable to understand their own right and freedom. They are not free in this so-called “Society”. Thus, discrimination not only hampers women future but also impedes the country growth.

Similarly, Pokhrel (2014) studied on the topic “Gender discrimination: Women perspectives”. The main objective of this study was to explore the perception of women in discrimination in various aspects in a male dominated society. The study was designed by descriptive study based on sample survey. The total of 200 women was selected randomly for this study. The findings of her study showed that there is a discrimination against women in various aspects. Women are aware of discrimination in the societal and household levels. They perceive more discrimination in the societal level comparing to household level. Married women perceive more discrimination in mobility, property, occupation and education. Similarly, unmarried women perceive more discrimination in mobility and way of behaving. They consider gender and customary practices as major factors responsible for discrimination.

Wright (2016) studied on the topic “Social justice in the mathematics classroom”. This study reports on the establishment of a research group, comprising five teacher researchers and him, with aimed to challenge this situation through adopting a participatory action research methodology in educational attainment in London. By planning, teaching, and evaluating innovative classroom activities, the group demonstrated how making mathematics more relevant and meaningful can enhance students’ engagement and agency. The collaborative and mutually supportive nature of the group developed teacher researchers’ self-efficacy in addressing issues of social justice in their mathematics classroom.

The research project reported in this paper provides some insight into what teaching mathematics for social justice might look like in practice, and how it can be promoted through an effective model of professional development. It also demonstrates how teachers and researchers can work collaboratively, through systematic inquiry, which generates reliable and trustworthy findings, to challenges the current situation in which mathematics teaching perspectives have created inequalities and injustices within society. It is unlikely that those in positions of power will embrace the findings of this research, since there might be better served by maintaining the status-quo. However, it is hoped that those committed to education as a means of changing the world for the better might gain some insight from the project’s findings into how to go about bringing about positive change in the mathematics classroom.

Wonnacott (2011) conducted a research on “Teaching mathematics for social justice and its effects on affluent students”. The main objective of his study was to explore the effects of incorporating social justice issues in mathematics with affluent,

middle school students. This study used action research. Teaching mathematics for social justice is a pedagogy that uses mathematics as a tool to expose students to issues concerning power, resource inequities, and disparate opportunities between different social groups to illegal social and political action. Findings indicate that integrating social justice issues into mathematics affected some students' cognitive and affective domains and in some cases led to empowerment and action. The study also found that students' perception of responsibility, their age and personal connections along with the amount of teacher direction may have affected students' development of social agency. These findings help to inform teachers' practices and contribute to literature on critical mathematics.

Panthi et al. (2018) described about the topic "Strategies for promoting social justice in mathematics classroom". The purpose of this paper was to discuss the strategies used by the teachers for promoting social justice in the mathematics classroom. An interpretive qualitative research method was applied for data construction, analysis and interpretation through an iterative process. Three math teachers and their three students (one for each teacher) were selected as the research participants purposively from three public secondary schools in Kathmandu. Qualitative narratives were generated through in-depth interview and classroom observations with each participant. The data analysis went through multiple layers of thematic analysis and interpretations of the narratives from the interview data. Altogether six themes emerged from the analysis of the data. These themes include counseling and encouragement, group work and cooperative learning, linking mathematics to daily life, personalized way of instruction, promotion of joyful environment, and class work and projects.

## **Theoretical Review**

The theoretical discussion is needed for the interaction of the findings of the study. Theories provide an important base for understanding and interpreting the realities that comes across the process of research. Here, I used the feminist theory in my research study.

**Feminist theory.** Feminist theory came into existence with the dissatisfaction toward sociological theories and subordination of woman in various fields. Feminists argue that mathematics is a male dominated subject that explain everything from the viewpoints of male behind female and feminists' perspective is must to understand the subordination and exploitation of women by men. It argues that women are excluded from the domain of mathematics, thus masculinity remains privileged. Feminists argue that only including or adding women in the domain of mathematics does not serve the purpose of understanding women or justify the absence of women's presence in mathematics. They further claims that the biological difference between men and women do not explain their roles inside classroom rather it needs to be understood as socially constructed (Askins, 2005). They admit that there are anatomical differences between boys and girls but what is important are the ways in which girls and boys are socialized and brought up, how they are treated and interacted and the ways they are taught the appropriate behavior.

According feminist analysis, in all cultures, girls have been socialized into gender roles, although the degree to which behavior is innate or environmentally determined is greatly debated. In most cultures and time periods of the world, girls have traditionally played with dolls and toy, cooking and cleaning equipment, while boys prefer toys and games that require more physical activity or simulated violence,

such as toy trucks, balls, and toy guns. Girls may be prevented from participating in many of the same activities that boys participate at the same age, as a matter of that may cause physical injury. Sometimes boys are pressed to be more responsible than girls, except in the case of caring for younger children, which is sometimes thought to be instinctual in girls. Girls, as a group, may be perceived as being more docile than boys, and as being less capable of rational decision making and more governed by emotional responses.

**Feminist theory and education.** Since my study deals with the social justice in mathematics classroom within discrimination against the girls in school, I discuss feminist theory and education particularly. The feminist argue that patriarchal society prepares the girls for the subordinate roles both in public and domestic life, with boys/men leading the upper posts and taking major decisions. In educational area, they have argued that girls are not only disadvantages in the educational system but also learn to be subordinate and to accept dominant ideologies of feminineness and masculine. They explain that subtle processes coupled with make girls excel only in particular subjects, thus delimiting their opportunities in labor market.

Feminist patriarchy research has shown that girls learn to create their identity as feminized, radicalized and located within a class system through schooling processes. They further claim that schooling depicts patriarchal nature through structural positioning of women in lower level of schooling system. “The axis of feminist enquiry id gender, which consists of deeply ensconced social meaning and their derivative power” (Wood, as cited in Fox & Murry, 2000). Female members of the school, both students and teachers, are disadvantaged irrespective of the attitude and values of individual teachers or the policies of individual schools or local authorities that provide base for understanding and explaining actions of what is going



on. As theories make sense of facts, similarly feminist's theories provide basis for explaining gender division in all spheres of society including education, about subordinations and oppression of the women. Much of the feminist theory focuses on analyzing gender inequality and the promotion of women's rights, interest and issues. Among various feminist perspectives, I have adopted radical and social feminism for my study. These feminists' theories address oppression of women, ways of overcoming them, power relations and expression of individual self.

**Social justice in educational policies.** The issue of social justice is gaining a momentum in the educational plans and policies in Nepal in recent years. The divide of the education system as private and the public is one of the much-debated issues related to social justice in education in general and mathematics education in particular, in the country. The private and public education system in the country has produced two kinds of mentality with social implications leading to the division of the society. These problems reflect in the private schools (MOE, 2015). The government framed The National Curriculum Framework to help schools to frame their teaching and learning as per the government directives and policy. The National Curriculum Framework for School Education in Nepal 2007 states that:

*From the point of view of access and equity, the principle of positive discrimination needs to be adopted for the expansion of education. Therefore, the nation should make special provision for women, helpless and senior citizens, orphans with disability and economically and socially backward community. Furthermore, it should safeguard the right to education in mother tongue, guarantee the child rights and provide free basic education. (CDC, 2007).*

Hence, the document shows the policy of the government to provide equal access to education for all despite gender, age, and status of one's life. However, there

is no seriousness in the concerned authorities to improve the quality of public education in Nepal leading to further deterioration of school mathematics curricular practice in the classrooms. As a result, there is a huge difference in student achievements in mathematics across the geographical locations, ethnic majorities, and gender (MOE, 2015). Recent study on National Assessment of Student Achievement (NASA) reported that;

*In mathematics, the average achievement score is 57% in the private schools where as it is 26% in the community (or public) schools. However, it is not clear whether it is due to the effectiveness of instructional processes in the institutional schools or manifestation of the disparity of socio-economic status of students in these two different school systems (MOE, 2015, p.vii)*

The disparity reported above in the achievement in private and public schools has been one of the major sources of social inequality in mathematics education. The report highlights that there is also a difference in the achievement of Dalit and some Janajati students compared to students from the majority communities in Nepal (MOE, 2015). The report further indicates that there is a wider gap in the students' achievement between rural and urban schools in Nepal. The achievement gap is about 24% in the grade 8 (MOE, 2015).

Recently, the Government of Nepal, Ministry of Education exposed School Sector Development Plan (SSDP) 2016/17-2022/23 which mentions about equity and inclusion. This policy document states, “there has been significant progress on strengthening equity, and there is now gender equality on a number of basic and secondary education indicators” (p.28). The same document states that there are still “many differences remain with children receiving inequitable access to quality education due to the gender, socio-economic status, language, ethnicity, caste, and

geographical location and differing abilities” (p.28). Realizing these issues, SSDP has suggested for strategic interventions by consolidating equity-based strategies, using disparity-based formulas and indexes, strengthening the institutional capacity to provide inclusive education for all children (MOE, 2017).

When it comes to education policy in the country, the new constitution of Nepal (2015) has guaranteed the right to education in mother tongue until high school. It states that, “Every Nepali community living in Nepal shall have the right to acquire education in its mother tongue up to the secondary level, and the right to open and run schools and educational institutions as provided for by law”(part 3,31.5). The provision is not a new one because Nepal had a similar provision in the Interim Constitution 2007. Recently, the Ministry of Education introduced the National Education Framework for School Education in Nepal 2007 (UNESCO,2011) which embarks upon curriculum reform based on equity and access to mathematics education in Nepal due to lack of clarity in vision, mission , and enactment of educational plans and policies.

Social justice in educational policies relate to equal opportunities and desegregation of higher education. The educational policies should create opportunities for all in education by implementing and enhancing equality indicators. There are three key elements in social justice in educational policies –first, bringing excluded and marginalized students to the fore; second, applying social justice audit to assess the effectiveness of social justice policy in practice ; and third, adopting redistribution of resources in a fairer way and recognizing the cultural and social identity (Thrupp &Tomlinson, 2005). However, there is ongoing controversy in education policies unveils some of these controversies in relation to multiculturalism, accountability, and demands of educational standards.

**Vygotsky's constructivist theory.** According to social constructivism of Vygotsky, mathematics is a social construction, a cultural product, fallible like any other branch of knowledge so constructivism believes that learners can construct their own understanding and knowledge of the world through experiencing the things and reflecting those experiences. “Constructivism emphasizes the aspect of learning which is about understanding and, in doing so, takes us beyond any naive conception of learning a rote learning or as a unproblematic ‘drinking in’ of new information”(Fox, 2001).

Vygotsky’s constructivist is proximate to my research issues since my focus is on socio-cultural dimensions having direct impact on participation of females in mathematics. Vygotsky emphasized on human sociability, social interaction and culture of society. Fallible nature of constructivism believes that there is not a single truth: rather all truth is constructed by individuals or societies so I engaged with participants to get insightful ideas in my research topic through the constricted meaning and understanding of participants about mathematics.

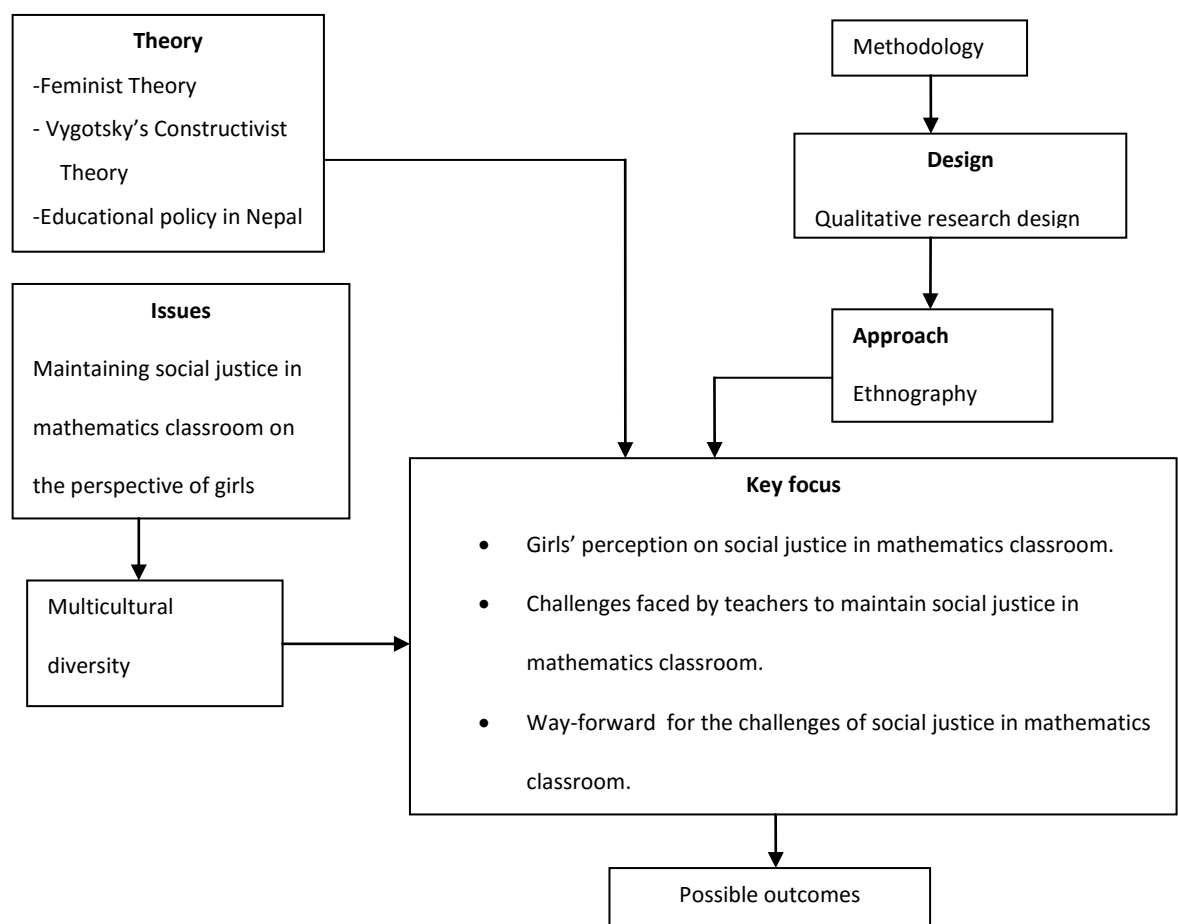
### **Conceptual Framework of the Study**

Conceptual framework is a representation, either graphically or in narrative form, of the main concepts or variables, and their presumed relationship with each other. It brings clarity and focus, helping researcher to see and organize the research questions more clearly. Also, helps to make explicit what the researcher already know and think about the area and topic.

The theoretical approaches and the review of literature related to study mentioned above have provide a wide range of knowledge needed to adopt and appropriate research methodology and have also provided guidelines to follow appropriate theories to analyze and interpret the findings. Here, the feminist theory

could be used to analyze gender inequality and the promotion of women's rights, interest and issues the gender difference and the education policy could help to analyze social justice in mathematics education. Similarly, the constructivism theory focuses on socio-cultural dimension. The above review of literature and theories, help me to draw the following conceptual framework:

**Figure: 2.1. Conceptual understanding of the study**



The above conceptual framework shows that my study agenda is related to social justice in Mathematics classroom. For this, I took students', teachers' and educators' experiences and critical reflection in their existing practice of social justice. This study aims to explore girls' perception of social justice and challenges to maintain social justice for the promotion of equity and fairness in mathematics

classroom with their strategies to reduce challenges to maintain social justice for the promotion of equity and fairness in mathematics classroom. I applied interpretive inquiry method. I captured lived experiences of educators, teachers and students through interviews. It is notable that interpretive inquiry has not specific rules to collect information. I also used related theory. Likewise, I generated the findings and conclusion based on multiple layers of analysis and interpretation of the narratives for my research.

To sum up, in this chapter, I divided the review of literature into two parts: empirical and theoretical. Based on this, I presented the conceptual framework of the study and described it.

## **Chapter III**

### **Research Methods and Procedures of the Study**

This chapter presents the procedure of the study, which involves the design of the study, population, sample and sampling strategies, study area/field, data collection tools, data collection procedures and data analysis and interpretation procedures. It also explains the procedure of data collection. I adopted the following methodologies for this research work:

#### **Research Design**

Research design is ways through which the researchers collect the data, interpret and analyze. This is an ethnography related to maintain social justice in mathematics classroom on the perspective of girls'. Thus, this study is qualitative design and ethnography approach. Qualitative research method involves the use of qualitative data, such as interviews, documents and observations, in order to understand and explain a social phenomenon. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Creswell, 2005). Qualitative research being with assumption, a worldview, the possible use of a theoretical lens and the study of research problem inquiring into the meaning individual or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, data analysis that is inductive and establishes patterns or themes. The final written report or presentation includes the voice of participants, the reflexivity of the researcher, a complex description and interpretation of problem and it extends the literature or signals a call for action.

## **Ethnography Approach**

Ethnography is a qualitative research method which involves a description of people and nature of phenomena. It is designed to explore cultures. It is designed to explore cultural phenomena where the researcher observes society from the point of view of the subject of the study (Acharya, 2072). An ethnography is a means to represent graphically and in writing the culture of a group.

Ethnography is the study of people in the naturally occurring setting or field by means of methods which capture their social meanings and ordinary activities involving the research participating directly in the setting (Brewer, 2005). It focuses on cultural groups. Ethnography is a qualitative research design in which the researcher describes and interprets the shared and learns patterns of values, behaviors, beliefs and a language of culture-sharing group. Ethnography is also a way of studying a culture sharing groups as well as the final written product of that research as a process and outcome (Harris 1968, as cited in Creswell, 2005).

The profounder of ethnography are Boas, Milinowski, Radcliffe-Brown and Mead in early 19<sup>th</sup> century who had begun in like comparative cultural anthropology

In my research I involved extend observation of the group or class, most often through participant observation, in which I immersed in the day to day lives of the people and observed and interview the group. Thus my study is related to the ethnography approach.

## **Selection of Field**

In dealing with the purpose of my research, I have selected Central Department of Education, Department of Mathematics Education, from University Campus Kirtipur, Kathmandu, five girl students, three mathematics teachers and two math educators through the purposive sampling.



### **Sample of the Study**

Sample size of the qualitative research is not fix. There are no rules for sample size in qualitative inquiry. Therefore, the sample size of this study depends upon the researcher what s/he wants to know, what the purpose of research was, what can be credibility of the study and what can be done with available time and resources (Khanal, 2073). Thus, for the sample of my study I selected five girl students, three mathematics teachers and two math educators from Department of Mathematics Education Kirtipur, Kathmandu by the purposive sampling method.

### **Research Tool**

This study mainly focuses on the interpretive qualitative method for data collection, analysis, and interpretation. On the basis of this study, interview schedule and class observation guidelines were used as tool for this study.

**Class observation guidelines.** Observation means to watch over all from the every point of view. Observation allows gathering data on the physical setting, human setting, interaction setting and program setting. Observation guideline is a kind of tool that helps to see the knowledge through the use of sense that is eyes, nose, tongue and skin. It has great important in my research works. As data gathering device, direct observation makes important contribution to descriptive research. Thus, for collecting data I prepared the observation guidelines. Then I observed the classroom and collected the needed information through the observation guidelines (see appendix-1).

**Interview guidelines.** Which is the process of communication or interaction in which subject or interview gives the needed information verbally in a face to face situation. The open ended semi structure interview was administrated in this study on the basis of objectives. Prior to visiting the field interview schedule is already developed with reference to research objectives and with guidelines of previous

researchers. The interview schedule included the information of key students, their opinion about classroom environment and school related conditions, mathematics learning, culture, gender difference etc. It is assumed that these variables are already established and they could influence to maintain social justice in mathematics classroom. Mathematics teachers interviewed also. Direct face to face interview with respondent were taking. One set of interview guidelines was developed as an instrument for the collection of needed information which was used for girls students and other one/one set developed for teachers and educators.

### **Quality Standard**

After completing the construction of the research tools, it is necessary to maintain quality standard. For the quality standard the reliability and validity of data were maintained by the following techniques:

**Credibility.** The credibility criteria involve establishing that the results of qualitative research are credible or believable from the perspective of the participant in the research. Since from this, the purpose of qualitative research is to describe or understand the phenomena of interest from the participant's eyes, the participants are the only ones who can legally judge the credibility of the results. For collecting data I observed class and took interviews with teachers, educators and students. This helps to maintain reliability of data.

**Transferability.** Transferability refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings. After completing my research it can be generalized in other areas within Tribhuvan University. It can be also generalized social organizations and other social sectors. Thus, this helps to maintain quality standard of data.

**Dependability.** The idea of dependability emphasizes the need for the researcher to account for the ever-changing context within which research occurs. In my research, I collected data from different sources by using classroom observation guidelines and interview guidelines as research tools for the quality maintain of data.

**Confirmality.** Qualitative research tends to assume that each researcher brings a unique perspective to the study. In my research, I collect the data from different perspective of my participants' interviews and from classroom observation. This helps to maintain reliability of data interpretation.

**Triangulation.** Triangulation is a method to get an accurate and reliable picture of situation. I tried to understand by collecting different kinds of information from different perspective, from different sources and with different tools. Here I used data triangulations where the data obtain from the class observation, interview with teachers, educators and students. This helps to maintain quality and validity of qualitative data interpretation.

**Prolong stay in the field.** For collecting the data I stayed ten days in a field where the mathematics classroom observed. I took college from Kathmandu valley where the different social background students can be found. Interview was taken for few days and school documents (teaching method and materials) collected for few days. In the field which I saw and found those data were taken for research. That the reliability and validity of the data.

### **Data Collection Procedures**

The data were collected through above mentioned tools from different respondents and sources were processed in different steps. The permission was taken from the administration of the selected Campus. Then I observed the classroom and interacted with the respondents informally before the class started. After then, I

informed about the nature and purpose of my study and permission was taken before conducting the interview. Likewise, also the teachers approached informally during their leisure time. The interviews of selected students, teachers and educators were taken within ten days. Their interview was record. The data from interviewed in the recorder transcribed in Nepali in note book. Then, that translated in English in computer. Separate files were created for each respondent.

### **Data Analysis Procedure**

Miles and Huberman (1994) suggest that good qualitative data analysis has to be systematic and intensely discipline. For the purpose of analysis, the themes were analyzed for answering the research questions. The sentences under the themes were paraphrased or quoted as stated by individual participants. The important paraphrases with same meaning were brought together and summarized to support the argument whereas less relevant passages with same meaning were skipped for the case of analysis. Then after, with the help of theories the analyzed texts were interpreted and summarized. Thus, analysis of the statements from the specific themes were done and theories were used to interpret the meanings, values, experiences, opinions and behavior of respondents from the analyzed themes and answer the research questions.

In this qualitative research I collected the data from the participants and display them for analyzing and interpreting. The data can be reduced during the interpreting and check their validity by using the different corresponding theories. It is qualitative as well as descriptive research, so there is no mathematical procedure to analyze the data. The collected information for this study was categorized according to the respondents and the different themes were given in the text of the interview and observation note. These themes were considered as a code. The similar code version of the respondents were collected together and explained in their perspectives. The

data were analyzed and interpreted by using descriptive method with the help of literature review and the theoretical framework.

## **Chapter IV**

### **Data Analysis and Interpretation**

This chapter deals with the various forms of social justice that create discrimination between gender, ethnic, castes, mentally and physically disabled in higher education. In this chapter, I have tried to address my research in three sections. The first section discussed about exploring the girls' perception of social justice in mathematics classroom, second section discussed about the challenges faced by teachers to maintain social justice in mathematics classroom and the third section discussed about the strategies for reducing the challenges to maintain social justice in mathematics classroom.

#### **Section 1: Girls' Perception of Social Justice in Mathematics Classroom**

This section discussed about exploring the girls' perception on social justice. The socio-cultural norms and practices have a huge impact on everyday forms of discriminations against women. The patriarchal social structures, girls' early marriage and early pregnancy, motherhood duties and household works affect the participation of girls and women in formal education. Social justice denotes justice for poor, exploited and oppressed people in all societies, and surrounds struggles of people everywhere who work for gender equality, intellectual protection and human rights (Panthi et al., 2018).

Here, I took an interview with five girl students. The interview was taken separately with each student at Central Campus. The following themes were emerged on the basis of participants view.

## Equality

Equality is when everyone is treated in the same way, without giving any effect to their need and requirements. In finer terms, it is a state of getting the same quantity or value or status. It is a situation where each and every individual is granted same rights and responsibilities, irrespective of their individual differences.

Equality means sameness. In my opinion, everybody's needs should be met equally. In a classroom context, teachers need to treat all students equally. Equality is necessary for maintaining uniformity in the quality of mathematics teaching. In this regards my student participant 'S1' states that,

*Teachers should manage classroom environment by asking questions equally to all students without any biasness. All of the students have equal rights to learn and also to ask questions related to the topics in classroom. Mathematics teachers need to treat all students equally (Interview, 18th March, 2019).*

In this regard, Tanko (2012) views socially just teaching as a way of teaching that helps learners to understand their world better and also enables them to seek their justifiable share of benefits in their society, while contributing to its positive development. It also includes issues of equal opportunities for jobs and income, civic participation, and information and support related to one's personal life. I feel that it is meaningful understanding of teaching and learning things. Similarly, my student participant 'S3' argued that,

*Equality is to behave equally with all students, not to deviate them, to make them enjoy of freedom, and to create the environment of equal justice. Through this approach students feel themselves being equal. This aims to explore active*

*participation in classroom. In addition; she argued that teachers should be treating the students according to their level of knowledge (Interview, 18<sup>th</sup> March, 2019).*

In this regard, Gutierrez (2008) opines: Although equity means “justice” or “fairness,” it is often associated with equality, which means ‘sameness’. However, in order to address social justice and account for various home resources, student identities, and other contextual factors, students need distinct (not the same) resources, and treatment in order to achieve “fairness.” (pp.40-41).

The above argument shows that the teacher should give equal emphasis to students from different gender, ethnic groups and background. However, students from marginalized communities have marginal thinking i.e. they concentrate on other works rather than on mathematics learning. Teachers should motivate the ones who do not have any concept of mathematical topic to make social just classroom. Teacher should use same criteria to evaluate all students. Teachers should be fairly examining all students to ensure social justice in his classroom. I think that mathematics teachers have to give equal chances for learning mathematics to all students so that it helps to improve performance of all students.

### **Fairness**

In general, fairness is unbiased behavior to others. In a classroom context, it refers to a situation in which teachers do not bias their students. That means, Students do not feel dominated by others in their classroom. In this regards, my students participant ‘S1’ shares her view as,

*Fairness refers to treating all students without any bias. But sometimes I feel unfair activity is doing in my classroom by some of the teachers during class time. I*



*need to have equal chance to learn mathematics. Some of activities that the teachers conduct in my classrooms are unfair. Teachers have to behave fairly to all students for making social just classroom (Interview, 19th, March, 2019).*

The similar opinion is given by Student 'S2' when she said; *“I need to be treated equally. I need to clearly understand what teachers teach in their classroom. Classroom activities should be transparent and without biasness. In order to improve students' performances and develop our beliefs and confidence towards mathematics, teachers need to promote a good relation among students and expect good success rate for all students” (Interview, 19th March, 2019).*

In this regard, Singh (2011) views that the social justice as unbiased distribution of material and nonmaterial resources that are “beneficial and valued”. In other words, teachers need to provide equal opportunities to learners, if they focus on social justice. Singh also highlights the necessity of equal participation of all students in teaching and learning.

Thus, from the above opinion I concluded that there are different categories to make teaching fair such as clarity in teaching, teachers' confidence, transparent teaching, and focus on equality. I also argue that the teachers have to give equal importance to all students in their classroom. I realize that fairness is to be free from biasness. My participants too have a common view that teachers need to teach their students without being biased and provide material and non-material resources to their students without being biased. I think that it improves quality of teaching and learning and also student performance. This argument shows that fairness is being free from biasness and inequalities. Teachers have to give equal importance to all students in their classroom.

## Equity

The term equity refers to the system of justice and fairness, where there is an even-handed treatment of all the people. Under this system, the individual needs and requirements are taken into account and treated accordingly. Equity means conducting unequal behavior to unequal students. In this context, teacher gives an opportunity to all students according to their needs. It also refers to increasing the performance of low performers and socially, geographically backwards students. In this regards my student participant 'S2' states that,

*Equity is something where all students have similar position in their classroom. I think each teacher should realize that he/she should not discriminate students according to their gender, caste etc. In my classroom, students from different gender, ethnic background and proficiency level are mixed in a group. Thus, the teachers need to be free from any kind of biasness. In my opinion this practice helps students to learn from each other. It also helps them to feel fairness in their classroom during class time (interview, 19th March, 2019).*

In this regard, Moscardini (2014) states that the teachers should be applying cooperative teaching and learning practices for the improvement of social justice. Teachers need to understand that an equitable practice in mathematics teaching acknowledges the involvement of all students in making sense of their mathematical learning. Teachers need to use the approaches that take care of classroom diversity and ensure equity (as cited in Panthi, 2016). Similarly, the student 'S4' argued that,

*Equity is a necessary component for equality. Further, she argued that there should not be unequal behavior to students from different backgrounds. She said that teachers need to behave students equally even in unequal situation to ensure social*

*justice and equity. I think that there might be inequity in terms of caste, gender, economic condition, diverse culture and social position out of school. Thus the teachers need to maintain equity for making social just classroom. Teachers should be emphasis on the students who do not interact well in learning process (Interview, 21<sup>st</sup> March, 2019).*

The above argument shows that this practice tries to maintain equal justice, psychologically and encourages students to be present at school regularly. Teachers should be supports weak students and makes them active in mathematics classroom. Similarly, student participant ‘S5’ states that,

*Equity is reducing gap between good and weak students. In mathematics classroom teachers should be behave equally with students from different ethnic communities and support marginal students. Teachers also provide books to needy students and give them reinforcement for making social just classroom (Interview, 21<sup>st</sup>, March, 2019).*

This argument shows that it is necessary for improving capacity of all students in mathematics classroom. I argued that teachers have to uplift marginal and weak students in mathematics classroom by guiding students according to their needs. I think that equitable classroom opens up enough space of classroom interaction. The teachers need to assist to develop ability of students in mathematical works. They need to have socio-political awareness for the application of mathematics. Thus, teaching mathematics for social justice may assist to enhance students' consciousness of social injustice, which happen in large communities. It is also important to note that equity is a notion that is often measured on the basis of test scores, with instructors looking for equal test scores among students of various cultural groups, social classes

or sexes. Therefore, teachers need to try to develop performance of all students (Marginal and disadvantaged students).

### **Caring Weak and Marginal Students**

I perceive that social justice also refers to caring low performer and socially and economically disadvantaged and marginalized students. So, teacher needs to care such students. I realize that caring and justice are two parts of the same coin. So, we cannot separate them. In this regard my student participant 'S4' argued her views as,

*Teachers need to focus on students, who are academically (in reading and writing), socially and economically weak and marginalized in their society. Teachers should be providing extra classes, special treatment, counseling, and extra time to weak and marginalized students. In addition, teachers always support socially weak students for the improvement of their performance (interview, 21<sup>st</sup> march, 2019).*

Similar response is given by student 'S5'; *economically and socially marginalized students are weak at studies. They do not want to ask questions about the topic. Teachers should be explaining to encourage them in the ways that they can ask questions and understand teaching contents (treatment on the basis of capacity) (Interview, 21<sup>st</sup> March, 2019).*

In this regard, Adam (2015) views there are two primary ways to maintain relationship between morality of justice and morality of care: (1) the superiority approach: It describes that one ethic group is superior to others. In most cases, it is discussed in regard of justice. So, some people discuss it as a superior approach; (2) the integration approach: It seeks to find one monistic theory, in which care and justice are connected. The latter view is that justice cannot exist without care and vice

versa. So care and justice cannot be separated. They are interrelated. In my opinion, teachers need to give high priority to care each student in classroom (as cited in Panthi, 2016).

Thus, I concluded that the research focuses on 'morality of care' and 'morality of justice' by examining critical ethical issues. I have come to realize that social justice is incomplete without care. Also, the teachers need to identify and respond to emotional and psychosocial needs of students. I mean, teachers should watch and care marginalized, disadvantaged, weak and slow students so that the performance of all students may increase. Weak and marginalized students need special care and treatment. Disadvantaged students need special care and extra time. Such kind of support has encouraged students to be regular in the classroom.

### **Social Process**

I think that social justice also includes socialization of classroom communities in which students and teacher cooperate to each other. It also refers to teachers' and parents' active participation and interaction to support students. Thus, it is sharing ideas and reflections to promote social justice in classroom communities. In this regard, my student participant 'S1' shares her view as:

*Social process is the process of socialization in a classroom, in which all students are connected to one another. In classroom teaching and learning Teachers should include good and weak students, from different ethnic communities in a group and helps them to socialize themselves. Teachers should help to develop a good relation among the students in his class. (Interview, 18<sup>th</sup> March, 2019).*

Similarly, my student participant ‘S3’ shares her view as, *Students cooperate with each other. We also use mathematics in our daily lives. We are engaged with different project works. When we work together, we support each other. All students participate actively and coordinate with each other when we are engaged with project works. This practice has helped to maintain social justice in my classroom (Interview, 21<sup>st</sup> March, 2019).*

In this regard, Colquitt (2014) views this process as conscience. It is learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality. Moreover, he emphasizes that critical pedagogy is an analysis of the relationship among socio political power, social processes, and construction of knowledge.

Thus, I concluded that the teachers need to encourage students to think critically about any topic and to work on challenges. Students need to have enough opportunity to pose questions to their teachers when they do not understand subject matter. Also, students should be free to think, ask, explain and reflect on/about any problem of mathematics so that they can learn practical aspects of mathematics. Thus, a classroom should be seen as a community and a process of socialization in which they cooperate with each other.

To sum up, in this section, I explained girls’ perception of social justice in mathematics classroom. I found that they perceived social justice as equity, equality, fairness, social process, caring weak and marginal students. Moreover, it has come with further meaning-making that girls are expected to behave equally to the students and provide equal access and opportunity to all of the students in classroom during class time. Likewise, girls are expected teachers need to teach lesson relating it to

context. As shared by participants, teachers should care weak and marginalized students more. They should guide equally to students and do not differentiate between these Students. Teachers need to identify those students' weaknesses and treat them accordingly. Disadvantaged students need special care and extra time. However, there are some challenges while teaching and learning mathematics in classroom. I have described the challenges faced by the teachers to maintain social justice in mathematics classroom in the next section.

## **Section 2: Challenges Faced by the Teachers to Maintain Social Justice**

This section discusses about the challenges faced by the teachers to maintain social justice in mathematics classroom. It is not easier to take action as it is easier to say. It is challenging to act for social justice in the school in teaching mathematics in culturally diverse classes. There are some challenges associated with teaching for social justice. Here, socially aware educators may perceive classroom pedagogy as a threat to the status quo, and also rigid curriculum that has little or no real relation to learners' lived experience outside their classroom (Acharya, 2072).

The biggest challenge faced by teachers and teacher educators is: how can they work effectively and equitably for all learners in ever more diverse classrooms. So as to address the research question 'how do teachers express the challenges of promoting social justice in mathematics classroom?' I have pointed out various challenges for promoting social justice in our mathematics classroom. In doing so, I have generated different themes based on the three teachers' interview. Each of the themes is presented below.

## Diverse Students

Since our mathematics classrooms are multicultural. So the issue of social justice is always burning. Therefore, teachers need multicultural education. Teachers apply very hardly single way of instruction to different students. Nevertheless, it is a challenging issue for social justice. In this regard, teacher 'A' states:

*Students are from various backgrounds such as cultural, economic, social, gender, geographical, academic, and non-academic. Further, they have different cultures and native languages. Teacher gives them different types of works but some of them mostly do not involve themselves in those works. Some of them are passive and noisy too. Some students sometimes tease their friends and disturb the whole class. Such diversity, it has been difficult to teach them equally. Therefore, it is one of the main challenges for promoting social justice in mathematics classroom (Interview, 28th March, 2019).*

The similar response is given by teacher 'B'; he argued that *I have students from various ethnic and language groups. Sometimes, I face problems when giving real life examples to students, but real life examples may not be meaningful to other students with different background. When I use a term, some students get confused (Interview, 28th March, 2019).*

In this regard, NCTM (2000) states that mathematics classroom is a place where all students should be stimulated to actively participate, share various ideas, and take part in problem solution. For this, it may need socially just instruction, which may require teachers to view mathematics education through social justice perspective. I think, teachers should have knowledge and skills to reinforce students in classroom. Also, Panthi (2016) noted that "teachers should view students' home



cultures and languages as strengths upon which to build, rather than deficits for which to compensate.” (p. 3). This statement suggests for purposeful attempts of teachers to identify, grasp, and represent the lived experiences of students and their attempt to provide students with meaningful learning opportunities that may help to drive students towards success.

From above argument I concluded that “real life example” could maintain social justice, but problem is with giving equal experiences to the other students from different socio-cultural and linguistic background. In this diversity, same thing may have different meanings for diverse students. There are also low, good and average students in classroom. Due to all of these things, it is difficult for teachers to maintain social justice in classroom. . I think, teachers should have knowledge and skills to reinforce students in classroom.

### **Gender Gap**

Gender is a set of features distinguishing between male and female, particularly in the cases of men and women. Depending on the situation, the discerning features vary from sex to social value to gender identity. Gender differences in mathematics performance and ability have been concerned and a lot research is carried out to address the under-representation of women at the highest levels of mathematics, physical sciences and engineering. In this regard, teacher ‘B’ states;

*Gender gap is a challenge for maintaining social justice in my classroom. I found from my experiences, in some classes females were more active than males .But most of the classes I found that male students were active than females. Teachers focus more on boys than on girls in mathematical activities. Thus, the gender*

*discrimination is a challenge in classroom. (Interview, 28<sup>th</sup> March, 2019).* Similarly, the teacher C said that, *few male students are better than female students. Most female students are nearly at the same level of performance. The performance of boys and girls are slightly different (Interview, 29th March, 2019).*

The above argument shows that gender gap creates inequity in classroom and gender difference on performance increases social injustice. So, Teachers have to try to reduce gender difference. They need to be gender friendly in terms of lesson planning, teaching methods, preparations of materials, language use, seating arrangements and classroom management as a strategy to maintain gender equity in their classroom.

### **Cultural Differences**

Culture includes ethnicity, socio-economic status, language, geographic origin, learning manner and abilities, gender etc. It is challenging to change traditional instructional techniques and adopt multicultural techniques for teaching and learning mathematics.

In this regard teacher 'A' said, *“Cultural difference is one of the challenges for maintaining social justice in classroom. Because of cultural diversity, they have different feelings. For instance, Muslim students worry when holidays are given to Hindus. The effect of this is reflected on their behaviors” (Interview, 28th Aug, 2019).*

The similar response is given by teacher 'B' as; *Different religions are challenges for social justice. Students dominate each other on the basis of religion. Even teachers behave differently to their students. For instance, some teachers appreciate Hindu students consciously or subconsciously dominate Muslim students*

*and others. That influences teaching and learning of mathematics (Interview, 28th March, 2019).*

Also teacher 'C' shares the similar views as; *Cultural differences are existence in my classrooms. Students from different ethnic groups behave differently with their friends in their classroom. Some children from minority group hesitate to take part in different activities as they feel dominated by a certain group. So, the classroom environment is not good for learning mathematics (Interview 29<sup>th</sup> March, 2019).*

In this regard, Upadhyay et al., (2067) stated that school environment and the role of teachers are important; teachers need to be aware of diversity that exists in classroom and how socio-cultural factors affect academic performance of students. Teachers' perceptions and attitudes towards cultural diversity are crucial for student motivation towards learning.

From the above arguments I concluded that there are various cultures of students as there are different religious groups. Students of one religion slightly dominate students of other religion in classroom. Some teachers are also biased in terms of religion. However, I think, teachers should not bias students based on their cultural background and also encourage their students not to be biased to their friends. Therefore, it can be argued that cultural difference is one of the main challenges for maintaining social justice in mathematics classroom.

### **Insufficient Teaching Materials**

I realized that there are not sufficient materials in mathematics classrooms. But, students conceive the idea from any lesson taught using material. Thus, it creates a problem in teaching. In this regard teacher 'A' reported that;

*Mathematics classrooms do not have enough materials. They have textbooks and some practice books only. Students want to use laptop and mobiles to learn mathematics but there is no laptop and mobile for classroom use. We also need to use overhead projector. But, most of the time we are using only textbook (Interview, 28<sup>th</sup> March, 2019).*

Similarly the teacher 'B' said, "There are insufficient overhead projectors, computers, and audio-video materials for classroom use. But, these materials are necessary for mathematics teaching" (Interview 28<sup>th</sup> March, 2019). Teacher C further adds, "The materials which are available at college they are unable to use topic-related materials in classroom. I do not even try to design materials (Interview 29<sup>th</sup> March, 2019)

From the above arguments, I argued that all the teacher participants report that there are not sufficient materials for classroom use. I feel that teachers are not serious about the construction and collection of materials. But, I think, materials are necessary for effective teaching.

### **Non- participatory Teaching**

I think that traditional teaching techniques are also challenges for promoting social justice in classroom context. In this regard, teacher 'B' said, "I use board marker and emphasize more on teacher-centered techniques in teaching mathematics. Due to large number of students, it is not possible to make all students participate in different tasks" (Interview 28<sup>th</sup> March, 2019). Similarly the teacher 'C' also stated that,

*Teachers' habits of traditional teaching in classroom are challenges of social justice. This sort of conventional teaching does not give opportunity to students to participate in different tasks .So, teachers need to be more active and encourage all students to participate in class activities (Interview, 29th March, 2019).*

In this regard, National Research Council (2000) states that Conventional forms of mathematics instruction tend to focus on finding right answer and memorizing facts and procedures, but often leave students' unengaged and unprepared for difficult and innovative problem solving .

From above argument I argued that when teachers use a participatory teaching approach, students are motivated to learn mathematics. They are close with their teachers. They learn mathematics more. But, teachers cannot easily adopt participatory approach because of classroom problems. Teacher-centered technique (teacher is more active and students are passive) is one of the challenges of social justice in mathematics classroom. Our mathematics teachers use marker and talk in their classroom, which is a serious problem to maintain the linkage between learning mathematics and application of mathematics. The traditional forms of mathematics instruction focus on finding right answer and memorizing facts and procedures, but do not focus on engagement and innovative problem solving.

### **Students' Absenteeism**

Students' absenteeism is another great problem. When students are absent in classroom, they missed different topics and it is difficult for them to understand next topics. Absenteeism is disturbing students' performance, promotion, dignity, and job possibility. In this regards, teacher 'A' stated that;

*Students' irregularity in classroom, these students do not understand topics but I am compelled to move to another topic as I have to complete the course in time. I also take fine from the absent students so that they will be discouraged from being absent in their classroom. I think that the regularity of students is increased day by day because of the fine (Interview, 28th March, 2019).* Similarly the teacher 'C' said, "Many of the students are frequently absent in school and also they avoid class even after coming to school. As a result, they are weak in mathematics including other subjects and this creates inequity in classroom" (Interview, 29th March, 2019).

From the above argument, I argued that student absenteeism is one of the major challenges in classroom. It is one of the problems for making equitable classroom. The irregular students feel difficult to understand topics and they are weak at mathematics. So, students absent have adverse effect in maintaining social justice in classroom.

### **Different Interests of Students**

I perceived that students have various interests in learning. They have different backgrounds and goals in their lives. They are interested in learning the things that is related to their goal. In this regards, teacher B reported,

*Students have different interests such as some of them are interested in geometry; others are in algebra and rests are in arithmetic. Similarly, they have different interest in different subject areas. Some students do not have interest in mathematics reading and writing. They make a noise in classroom. The students, who want to do catering and as assistant in driving do not show any interest in their study. However, a few students, who want to study science in future, are good in mathematics (Interview, 28th March, 2019).*

In other words, individuals are characterized by a more or less stable preference for a particular class of objects, topics, or learning tasks. Typically, individual interest is used as a predictor of academic performance. However, there is also research about advanced changes in interest, such as gender-specific shifts in interest for various topics across years in school and about the effects of people's situation-specific states of interest (Panthi, 2016).

Thus, I argued that students have various interests in different subject areas. They also have various future interests, which can be a cause of inequity in classroom. Similarly, not all students are equally good at mathematics, or have equal interest in mathematics. Therefore, student interest has been seen as a challenge for maintaining social justice in mathematics classroom. The notion of interest plays a vital role in academic and psychological discussion of learning and development. The theory of interest was developed by Herbart at the beginning of the nineteenth century. Many researchers use a notion of individual interest as a feature of person.

### **Marginalized Students**

The students who are socially, economically, academically and geographically backward, are marginalized students. These students need to be promoted. Most of the public schools in Nepal have such students. This has been a next challenge for promoting social justice in classroom context. In this regard, teacher 'B' stated that,

*Marginalized have weak. Sometimes, they want to read and write mathematics, but they have no opportunity at home as most of them work in other's homes. Some challenge marginalized students are problematic in classroom. They are afraid of teacher as they have weak performance in classroom (Interview, 28th March, 2019).*

In this regard, the Gutiérrez, (2008) focused on that examining the gaps between students has raised awareness for equity in education, but a great care is needed when focusing on achievement gaps. There can be a tendency toward "gap-gazing" (p. 358), Focusing on marginalized students as having somehow insufficient mathematical skills, instead of looking at this situation with a view to improving outcomes. Thus, the presence of the issues related to race, class, language and culture, and communities continue historically, which has been a challenge for promoting social justice in classroom.

To sum up, in this section, I described the challenges of maintaining social justice in mathematics classroom. The major challenges include: classroom diversity, students' absenteeism, inadequate prior knowledge of students, students' different interest (future and subjective interests), marginal students, non-participatory teaching, and gender gap of students, cultural differences as mathematics a difficult subject and insufficient teaching materials in schools. These aspects are perceived as hindrance for equitable classroom. These are the emerging challenges for socially justifiable mathematics classroom.

### **Section 3: Strategies for Reducing the Challenges of Maintaining Social Justice**

This section discusses about the strategies to reduce the challenges of maintaining social justice in mathematics classroom. National Council of Teachers of Mathematics NCTM (2000) has promoted a standard based approach to mathematics instruction and sketched the principal and standards for developing a comprehensive school mathematics program. Adams, Bell and Griffin (1997) have established five principles of social justice in education and these principles support educators to: balance emotional and cognitive components of learning process, acknowledge and



support personal experience, maintain social relations in classroom, utilize students' reflections and change as outcomes of learning process (pp.42-43)( cited in Upadhyay et al. 2067).

Given these notational contexts, I think that these principles are also useful for teachers for promoting social justice in mathematics classroom. These provide wider guidelines to teachers for reducing inequity in their classroom. So, as to address the research question 'what strategies do the teachers use for promoting social justice in their classroom?' here, I have explored educators' participants' strategies for maintaining social justice in mathematics classroom. Here, I have generated different themes based on the two educators' interview. Each of the themes is presented below:

### **Counseling**

Counseling means understanding students' personal problems and offering them advice to solve the problems. I experience that counseling is also situational. That means teachers need to treat students according to their needs. I realize that skillful teachers can change their students' habits of learning mathematics with the help of counseling. It helps to promote the desire of learning mathematics. I think that, it is especially useful for weak and marginalized students for improving students' performance. I consider that it motivates students towards their subjects. It depends on teacher skills and ability. In this regard, educator 'A' states that;

*Teachers need to council and motivate weak students for the upliftment of their mathematical knowledge. I believe that counseling upgrades weak students to medium and medium to higher level of performance. For example, a girl student, who does not have any attention towards learning mathematics in classroom, has shown her interest in mathematics after council ling. She has also gradually improved her*

knowledge. She is making a plan to do something in mathematics (interview, 1st April 2019).

The above argument shows that marginalized, disadvantaged and weak students need counseling for improving their performance. Also, motivate the students to learn mathematics. Similarly, the educator 'B' shares his view as;

*Everyone has a special problem. Teachers need to motivate students to be active and develop their positive attitudes towards mathematics to make them able to tackle with different problem. Therefore, teachers need to counsel all students. Teachers should be categorizing counseling into individual, group or clinical counseling. In individual counseling, motivation is given to individual students, who have special problem (economic, social, psychological) in learning mathematics but in group counseling, students with similar problems are counseled in a group. For example, at the time of earthquake, group counseling was given to reduce the tension of students. Teachers should be encouraging them to do different activities and try to divert their mind from the critical context. Teachers need to ask them not to be afraid of earthquake but to be aware of natural disaster. In clinical counseling; teachers should treat students whenever a problem arises. So, it can take place anytime and anywhere. It can be either in a group or in an individual level. Before counseling, teachers need to find out students' problems such as lack of time to study at home and economic problem (interview, April 1<sup>st</sup>, 2019).*

In this regard, social justice counseling is a careful action for improving equity, access, participation in classroom, which supports for the enhancement of individual and circumstantial justice. The aim of social justice is to eliminate the systems of oppression, inequity, inequality, or exploitation of marginalized

populations and communities (Constantine et al., 2007). It should also be noted that awareness, knowledge and skills have been considered as the three necessary elements of service delivery models that give culturally appropriate counseling. Further, multicultural training within academic programs have also blended these three elements into curriculum, pedagogy, and student evaluation. So teachers should follow this model while teaching mathematics for promoting social justice in classroom (Panthi, 2016).

From the above argument, I argue that counseling is necessary for students to enhance their skills in mathematics and make conscious them to learn mathematics. Students need counseling for improving their performance. Teachers should use group counseling, individual and clinical counseling for developing mathematical knowledge to the students. Social justice counseling is a careful action for promoting equity, access and participation of students. The three elements such as consciousness, knowledge and skills provide culturally responsive counseling.

### **Group Work**

From my point of view, it is good to organize group work in large class size. In group work, students become more active in their classroom. It promotes the feeling of cooperation. Especially, marginalized and lower achieving students can learn more from their colleagues. They have good opportunities to express their knowledge in their group so that students develop their performance. In this regard, educator 'A' states that, *teachers need to divide all students into small groups with good balance of gender, caste, age and capacity and then students ask to do project work in their classroom. Then there will be a good coordination within groups and among groups (Interview, 1st April, 2019).*

From above I argued that the group work practice also improves the tackling capacity of students in mathematics. Similarly, educator 'B' also shares his view as,

*Not too easy to care all students individually. Therefore, teachers need to divide all students into small group mixing at least one good student in each group. In each group team leader teaches his/ her friends. Different students are clever and good at different things. So, share their knowledge with one other. Thus, group work brings uniformity and equity in learning. Teachers feel easy to teach when students are divided into different groups. Also, the students learn more from their group work. Thus the group work helps to develop confidence in students (interview 2<sup>nd</sup> April, 2019).*

In this regard, Kriflik & Mullan (2007) state that the aim of group work is to gain and build knowledge together. Solving problems in groups usually involves each individual in the group work and students provide feedback to each other. In a group work, students have more opportunities to express their thoughts and exhibits deeper mathematical concepts. Their own mathematical strategies can be improved because they are able to coordinate with their peers. During group work, students do not feel lonely and may feel less worried about practicing mathematics. The use of group work as cooperative learning technique positively supports student learning .Project focused group work can also develop social and personal skills. Additionally, other vocationally oriented group work skills may enhance learning provided that consideration is given to group size, formation, skills development and assessment strategies. Teaching and learning in small group has a valuable part to play in classroom. It allows them to make meanings, to express themselves in language of the subject, and to establish a close relationship with academic staff.

From above, I conclude that the group work is suitable for large mathematics classroom. All of my participants have a common view that the teachers need to divide students into small groups; each of which contains good and weak students and each student shares his/her idea with other members in the group. Each student learns more from group work. Teacher is a facilitator in such groups. Group work develops personal and social skills in students. It also gradually promotes instrumental skills of listening, presenting consideration and persuading. It creates great learning opportunity to students and helps to gain and build mathematical knowledge.

### **Enjoyment**

Teachers need to try to make joyful classroom environment. For this, they have to use different relevant materials. Also, they can teach mathematics contents using poems, songs, genre and drama where students enjoy a lot and conceive the notion of the subjects. Moving, touching things, laughing and telling stories are prime entry points for impartment skills and understandings. Teachers need to try to ensure both engagement and understanding for all learners in every lesson. In this regard, my participant educator 'A' shares his view as,

*Teachers should not punish students but motivate and counsel them to learn mathematics in an enjoyable way. Also, give them work to use mathematics tool and explain its different aspects. In this way, students feel comfortable to study mathematics and they tend to learn more from real materials such as prism, cylinder, cube, parallelogram, circular ring etc. Similarly, teachers sometimes teach mathematics with the help of poems and songs. Sometime, Students also compose poems in classroom and promote their ability (Interview, 1<sup>st</sup> April, 2019). Similarly, the educator 'B' shares the same views that teachers should teach some topics of*

mathematics through games and drama. Then students really understand the mathematics learning (Interview, 2<sup>nd</sup> April, 2019).

In this regard, Sakiz, Pape and Hoy (2012) define intellectual enjoyment as a positive activating desire experienced when the engagement in a task is joyful, pleasant, and satisfying. In learning environments, I felt that lack of enjoyment leads to feelings of boredom accompanied by disengagement from activities. Teacher characteristics may affect students' emotional experiences. In a study involving elementary school students in Brunei, teacher proximity (e.g., closeness) was found to be positively associated with students' enjoyment in science classrooms.

From above, participants share common views thus from that I argue that when students understand mathematics, they can enjoy it. Enjoyment comes after understanding of mathematics. Teachers should teach some topics of mathematics such as profit and loss games through drama and games. I think that the curriculum of mathematics should be contextualized so that teachers can link it with students' real lives, which promotes meaningful understanding and students' happiness. The academic desire i.e. academic enjoyment and discouragement arise in social situation. Positive desire should be promoted and negative desires should be prevented.

### **Linking Mathematics with Daily Life Context**

The use of mathematics in everyday life includes the use of real examples in the universe. Generally, we say that mathematics is a practical subject. Thus, we need to design the curriculum according to the necessity of the culture of society. However, it is a challenging work. We connect mathematics with students' daily life activities. We do not impose theory and bookish knowledge into students as this does not

sharpen students' mind. We need to make all students as creative worker. In this regard, my participant educator 'A' states as,

*Students enjoy a lot whenever teachers relate mathematical topics to their daily lives. I understand that mathematics should help to solve daily life problems of students. In my classroom, students raise many questions related to vector, such as why do we study vector? What is its usefulness in daily life? I tell one of the students to give him a pen. Then, I give real examples in my classroom. For instance, by using a pen, I tell them that there is a certain distance called magnitude and straight direction. It is used to find the distance between two planets. I feel that students enjoy learning when real life examples are given to them. Such examples also help to make mathematics learning memorable (Interview, 13th July, 2016).*

Similarly, the educator 'B' said that he found the connection between mathematics topics and students' daily life problem. He always gave them practical example. For instance, he teaches the topic of Bills and Discounts. He gives original bills and discussed about bills and discounts in classroom (Interview, 2<sup>nd</sup> April, 2019). In this regard, Garri & Appova (2012) state that an application of culturally relevant pedagogy, teaching for social justice challenges teachers to build specific curriculum that supports students to understand their problems that occur in their communities.

Similarly, teachers should relate mathematics with the cultures of students in which they perceive the notion of the subjects. If subject matter is related to students' daily lives and society, students may remember it for a long time. Therefore, teachers should value students' cultures. In acknowledging interaction between mathematics and human experience, we have to start to know how mathematics acts in society.

Mathematics creates our experience in the universe by communicating role of school mathematics and/or organizing our daily lives via a vast array of visible and hidden mathematical technologies (Falkenberg & Noyes, 2010).

From this argument, I argued that this practice supports students to tackle with mathematics problems. Students' performance has slightly improved due to real life examples. I think, teachers have to link mathematics with students' daily lives. Students enjoy a lot whenever teachers teach mathematical topics and relate mathematics with students' daily lives. Students easily understand the concepts. Mathematics should be visible, behavior and practical in the daily life.

### **Demonstration**

I perceive that demonstrating relevant materials and non-relevant materials in classroom develops thinking capacity of students. The physical objects which students can see, touch and feel are real materials but non-materials are related with teachers' knowledge and activities. Teachers need to be confident, knowledgeable and skillful for classroom demonstration. They also should have necessary knowledge of modern technology, such as computer, overhead projector, smart board and so on. In this regard, my participant educator 'A' shares his view as,

*Teachers should show both materials and non-materials in classroom. And always demonstrate materials and explain the concepts with the help of those materials. Allow the students to touch and see the materials. For example, make paper cylinder and show its each component to the students. Then, students will be interested to touch the cylinder and guess its volume. When teacher use real materials, all students seem to enjoy the topic and show interest to learn the concept (Interview, 1<sup>st</sup> April, 2019).*



The above argument shows that such activities help to improve creativity in students. When, students directly see and touch real objects and understand their features. Demonstration helps students to understand the concepts of mathematical terms. Similarly, the educators 'B' states that, *He makes cone, cylinder, cube and triangular prism. His students also participate in making those objects. He demonstrates those objects while teaching related topics. Students see, touch and understand different components such as area of curved surface, volume and area of total surface of those objects. It helps students to understand the concepts (Interview, 2nd April, 2019).*

In this regard, Zhu (2013) views that the educators believe that good relationship between teachers and students are important in learning process. For example, when teachers demonstrate supportive and helpful interpersonal behaviors, students are more actively involved in learning, and they develop deep learning approaches. As teacher-student relationship is integral to learning process, it is important to equip mathematics teachers with relevant knowledge about interaction models between teachers and students (as cited in Panthi, 2016).

Thus, I concluded that from demonstration, students become capable and develop the habit to read, write and discuss mathematics. I think that students promote exposing powers and skills in their classroom. When teachers demonstrate supportive and helpful interpersonal behaviors, students are more actively involved in learning, and they develop deep learning approaches.

### **Encouragement**

I feel that teachers always need to encourage their students in the classroom. They have to describe the importance of the topic and its application in the society.

They need to be always guiding students, if necessary. They also need to reinforce weak and backward students and motivate them to learning mathematics so that student performance is improved. In this regard, my participant educator 'B' states that,

*Students should be motivated and encouraged towards learning. Motivation is necessary for uplifting marginalized and weak students. All working class students should be motivated towards learning. There are different ways to encourage students, such as putting students in a group, making a shy student the leader of a group, and counseling students. Teachers should encourage weak students in different ways such as, praises students saying 'good!', 'Syabas!', 'well done!Etc. and also counsel them individually. Additionally, teachers reinforce and rewards good works of his students (Interview, 1<sup>st</sup> April, 2019).*

In this regards, Bolyan (2009) pointed that classroom instruction plays a great role to develop social justice in mathematics classrooms. It may be rarely required to be stated that social justice is complicated and debatable consideration and collection of practices in instruction. I consider that teacher should motivate students for reflective practice in classroom. The success of mathematics instruction relies on stimulating instructors to transform their beliefs (as cited in Panthi et al. 2018).

From the above views I concluded that, this helps to improve the activities of marginalized students. Students enjoy a lot and develop deep interest and positive attitudes toward mathematics. Teacher should motivate students for reflective practice in classroom.

To sum up, in this section, I have explored different strategies that need to use the teachers to reduce the challenges to maintain social justice in the classroom. They

include: counseling, group work, linking mathematics to students' daily lives, enjoyment, demonstration and encouragement. These themes were generated from educators' narratives. These techniques seem to be helpful for reducing challenges to maintain social justice in classroom. Such strategies are likely to give new and practical ways to understand the issues of social justice in Mathematics classroom in Nepal. It is likely to orient mathematics teacher with ideas on student-teacher relationship in mathematics classroom so, as to make mathematics classroom more inclusive and justifiable.

## **Chapter V**

### **Findings, Conclusion and Implications**

This chapter is basically concerned in deriving some findings, conclusions and implication. After the analysis and interpretation of the data the following findings have been presented.

#### **Findings**

The findings of this study are presented below based on three sections.

#### **Findings Related with the Girls' Perception of Social Justice in Mathematics**

##### **Classroom**

In this section, findings related to the answer of the research question 'how do girls' perceive social justice in mathematics classroom?' are with five central themes emerged from analysis of the data - equality, equity, fairness, social process, and caring students. These emerging themes help to make socially just classroom. Social justice also refers to the practice of teaching mathematics focusing on real context. Further, I have presented the following major findings:

- Teachers should care weak (socially, economically and marginally), slow and disadvantaged students. It helps to make classroom socially just.
- Our teachers need to teach mathematics based on social context. Also, teachers need to have contextual topics.
- Teachers need to try to provide equal chances and access to their students in mathematics classroom.

- Teachers also persuade students to be active in their classroom. There is a need to focus on practical mathematics rather than on theoretical one.

### **Findings Related with Challenges Faced by Teachers to Maintain Social Justice**

In this section, findings are related to the answer of the research question ‘what are the challenges faced by the teachers to maintain social justice in mathematics classroom?’ From the answer of this question emerge some themes such as; diverse students, gender gap, cultural difference, insufficient teaching materials, non- participatory teaching, students’ absenteeism, different interests of students, marginalized students. These are the hindrance challenges for equitable classroom. These are also the emerging challenges for socially justifiable mathematics classroom. Further, I have presented the following findings:

- It is arguably a challenging experiment to act for social justice in a school.
- These emerging challenges create problem in the classroom teaching for equitable classroom.
- Some challenges need to face by the teacher for maintaining social justice in mathematics classroom. They are diverse students, disengaged curriculum, large number of students, student absenteeism, traditional teaching techniques which create problem in the classroom teaching for equitable classroom.

### **Findings Related with Strategies for Reducing Challenges of Maintain Social Justice**

In this section, findings are related to the answer of the research question ‘what are the strategies of reducing the challenges to maintain social justice in mathematics classroom?’ From the answer of this question six themes are emerged such as; counseling, group work, enjoyment, linking mathematics with students’ daily

life, demonstration and encouragement. Such strategies are needed to apply teachers for the improvement of social justice in mathematics classroom. Further, I have presented the following major findings:

- Teachers need to manage minimum requirement to their students in classroom. They have to be confident and skillful in teaching mathematics. They need to associate teaching content with daily lives of students and their culture. Teacher and students always need to enjoy and be happy in classroom.
- Teachers need to be cooperative, helpful and facilitator. They need to have also friendly behavior with their students. They should give high priority for questioning in classroom.
- Strategies like counseling, group work, enjoyment, linking mathematics with students' daily life, demonstration and encouragement to give new and practical ways to understand the issues of social justice in Mathematics classroom.
- It is likely to orient mathematics teacher with ideas on student-teacher relationship in mathematics classroom so as to make mathematics classroom more inclusive and justifiable.

### **Conclusion**

From above it is concluded that, this qualitative interpretive study was addressed in three sections and conducted with five girl students, three mathematics teachers and two Math educators. I have found five key themes as equality, equity, fairness, social process, and caring students from open-ended interview with girls based on the interview guidelines (see appendix-2) that the girls' perceptions of social justice in mathematics classroom. I have also found from open-ended interview with teachers based on the interview guidelines (see appendix-3) that teachers should face

many challenges to maintain social justice in mathematics classroom. These are diverse students, students' absenteeism, and different interest of students, marginal students, non-participatory teaching, gender gap, cultural difference and insufficient materials. These are the hindrance for equitable classroom. These are the emerging challenges for socially justifiable mathematics classroom.

Thus, the teachers need to apply different strategies which are emerged as themes from the open-ended interview based on the interview guidelines (see Appendix-4) with the educators such as counseling, group work, linking mathematics on daily life, enjoyment, demonstration and encouragement to maintain social justice in mathematics classroom. So, I feel that, teachers need to use different strategies to cope with the challenges, such as persuasion, giving extra time, watching and caring, individual treatment, promoting teacher regularity, encouraging students regularities, grouping, individual treatment, giving regular assignments for making social just classroom.

### **Implications**

Every study has implications in different sectors. The result of this study has two major implications which are as pedagogical implication and policy implication. Also, this study has implications for myself.

**Pedagogical implications.** The pedagogical implication focuses on practical application of socially just teaching and learning in mathematics classroom. This study has outlined the processes that enable transformation of classroom practices to other situations. I have presented the following pedagogical implications of this study which are as;

- It can enable teachers and students to generate relevant knowledge that is transferable to other classroom situations.
- It gives insights for transforming teaching methods, for reforming curriculum, and for promoting social justice in classroom.
- It has highlighted how higher level mathematics teachers and students perceive social justice.
- It also throws lights on the existing challenges for promoting social justice in schools and wider society. The study has outlined processes that enable transformation of classroom practices to other situations.
- It has also highlights what strategies are used by teachers to cope with the challenges for promoting social justice in mathematics classroom.
- The study also awares teachers and educators about inequity in classroom. This study is likely to bring awareness among teachers for making socially just curriculum.
- It advocates school as an agency for social reconstruction.
- It helps teachers to make cooperative, helpful, facilitator and friendly behave with their students.
- Teachers and students' perception of social justice in terms of social process focuses on socialization of classroom communities, including good and weak students, cooperating and developing a good relation among the students in a class.
- It helps teachers to implement in the classroom by caring low performer and socially and economically disadvantaged and marginalized students.

**Policy implications.** The policy implication focuses on policy intervention for social justice in mathematics classroom through appropriate action to reform



curricula, textbooks, and mode of teacher education. From the girls' perception of social justice the five themes (equity, equality, fairness, caring weak and marginalized students and social process) and related interpretation highlight the benefits of social justice in mathematics classroom. Further, I have presented the following policy implications:

- This study assists Mathematics teachers, teacher educators, education experts, curriculum planners, policy makers, and all stakeholders should understand the existing situation and practices of social justice in mathematics classroom.
- It helps teachers to employ different strategies and try to establish themselves as socially just mathematics teacher/teacher educator.
- It gives insights for transforming curriculum and for promoting social justice in classroom.
- It also sheds light on the promoting social justice in schools and wider society.
- It requires a broader political determination and that should be expressed through policy and actions from the government and other stakeholders.
- It helps in Mathematics curriculum reform according to social justice orientation.
- The government motivates to pay special attention to the weak, marginal and disadvantaged students for uplifting their learning outcomes.
- The study also aware teachers and educators about inequity in classroom. This study is likely to bring awareness among teachers for making socially just curriculum.

**Implications for Myself.** I learned so many things from my research. I clearly understood the notion of social justice. It is a relative concept. I knew that teachers

need to try to provide equal chances and access to their students in mathematics classroom. Further, I have presented the following implications for myself; It helps me to understand clearly the various meaning of social justice as equity, equality, fairness and teaching in context.

- I learn that there is a need to focus on practical mathematics rather than on theoretical one.
- I have taken the idea from my study that teachers need to manage minimum requirement to their students in classroom.
- This study also helps me to know about the challenges for promoting social justice in mathematics classroom. They are diverse students, large number of students, student absenteeism, traditional teaching techniques which create problem in the classroom teaching for equitable classroom.
- I perceive that teachers apply different techniques to reduce barriers and challenges of social justices, such as giving extra time, watching and caring, individual treatment, encouraging students, giving regular assignments and promoting the use of mathematics lab.
- I also perceive that teachers need different teaching strategies as demonstration of materials and non-materials, counseling, group work, child friendly techniques and so on.

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## **Appendix-1**

### **Class Observation Guidelines**

- Physical environment of the classroom
- Area where boys and girls are seated
- Participation of boys and girls in classroom
- Students' views in Mathematics
- Interest of learners
- Teaching learning process
- Equal opportunity to learn
- Nature of motivation, reward and punishment provided by teacher
- Any activities or behavior within classroom
- Use of teaching materials

## **Appendix-2**

### **Interview Guidelines for Students**

- Classroom environment
- Favorite subject
- Views in Mathematics
- Self confidence
- Practice of learners
- Girls learning style
- Teaching strategies
- About social justice
- Impact of culture
- Diversity within students' background( ethnic, gender, socio-economic condition, Physically and mentally disability)
- Nature of reward and punishment provided by teacher



## **Appendix-3**

### **Interview Guidelines for Teachers**

- Teaching experience
- Teaching strategies of Mathematics
- Number of boys and girls in the class
- Students regularity in class
- Expectations for learning mathematics
- Questioning patterns
- Teacher Student interaction
- Interest of learners
- Social variable and girls' learning style
- Impact of culture
- Diversity within students' background (ethnic, gender, socio-economic condition, physically, geo-graphically, and mentally disability etc.)

## **Appendix-4**

### **Interview Guidelines for Educators**

- Teaching experience
- Teaching strategies of Mathematics
- Teacher Student interaction
- Social variable and girls' learning style
- Impact of culture
- Diversity within students' background (ethnic, gender, socio-economic condition, physically, geo-graphically, and mentally disability etc.)
- Social justice related challenges
- Social justice maintaining strategies