

**GENDER DIFFERENCE IN LEARNING MATHEMATICS: A CASE STUDY**

**A  
THESIS  
BY  
SHARMILA RIJAL**

**IN THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF MASTERS OF EDUCATION**

**SUBMITTED TO  
DEPARTMENT OF MATHEMATICS EDUCATION  
CENTRAL DEPARTMENT OF EDUCATION  
UNIVERSITY CAMPUS, KIRTIPUR  
TRIBHUVAN UNIVERSITY  
KATHMANDU  
NEPAL  
2022**

2022

SHARMILA RIJAL

1786

GENDER DIFFERENCE IN LEARNING MATHEMATICS: A CASE STUDY



त्रिभुवन विश्वविद्यालय  
शिक्षा शास्त्र केन्द्रीय विभाग

**गणित शिक्षा विभाग**

TRIBHUVAN UNIVERSITY  
CENTRAL DEPARTMENT OF EDUCATION

**DEPARTMENT OF MATHEMATICS EDUCATION**

विश्वविद्यालय क्याम्पस  
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS  
Kirtipur, Kathmandu, Nepal

पत्र संख्या:-  
Ref.

मिति:  
Date: .....

### Letter of Certificate

This is to certify Mrs. **Sharmila Rijal**, a student of the academic year **2019/2020 AD** with thesis number **1786**, Exam Roll No. **7528221**, Campus Roll No. **87**, and T. U Regd. No. **9-2-568-300-2013** has completed her thesis during the prescribed by the rules and regulations of Tribhuvan University, Nepal. The thesis entitled "**Gender Difference in Learning Mathematics: A Case Study**" embodies the result of her investigation conducted from **2021 to 2022** at the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward that her thesis is submitted for evaluation to award the Degree of Master of Education.

.....  
**Mr. Abatar Subedi**

(Head)

Date: 4<sup>th</sup> December, 2022



त्रिभुवन विश्वविद्यालय  
शिक्षा शास्त्र केन्द्रीय विभाग  
**गणित शिक्षा विभाग**

विश्वविद्यालय क्याम्पस  
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS  
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY  
CENTRAL DEPARTMENT OF EDUCATION  
**DEPARTMENT OF MATHEMATICS EDUCATION**

पत्र संख्या:-  
Ref.

मिति:  
Date: .....

**Letter of Approval**

Thesis Submitted

By

**Sharmila Rijal**

Entitled

**“Gender Difference in Learning Mathematics: A Case Study”** has been approved  
in partial fulfillment of the requirements of the Degree of Master of Education.

**Viva-Voce Committee**

**Signature**

**Mr. Abatar Subedi**

(Chairman)

.....

**Prof. Dr. Eka Ratna Acharya**

(External)

.....

**Mr. Krishna Prashad Bhatt**

(Supervisor)

.....

Date: 20<sup>th</sup> December, 2022



त्रिभुवन विश्वविद्यालय  
शिक्षा शास्त्र केन्द्रीय विभाग  
**गणित शिक्षा विभाग**

विश्वविद्यालय क्याम्पस  
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS  
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY  
CENTRAL DEPARTMENT OF EDUCATION

**DEPARTMENT OF MATHEMATICS EDUCATION**

पत्र संख्या:-  
Ref.

मिति:  
Date: .....

### **Recommendation for Acceptance**

This is to certify that Mrs. **Sharmila Rijal** has completed her M. Ed. thesis entitled “**Gender Difference in Learning Mathematics: A Case Study**” under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward her thesis to the Department of Mathematics Education to organize the final viva-voce.

.....  
**Mr. Krishna Prashad Bhatt**

(Supervisor)

Date: 4<sup>th</sup> December, 2022

## **Dedication**

This thesis is dedicated to my father, my mother and my brother, whose love, support, and encouragement have enriched my soul and inspired me to purpose and completed this research.

### **Declaration**

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

© 2022

Copyright by **Sharmila Rijal**

This document is copyright material. Under the law, no parts of this document may be reproduced without the expressed permission of the researcher.

Defense Date: 20<sup>th</sup> December, 2022

All Right Reserved

## Acknowledgements

I would like to specific my honest thanks, cordial gratitude and deep grasp to Mr. Krishna Prashad Bhatt, my supervisor from Department of Mathematics Education, Kirtipur, for his continuous guidance and valuable suggestions in making this thesis completed. My sincere appreciation goes to Prof. Dr. Bed Raj Acharya, Mr. Krishna Prasad Adhikari for their valuable suggestions, comments, inspiration and encouragement in improving this thesis. Similarly, I would like to express my sincere gratitude to Mr. Abatar Subedi, Department head of Mathematics Education for managing such a co-operative environment, my external Prof. Dr. Eka Ratna Acharya, Prof. Ganesh Adhikari and all the respected Professors of Department of Mathematics Education T.U, Kirtipur Kathmandu for academic inspiration, encouragement, support and suggestion to bring this work into present form.

I should remember here all the principals and mathematics teachers of sample school for their sincere co-operation and support. I must extend my heartfelt thanks to all my colleagues, who directly or indirectly help me in completion of this study.

Also, my thanks go to the computer service man for typing and editing APA format of my thesis. Also, I would like to express thanks to my all friends and Mathematics teachers who provided me their valuable time and suitable information for my research.

Finally, I wish to express my gratitude to those who may have contributed to this study directly or indirectly.

---

Date

---

Sharmila Rijal



### **Abstract**

The main concern or area of this study was “Gender Difference in Learning Mathematics: A Case Study”. The objectives of the study were to analyze the causes of gender difference in mathematics learning at secondary level and to identify the strategies taken by the schools for minimize the gender difference in mathematics learning. This study was based on case study approach under qualitative research method. This study was based on Kawasoti Municipality-16, Nawalparasi district. This study was bounded on only Shree Janata Higher Secondary School of Nawalparasi district. This study was focused only class nine and ten students of secondary level. This study was based only the responses of six mathematics students (3 boys & 3 girls) for case respondent, and also this study was selected students' parents and two mathematics teachers for interview. In-depth interview, classroom observation, document reviews were used as tools for data collection. The researcher was observed mathematics classroom for one weeks. Collected information were analyzed and interpreted with the help of conceptual framework and linking with theoretical construction.

This study found that, lack of teachers' biasness in the classroom, gender discrimination, male dominated society & social belief, lack of parents' concentration towards their children education, cultural & custom, household workload at home, lack of parents' support and also culture feast and festivals are the causes of gender differences in mathematics learning at secondary level. Also, this study found that, to provide equal opportunity for boys and girl in mathematics learning at home & school, to use local language in mathematics teaching/learning at school, creating good learning environment at home for the students, to improve the school policies, to provide scholarship for the students which family's economic condition is weak are

the main strategies for minimize the gender difference in mathematics learning. Since the local culture is female oriented and the girls had household workload than boys. Girls had no enough time to practice mathematics and the household works were given priority than their study. Although, the learning environment of girls in home was not satisfactory. So, girls do not better in mathematics than boys, thus, gender difference was found in mathematics learning environment in home. Since, the local culture is patriarchal society; all of the household workload was responsibilities of girls. So, girls have not good performance in mathematics.

## Table of Contents

<i>Letter of Certificate</i> .....	<i>i</i>
<i>Letter of Approval</i> .....	<i>ii</i>
<i>Recommendation for Acceptance</i> .....	<i>iii</i>
<i>Dedication</i> .....	<i>iv</i>
<i>Declaration</i> .....	<i>v</i>
<i>Copyright</i> .....	<i>vi</i>
<i>Acknowledgements</i> .....	<i>vii</i>
<i>Abstract</i> .....	<i>viii</i>
<i>List of Abbreviations</i> .....	<i>xiii</i>
 <b>Chapters</b>	
<b>I: Introduction</b> .....	<b>1-7</b>
Background of the Study .....	1
Statement of the Problem.....	4
Objectives of the Study .....	5
Research Questions .....	5
Justification of the Study .....	5
Delimitations of the Study .....	6
Definition of the Related Terms .....	7
<b>II: Review of Related Literature</b> .....	<b>8-20</b>
Review of Related Empirical .....	8
Implication of the reviews for the study. ....	13
Research gap. ....	13
Theoretical Framework .....	14
Conceptual Framework .....	19

<b>III: Methods and Procedures .....</b>	<b>21-26</b>
Research Design.....	21
Area of the Study .....	22
Selection of Respondents .....	22
Tools of Data Collection .....	22
In-depth interview.....	22
Observation note.....	23
Document review.....	24
Data Collection Procedures.....	24
Data Analysis Procedures .....	25
Quality Standard .....	25
Ethical Consideration.....	26
<b>IV: Analysis and Interpretation of Data .....</b>	<b>27-50</b>
Introduction of Case Respondents .....	28
Classroom Observation Episode .....	31
Mathematics Learning Environment of Boys and Girls at Home and School.....	35
Causes of Gender Difference in Mathematics Learning at Secondary Level .....	38
Gender discrimination.....	38
Teacher's biasness in the classroom.....	40
Male dominated society and social belief.....	41
Parent's concentration towards their children education.....	41
Culture and custom.....	43
Household workload at home.....	44
Parents' support.....	44
Local culture feast and festivals.....	45

Strategies for Minimize the Gender Difference in Mathematics Learning.....	47
<b>V: Findings, Conclusion and Implications.....</b>	<b>51-56</b>
Findings of the Study .....	51
Conclusion .....	54
Implications of the Study .....	55
Recommendations for Further Researcher.....	56

## **References**

## **Appendices**

**List of Abbreviations**

BS	:	Bikram Sambat
NEC	:	National Education Commission
NESP	:	National Education System Plan
MoE	:	Ministry of Education
B. Ed	:	Bachelor of Education
M. Ed	:	Master of Education
HSS	:	Higher Secondary School
&	:	And
%	:	Percentage

## **Chapter I**

### **Introduction**

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

#### **Background of the Study**

Mathematics is important in every step of life such as science, commerce and even in research for that mathematics knowledge is very essential. Mathematics is often called backbone of education and fundamental component of the literacy. Different research shows that it is a gate way and critical filter to higher study and employment. Mathematics is a very important subject; it helps to develop logical thinking in one side and on the other side it helps students to develop their careers and also provides doorways for the further study.

The meaning of gender issues of class socially created roles of men and women (Acharya. 2017). In this study gender refers to the social identity of men and women. It cannot be understood at the level of individual is grammatical classification of sex. Gender refers to the roles and responsibilities of men and women that are created in our families, societies and cultures (Poudel, 2019). Gender is social strata. It is main focus on the analysis of gender as a social structure that has its origins in the development of human culture not in biology or procreation. Gender is human invention like language kinship, faith and technological know-how and additionally gender is sociological distinction and sex is biological difference. Mathematics is necessity of civilization. It was originated from practical experience of human beings need and it continued to develop along with the development of civilization. Mathematics is creation of human mind. Mathematics gives us power of

the human mind and becomes an intellectual capacity for both men and women. The international content of gender definition is 'it has more direct relevance the peace is in extricable linked with equality between women and men development'. People are born free. A mother has to bear the same pain whether they are boys or girls. But the time passes discrimination starts, treatment differs and separate responsibilities are given. The girl's periphery starts to limit whereas a boy's starts to expand. Providing education to a girl is thought useless because she would go to her husband's house after marriage. All these have affected the literacy rate of girls in the country.

According to the 2011 census showed the percentages of girl's literacy rate 57.9% and boys at 75.6%. Girls who are sent to school have to do household work, take care of the youngsters and help parents in their work. As a result, they are not able to do well in their study. They are irregular in the school. They have to drop out from early grades. It is very difficult from them to complete the primary cycle of education. The socio-economic condition also affects their education. Due to lack of educational awareness in parents.

According to Acharya (2017) gender is a social group and it focuses on the evaluation of gender as a social shape that has its origins in the improvement of human tradition now not in biology. So, whatever the behavior shown for girls, it is created by social and cultural activities in our context because of the male dominated society. Females are only for man help they can do nothing for their own existence and for their identity, our culture is dominating with full of such concept. In such situation how a girl can flourish? School is also a mini-society. This area is also not protected by the discrimination or we say gender bias, which studies show that school performance of girls is not satisfactory. They are more irregular in the school than



boys. Home environment also affects children's learning. Moreover, there is gender discrimination in the school and at home as well as in the society.

Gender differences can be seen in mathematical achievement that is why gender difference has been taken as burning issues in mathematics education. Females are very backward in comparison to males, in respect to education development. There are many causes of backwardness of females among them social factor is one. Teachers have not exhibited the most respectable track record when it comes to date to recording their behavior towards male and female. On the gender differences on mathematics education related research; Khanal (2016) show that, boys got more attention by being straight forward and unreserved, teachers praise boys more often, boys receive more academic helps and teachers are more likely to accept boy's ideas or opinions during classroom. Vetter (1992) reported that there were important gender differences in the home however; parents had lower expectation for their daughter then had for their sons in term of mathematical achievement. Linn and Hyde (1992) reported that male was better at making conjectures, setting experiments and problem solving but female is better in interpersonal relationship and performing family task such as sewing, typing and cooking. In secondary level girl performance is very lower than boys. Traditional empirical research monitoring female's participations in mathematics and related career activities should continue, as should document the effect of investigating program.

Going back to the history of Nepalese education, it clearly shows that Nepalese education was a male dominated education system. Girls were not considered as a part of education system. Since Nepali who wanted to get higher education used to go Indian school and college because of strict conservation thought of Rana Regime, it was not possible to girls to get formal education. Only a few girls

were fortunate enough to get education at their home if their elder wished to and could afford a private tutor or guide by their educated elder. This clearly reveals the denial for girls' formal education, disadvantage faced by girls and the opportunity they are deprived of simply because they were girls. This is one of a historical evidence from the gender discrimination against girls. NESP (1971) to some extent had attempted to follow the three issues in this regard. School environment is not favorable for girls. There is no appropriate physical facility in the school. Lack of facilities discouraged girls from going to school. All these have affected the literacy rate of girls in the country.

### **Statement of the Problem**

Previous studies have established that the overall picture of girls and women's participation in mathematics education is low because of the limited opportunity, many obstacles and relevance. Lower achievement and also the participation of female in mathematics is reflection of their position in society. Efforts have been made for the expansion of girls' education in the country and today more girls are enrolled in schools. But studies show that school performance of girls is not satisfactory. They are more irregular in school than boys. Home environment also affects students' learning. According to (CERID, 2004) the main problem of this study is mainly concerned with the gender difference in learning mathematics at grade nine & ten students in Nawalparasi district.

Similarly, in university stage there is negligible variety of female in mathematics study room as compared to boys. So, I am very interested to find the gender difference in mathematics learning. There is an increasing number of boys' enrollment in school but the enrollment of girls we can see the smallest number of enrollment rather than boys' (Khadka, 2018). In my experiences, the girls'

achievement in mathematics is in critical situation without many national level reports have been shown the report in favors of girls. There may be many causes behind it. The family related factors, school related factors, social factors and personal related factors may be one of the major factors behind the gender difference in mathematics learning. Therefore, I'm interested in study this area/topic. So, I selected this area.

### **Objectives of the Study**

The objectives of the study were as follow;

- ) To analyze the causes of gender difference in mathematics learning at secondary level.
- ) To identify the strategies taken by the schools to minimize the gender difference in mathematics learning.

### **Research Questions**

The research questions of the study were as follow;

- ) What are the causes of gender differences in learning mathematics at secondary level?
- ) How does the gender affect in attaining poor marks in mathematics?
- ) What are the strategies taken by the schools to minimize the gender difference in mathematics learning?

### **Justification of the Study**

The reason why the researcher tries to find out the gender difference in learning mathematics is to identify why the girl's student obtain low score in most of the examinations though they are treated equally as: they are taught same experts by the same school and same tutorial classes. This type of research helps to policy maker and educationist to follow the right strategies to eliminate the evil occurred by gender gap because government is investing millions of dolar for women empowerment but

because of low grade in technical subject lie mathematics related subject such investment is being just a wastage. This research study is justification as follows:

- ) This study is helpful to reduce the gap between gender and learning mathematics.
- ) This study is helpful to provide necessary guidelines for policy makers and educationalists to formulate national education policies that are related to mathematics.
- ) This study helps to support for good parenting in favor of girls in learning mathematics.
- ) This study provides ground for the structural changes inside classroom, school and home environment.
- ) This study explores the ways for new research plan in this field.
- ) This study is helpful the curriculum designers to design the curriculum according to the national need, level and ability of learner.
- ) This study is helpful for students to be aware of the main problems of the mathematics that adopt required strategies for the improvement of mathematics education.

### **Delimitations of the Study**

This study was delimited on the following area;

- ) This study was based on Kawasoti Municipality-16, Nawalparasi district.
- ) This study was bounded on only Shree Janata Higher Secondary School of Nawalparasi district.
- ) This study was focused only class nine and class ten students.

- ) This study was based only the responses of six mathematics students (3 boys & 3 girls) for case respondent, and also this study was selected student's parents and two mathematics teachers for interview.
- ) This study was based on case study approach under qualitative research method.

### **Definition of the Related Terms**

**Gender bias.** Gender bias is basically the belief or attitude that one sex is of higher power than the other sex. Gender bias is the gender issue in this research. In education, this includes decisions related to admissions and grading and giving opportunities in classroom.

**Gender analysis.** It is the series and evaluation of sex-disaggregated information. Men and ladies each operate one-of-a-kind roles. This leads to ladies and men having special experience, knowledge, talents and needs. Gender analysis explores these variations so policies, applications and project can perceive and meet the exclusive wants of guys and ladies.

**Gender discrimination.** Prejudicial treatment of an individual based on a gender stereotype (may also be referred to as sexism or sexual discrimination).

**Gender.** Issues of class socially created roles of males and females.

**Teacher.** Teachers who teach mathematics in grade nine/ten of selected schools is referred as a teacher.

**Achievement.** It was defined in terms of the score obtained by girl's students on the mathematical achievement test. Achievement in this study is defined in terms of score obtained by the students in their mathematics exam at school.

## **Chapter II**

### **Review of Related Literature**

This chapter deals with the related literatures about the gender differences in mathematics learning. Review of related literature is an exacting task, calling for a deep insight and clear prospective (Khadka, 2016). To conduct an effective research, researchers are required to be familiar with related literatures, theories, reports, articles, education policies and programs that help in conceptualizing the problems, conducting the study and interpreting the findings. The related studies provide the researcher in making his problems more realistic, precise researchable and meaningful. The related literature review done with the help of national as well as foreign scholar's research. Some of the related literatures are listed below.

#### **Review of Related Empirical Studies**

Janwali (2016), did her research entitled "A study on causes that affect mathematics achievement of girl's students" with the objective to determine school related factors and out of school related factors which affects the mathematics achievement of girl's students and to determine the correlation between affecting factors and mathematics achievement. The tools for the study were administered to the sample of 50 students from rural and urban area of Rupendahi district and mean, SD, correlation coefficient and multiple regressions were used for the analysis of data and found that mathematics achievements of girl's students were strongly positively correlated with peer's behaviors, effective classroom teaching and the teacher's behavior and family background were also had some positive effects on mathematics achievement of girl's students.

Dhakal (2017), conducted his thesis a study on the topic "A study of the factor affecting the girl's students' attitude towards the selecting of optional mathematics at

secondary level". He concluded from the study that the girls should have the positive attitude towards the selection of optional mathematics. The attitude is only the determining factor to select optional mathematics and the girl's students do study optional mathematics because they have positive attitude towards these variables and those having negative attitude do not select optional mathematics. The learning achievement of those who survive is also not encouraging.

B.K (2017), did a research entitled "Causes of low achievement in mathematics of grade X students". This was a case study based on qualitative research method and descriptive in nature. Main objectives of this study were to find out the causes of low achievement in mathematics of grade X students. School documents, observation notes and interview guidelines were used on the tools of this study. All the students of Kailali district of grade x were the population of this study. Among all school of Kailali district, Saraswoti Mavi, Darganli were selected and from this school, 6 boys and 6 girls of grade X were selected as the sample of this study. The collected information from class observation, interviews and school's records was first categorized and then different themes was given there will be considered as a code and similar code version of the respondents was collected together and was explained in their perspective's. Cross math was adopted to maintain the validity and reliability of the results of the study. After the analyzing and interpretation of data, the researcher found that the financial condition, parent education irregular checking home work by teacher negative attitude of mathematics for learning, poor physical condition of school i.e. no proper drinking water, no enough teaching material, no qualified and trained teacher, lack of library are the major causes of low achievement of mathematics of grade x in Kailali district.

Upadhyay (2017), females are very backward in comparison to male in respect to educational development. There are many causes of backwardness of females among them, Social factors is one female could not educational and social equality for a long time. Researcher found that gender differences in math achievement have declined. However, gender difference still preparatory courses that are considered essential to acquiring the foundation for future of advanced mathematics.

Chataut (2014), conducted his thesis a study on the topic “Achievement in mathematics by gender” with the objective to compare the achievement in mathematics according to of enrollment school year and gender. Researcher used t-test, ANOVA and post hoc test to compare achievement in mathematics. He concludes that mean score of girls is less than boys, main cause behind such low achievement of girls is less priority given by parents to their daughter than son, less confidence of girls to solve mathematical problem, home environment, cultural customs, classroom environment to study, unequal behavior by boys' students.

Sharma (2014), carried out a learn about on “Effects of family surroundings in mathematics achievement”. The main objectives of this study are to compare the mathematics achievement of students of lower secondary level with respect to their family environment. This research was based on the descriptive survey design along with comparative design and qualitative in nature. He was chosen thirty students from four public and private school in Lalitpur district. The finding of the study shows that the mean achievement score of educated parent’s children are higher than the mean achievement score of literate parent’s children.

Benbow and stanley’s (1999), conducted his master thesis “A study of sex difference in mathematics ability” Gender differences in arithmetic have obtained serious in the mathematics training lookup for the last four a long time in the united



states after strong proof for a male advantage. It is a study of gifted of gifted seventh grade and the results show males are four times more likely to score than females on the scholastic Aptitude Test in mathematics.

Lamsal (2016), conducted his thesis a study on the topics “Causes of gender gap in enrollment in major mathematics course” with the objectives to identify the causes of gap between the enrollment of male and female students in higher mathematics education and, to find out the factors influencing in the gender gap in mathematics education. He concluded that there are many reasons create gender gap in enrollment of major mathematics course such as: less confidence, traditional method uses to teach, wrong cultural practices, discourage female students by other, unequal behavior boys’ students etc.

Neupane (2018), did the study on the topic 'Effect of Socio-Economics Status on Mathematics Achievement' which focused to find the correlation between socioeconomic status and mathematics achievement. He used descriptive survey design as well as quantitative research. The total sample of the study was 84 students of grade III of Dura and Gurung community from class V public school in Lamjung district. Mainly two tools, student achievement test and parent's questionnaire were used. The Mean and Standard Deviation and correlation, multiple regression were used for analysis of the data. He concludes that mathematics achievement of Gurung student found to positively correlated with father education. But the other variable was negatively correlated with mathematics achievement. Similarly, mathematics achievement of Dura student positively correlated to father education. But the other variable was negatively correlated with mathematics achievement.

Neupane (2017), conducted a study on the topic 'Effect of Parental Cooperation on Mathematics Achievement of Primary Students' which focuses to

find the parental cooperation on primary level taking the sample of 100 children and their parents from five schools of Tanahunh district. A multi-stage stratified random sampling procedure was followed in selection of schools. Selected school were located in rural, remote and urban areas of the district which had at least 20 children in grade five. Students' data were collected by MAT questionnaire and parents by interview. The collected data were analyzed by beta coefficients, coefficients of correlation and multiple correlation. In the conclusion of research, he found that parent's involvement in home activities with their children is more beneficial to the children's school learning.

Sharma (2019), conduct a study entitled "The Relationship of Home Environment and Mathematics Achievement of Dalit community at lower secondary level in Baglung and Parbat District". The main objectives of this study to find out the correlation between the facilities provided at home and children's mathematics achievement to analyze the achievement of a student with her/ his parent's education expectation and to suggest for making Dalit better home environment. Researcher used both the descriptive and analytical design to conduct the study. The researcher had taken as the sample for the study 50 students from 50 different families and 5 different school of the Parbat district. This study found most of the parent's expected their children to get their SLC level education and it was found that a significant relationship between parental expectations and the student achievement in mathematics. The mathematics achievement of Dalit student was strongly associated with the variable of facilities at home and parental expectation and the mean score of the availability of the facilities at home was positively correlated with mathematical achievement of the children.

Khanal (2017), conducted research on “Girls perception toward gender discrimination and its effect in learning mathematics” with the objectives to find out the perception of girl’s toward gender discrimination and, to identify situation of gender discrimination in mathematics classroom. He prepared questionnaire and administered two hundred students of five schools. He was used to rating scale with arranged in the Likert format. He concluded that sample students have positive perception toward gender discrimination and effect of parent’s behavior is more in learning mathematics than other type of discrimination.

**Implication of the reviews for the study.** The above collection of literature that is closely related to my study in way or the other portrays the types of research that was carried out in relation to gender. The reviews of above-mentioned literature have provided me with important implications on the issues of gender and mathematics learning. However, most of reaches and studies are based on the achievement difference between girls and boys and difficulties and barriers for girls in mathematics learning. Thus, I hope my study is helpful to decrease gender difference in learning mathematics. And also, the above-mentioned literatures have helped the researcher to save the research and draw meaningful conclusion. Review of those literatures gave some conceptual understanding about the gender differenc in learning mathematics at grade nine/ten.

**Research gap.** From the above review, there have been made many factors affecting learning mathematics and causes that affect mathematics achievement. From which the researcher has found that there are many factors such as culture, physical facility and home environment, teaching learning process, motivation and teacher interaction are the influencing factors in learning mathematics. From the above research study, it is clear that mathematics achievement of girl's students is low rather

than boys in secondary level and there are so many factors which affect achievement of students in mathematics education. And also, on gender difference areas many studies have been done in higher secondary level and also used by survey approach but my research was related in only the secondary level students and qualitative method not a quantitative. So, my research is difference than another research.

### **Theoretical Framework**

There are many ways of looking any phenomena. Everyone is probably familiar with the old story about the three blind men who encountered an elephant for the first time. One of them ran his hands over the animal's broad side and described the elephant like a wall. The second blind as he felt the one of the creature's huge legs, become convinced that the elephant is similar to a tree. Finally, the third blind man, as he handled the beast's flexible trunk, declared that the elephant resembles a large rope. As the perspective of these three blinds towards an elephant, there are various that have their own perspective towards gender discrimination and its practices in our family, society and school. Here in this section, researcher discusses the theme of Social Cognitive Theory and Feminist approach.

**Social cognitive theory.** According to social cognitive theory (Schunk 1991) learning occurs in the social environment by observing others. The reciprocal interactions among person's behavior's and environment and the distinction between learning and performance are some of the features about learning and performance of behavior from this perspective. Learning and performance of learned behaviors are influenced by several factors. According to Schunk (1991), "These factors have an effect on what folks to attend how they method information, whether or not they pick out studying as beneficial and how they bet their functionality for studying and performance". According to Bandura (1986) "human functioning is defined in terms

of a model of triadic reciprocity in which behavior, cognition and different non-public factors, and environmental events operate as interacting determinates of each other". He additionally explained learning is largely an information-processing activity in which data about the structure of behavior and about environmental events is converted into symbolic representation that serves as guided for action.

Environment refers to the factors that can have an effect on a person's behavior and Physical environment is the size of a room, the ambient temperature or the availability of certain foods (Acharya, 2017). There are social and physical environment. Social environment includes family members, pals and colleagues. Environment and state of affairs grant the framework for appreciation behavior. The situation refers to cognitive or mental illustration of the environment that may have an effect on person's behaviors. The three factors; environment, people and behavior are continuously influencing each other (Poudel, 2019). Behavior is not the certainly result of environment and the persons, just as the surroundings is no longer surely the end result of the men and women and behavior. The environment provides models for behavior. Learning takes place when a individual watches the action of another individual and the reinforcements that the man or woman receives (Khanal, 2019).

**Cultural difference and discontinuity theory.** In the cultural discontinuity theory (Ogbu, 1982) concerns about the cultural difference and discontinuity theory. The difference and discontinuity make hindrance in the students' learning. He says that those children whose home culture is much similar to the culture of school can face easily with the system that can result better learning achievement. If the culture is not same of home and school, the progress of leaning is slow to understand so that the result is not better learning achievements. Ogbu focused learning not only the product of the culture and language minority Disadvantaged and dominant groups are

able to know about knowledge through the curriculum and text book. He has identified the feature of cultures differences mainly of three types of minority groups, they are: autonomous, voluntary and involuntary. Ogbu (1992) focused on two types of cultural difference, i.e. the primary cultural difference of voluntary minorities and the secondary culture difference of involuntary minorities. There are two groups in the society which are voluntary and involuntary. The voluntary groups get chance to come in the main stream of development and they have got the chance in the participation but involuntary groups are unable to get the chance in the mainstream of development and they are unable to involve in the participation. It is difficult to cross cultural boundaries in school compared to the voluntary minorities with the primary differences. He furthermore elaborated that primary cultural differences might create problems in interpersonal and inter-group relation as well as difficulties in academic work for several reasons.

Discontinuity also occurs in the areas of language, though and measurement. In Nepal, there are many school schools which develop through the western influence as a consequence of donor network, modernization and globalization process. Although the education is for helping for the welfare of nation, it has too many aspects in business policy. There is no doubt in disrupting the transmission of the tradition culture of people because the curricular of school is existed on the basis of previous culture's reflection. In additional to this way/style of teaching /learning in school is also problematic because of its formal and unpredicted nature as it occurs only rigid ritualistic manner that does not ensure hearing of children. The language in the society does interaction which is good result to the students in learning the mathematic achievement. Interaction is the activities of social activities that make us

maturation and we are able to handle to the nation and country. The interaction may be with person, friends or groups and teachers.

**Feminist Approach.** Feminist approach 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 explains everything from the viewpoint of male behind female and feminist's 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 claim that the biological different between men and women do not explain their roles inside classroom rather it needs to be understand as socially constructed (Adkins, 2005). They admit that there is anatomical difference 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.

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 in at the same age, as a matter of protecting them from perceived outside Nawalparasiars, such as boys and men or anything that may cause physical injury. Sometimes boys are presented to be more responsible than girls, except in the cases 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

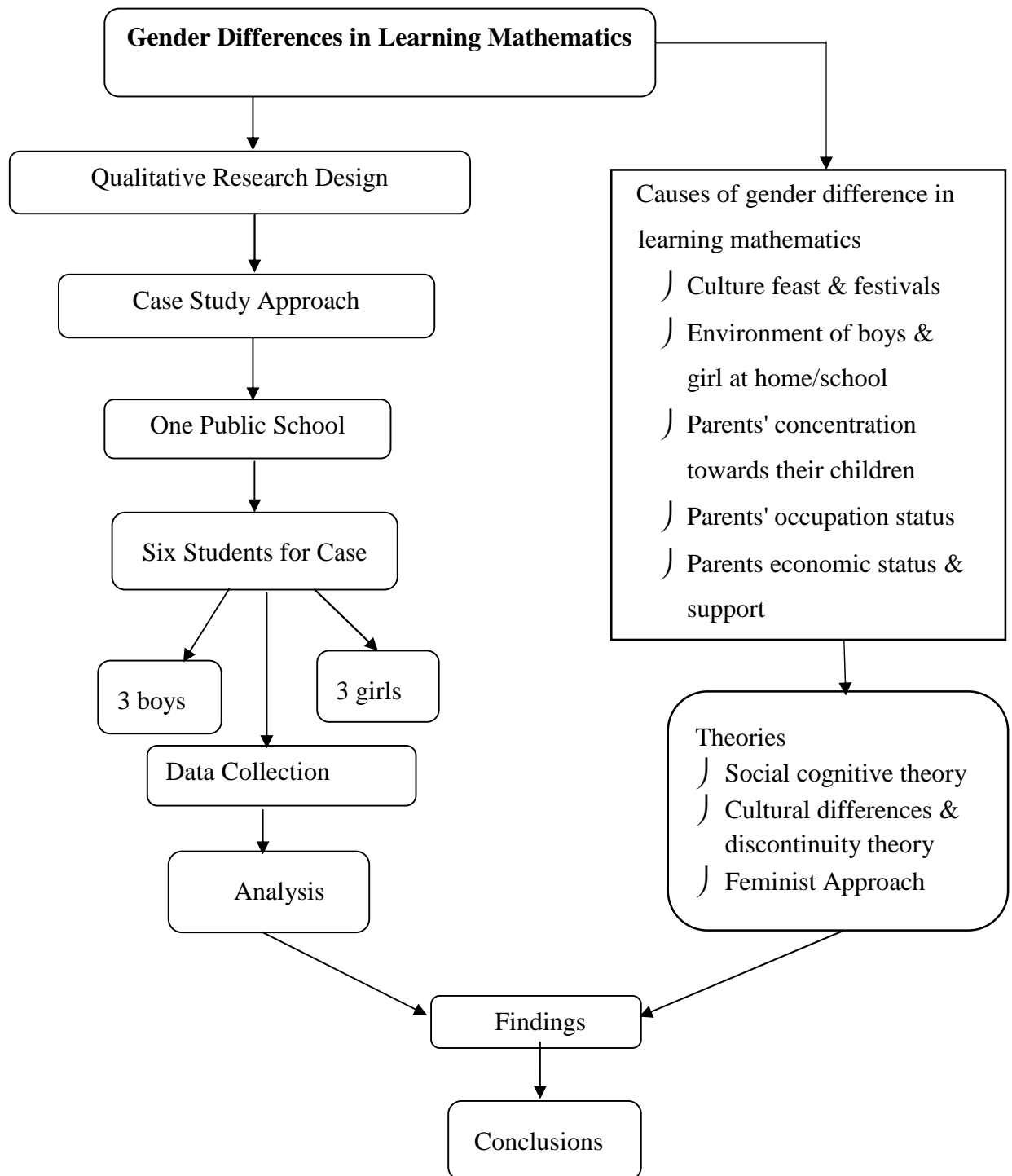
less capable of rational decision making and more governed by emotional responses. So, from the concept of above reviews of the theory, the researcher had drawn the following conceptual understanding for the further study.

According to Peter (1997 as cited in Khanal, 2019) feminist argue that mathematics is a male dominated subject that explain everything from the new point of male behind female and feminist perspective is most to understand the subordination and exploitation of women by man. It argues that women are exclude from the domain of mathematics, thus masculinity remains privileged. Feminist 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 claim that the biological different between men and women do not explain their roles in side classroom rather if needs to be understand as socially constructed (Adkins, 2005)



## Conceptual Framework

The conceptual framework is the pictorial description that is based on theoretical concepts and shows the interrelationships between the concepts and the variables related to the research (Khanal, 2019). This study was based on as follow;



The parent's concentration towards their children education, parent's occupation and economic status, parent's view towards boys and girls, interaction between teacher and students, local culture feast and festivals, Mathematics learning environment of boys and girls at home and school are some hypothetical factors that may gender difference in mathematics learning among students. The culture is male dominated. The son or boy is more emphasized than daughter or girl.

.

## **Chapter III**

### **Methods and Procedures**

Research methodology is a scientific approach which deals with the systematic procedure of collecting data. This chapter deals with selection of the study area, research design, sample of the study, tools, data collection instrument, data collection procedures, data analysis and interpretation procedures.

#### **Research Design**

Research design is the most important part of the research. Research design is the way and path of the research that guides the researcher to reach the goal of the research (Khanal, 2017). Qualitative research can be regarded as 'naturalistic inquiry' in the sense that it is conducted in the natural setting by trying to avoid any intentional manipulation and distortion of the environment of the informants by the researcher (Creswell, 2007). Those who have interaction in this structure of inquiry assist a way of searching at research that honors an inductive style, a focal point on person which means and the significance of rendering the complexity of a state of affairs (Creswell, 2007).

In case study, a real-time phenomenon is explored within its naturally occurring context, with the consideration that context will create a difference (Peter & Kaarbo, 1999). For achieving my purpose, I used case study approach because according to Cresweel (2007) in case study approach data is collected through by direct observation in natural setting and the actual incident on the spot. According to my research objective I used a case study approach under qualitative design as well as an in case study. So for achieving this purpose, I used the case study research approach

### **Area of the Study**

Every study needs study area; this study was based on only Kawasoti Municipality-16 of Nawalparasi district. In this district, I had selected Shree Janata Higher Secondary School of Nawalparasi district for the area of my research. The area of this study based on secondary level students under the one public school of Nawalparasi district. And also for the study area I selected only secondary level students under studying mathematics.

### **Selection of Respondents**

For respondents, Shree Janata Higher Secondary School of Nawalparasi district was selected by using the purposive sampling technique (based on my convenience). According to the purpose of my study, I had used purposive sampling to select the school. In this school, six mathematics students (three boys and three girls) were selected for the case respondents. Based on the students' gender differences, based on students' language, students' economic status, students' parents' education and students' annual result; I had selected these six respondents. And also, based on the school annual result low score abilities students were selected as respondents according to their knowledge level. Thus, I had used the purposive sampling technique for the selection of participants.

### **Tools of Data Collection**

There are many tools for the qualitative research to get the information from the people about their experience, ideas and beliefs. The needed data was collected from primary and secondary sources. Data was collected from classroom observation form and an interview guideline (see appendixes A, B,C,D,E )

**In-depth interview.** I had developed the different interview schedule form for students' interview, and mathematics teacher's interview. In this study all, the required

information was not possible to gather through the observation and documents. To go in-depth of the information interview was much more helpful. According to my research objectives, I had developed the open-ended interview theme with selected six mathematics respondent on the basis of gender difference in mathematics learning. So, I had developed the different area of interview schedule forms for students related to struggle of underprivileged students in learning mathematics such as cultural & society, parents' education, learning opportunities at home, home environment and also teacher and student interaction in the classroom. In-depth interview helped me to understand the personal thoughts, ideas, and experiences of the students (see appendix B,C,D ).

**Observation note.** Observation note was used to identify the students' activities, teachers' activities, interaction between students-students and students-teachers, classroom management and physical environment of the classroom while teaching/learning mathematics. Also, I had observed the family background of the students like their daily life, their home environment, their parent's professional and economical condition. Observation guideline was developed with reference to research objectives. Observation was helped me in collecting detail information about respondents, their everyday practices and capture actual experiences of the participants. I had observed college overall as well as key respondents individually and collectively during their work at college, classroom, playing with peers, interacting with teachers and friends, culture, and participation. Observation was helped me in collecting detail information about respondents such as their everyday practices, capture actual experiences of the participants, to identify students home environment and also teacher student's interaction in the classroom (see appendix A ).

**Document review.** In this study, I had used both primary and secondary sources of data. The primary sources of data were collected from the six mathematics students from selected school of Nawalparasi district. The primary sources of data were taken from face to face interview with students. And also, I had consulted some related books, journals, reports, articles, unpublished thesis, websites related to the topic to facilitate the related area of my study. The secondary sources of data were taken from various articles, reports and research studies, journals, related to the study.

### **Data Collection Procedures**

First of all, I visited the Shree Janata Higher Secondary School which is selected for my research then I meet the principal and mathematics teachers of this school. Then I said all about my study, and I had given my research proposal. After that, the mathematics teacher of this school agrees to give the permission for me about class observation. I had observed the mathematics classroom for the one week, after continue one-week class observation, I had chosen six mathematics students (3 boys and 3 girls) for case of respondent. Then, I organized the interview schedule in a related person. To collect the primary and secondary data, class observation was done regularly for one weeks during teaching learning activities. I had observed listen, interact and record the essential data from the information on the basis of observation from classroom behavior, interest, class test, homework, interest and needs in mathematics learning and other essential information would be carefully observed and noted every day. With the help of unstructured interview was taken with the above respondents would be taken with focus children, mathematics teacher and respondent's parents. The interacted with the above respondents were carefully listened and noted properly.

## **Data Analysis Procedures**

It is qualitative as well as descriptive research, so there is no mathematical procedure to analyze the data. The collected information at first, was categorized according to the category of the respondents and their different respondents were given in the text of interview and observation notes. After categorizing the collected data was interpreted and explained the perspective of the respondents which was more helpful to fulfill the objectives of this study. Cross match or triangulation was used more than one method or tool for collect more than one source of data for making the research qualitative and faithful. It is related to the students, teacher and parents to collect the data for this research. It was adopted to maintain the transferability, credibility, conformability and dependability of the information. Then, the cross matched information was analyzed and which was descriptive in nature. The case of the students which were collected from the different technique, was the major factors and their descriptive lead to the research in its full shape. The data analysis was interpreted by using the conceptual framework of the research in literature reviewed.

## **Quality Standard**

It is necessary to maintain quality standard after completing the construction of research tools. Checking and triangulation have been applied for quality standard. I had followed the following criteria to mention the quality standard in my research.

**Transferability.** Transferability is used in terms of the concept of external validity. This criterion shows the applicability of finding in one context (where the research is done) to the contexts (where the interpretation might be transferred). To maintain the transferability, I explained mathematical practices that found in different

community students. I tried to capture most of scenario by using deep description of observations, interviews and my meaningful making (Acharya, 2017).

**Conformability.** Another quality standard is conformability, which shows the quality of the result produced by an inquiry in terms of how well they are supported by information (member) who are involved in the study and by the events that are independent of inquiry. I am also a part of mathematics students so, to maintained conformability, before concluding the information, I got that information myself many times and sometimes. I confirmed that information to my other students before concluding as well (Acharya, 2017).

**Dependability.** This concept is used in terms of reliability. This is also another quality standard for judging the quality standard and shows the consistency of the inquiry process used over time. I tried to present the logic to maintain it, for selecting people and events to observe, interview and include in the study. I tried to maintain credibility and transferability to ensure dependability standard (Acharya, 2017).

### **Ethical Consideration**

If any kind of research that involves the person, special attention should be paid to the person's rights, dignity, freedom and privacy (Khanal, 2019). Therefore, I had considered some ethical issues in my research such as; I had observed the classroom only to take the permission with head-teacher or teacher of related school, I have addressed the ethical concerns in this study. I had observed the mathematics Classroom observation from taking the approval of head teacher and mathematics teacher of related colleges. Participation of the respondent was entirely voluntary. I have not published the name and address of respondents without their permission.



## **Chapter IV**

### **Analysis and Interpretation of Data**

This is considered as the main body of the research. Being the main body of research, it can be seen as the practical aspect of study. On the basis of the intended objectives and constructed tools for collecting information, researcher visited to research field for grasping current data. This is a case study related the gender difference in mathematics learning at Nawalparasi district. The main objectives of this study were to analyze the causes of gender difference in mathematics learning at secondary level, and to identify the strategies taken by the schools for minimize the gender difference in mathematics learning. Interview schedule of students, Mathematics teacher, interview schedule of head teacher, and observation form of participation in class are presented in appendixes. The main respondents of this study were focused, Head teacher, Mathematics teacher of grade nine of the school. Only one school was chosen for this study by purposively.

The collected information at first was categorized according to the category of the respondents and different themes were given in the text of interview or the observation note. These themes were considered as a code and the similar code version of respondents were collected together and explained in their perspectives. This chapter deals with the analysis and interpretation of the collected information data were categorized according the category of respondents and different themes were given in text view or the observation note. The obtained study is presented in terms of the following heading;

- ) Introduction of case respondents
- ) Classroom observation episode
- ) Mathematics learning environment of boys and girls at home/school

) Causes of gender difference in mathematics learning

) strategies for minimize the gender difference in mathematics learning

### **Introduction of Case Respondents**

**Respondent A.** Respondent A was 15 years old boy studying at grade 10. He lived in Kawasoti Municipality-15 of Nawalparasi district. It took about twenty-seven minutes to reach school from the hostel. He had seven members in his family. He had very weak economic condition. He used to feel difficult to go school from the hostel due to problem of his spinal cord. He usually used to be absent in school. The researcher just talked about learning difficulties in mathematics. Everyday life was one of the components of the discrimination. Participation, observation in the field of the researches come to know, physically disabled students had silence at classroom for example he used friendly language in his class on his own mother tongue language but the teacher did not like language, teacher aspect respective language. Due to his language he could not ask any question to the teacher and could not understand any mathematics problem. From this classroom observation, A is found fully helplessness not only from classroom as well as from school environment. In addition, being mile away from parents it become greatest problem for him, which brings hindrance in learning mathematics.

**Respondent B.** Respondent B was a girl of sixteen years from the grade 10. She was born in Nawalparasi district. She was living with her parents. There were four members in her family. She was single daughter in her family. Her family's economic condition was medium. Her father was a businessman and mother were housewife. Her family was literate. Main source income was the business in her family. She was interested in mathematics; he was interested to help her father's business stationary product and she was also interested in dancing and singing. She

was laborious and curious students. From three days observation of classroom activities, it found due to the limited availability of physically facilities, they faced the problem in learning mathematics. She used to do homework every day and used to attend regularly. Finally, as an observer, the researcher has indicated the everyday lives of girl's student, it is indicated that there is gender discrimination at home and school like some girls students face lack of classroom participation. We know that girls' students got more difficulty in learning mathematics at school because there lacked the child centered teaching environment.

**Respondent C.** The respondent C was a boy student of grade nine. He is 15 years old from middle class family. He has one younger brother and two small sisters. His parents are uneducated. His father works as a salesman in departmental store and mother is a housewife. His future aim is to be a good teacher. He likes science and mathematics. His performance in mathematics is good. He is an active, regular and discipline student in the classroom. He gets not good environment at home to study. He is more familiar with boys than girls. From this research, it seemed that his family was poor in economic condition as well as uneducated. However, she was so interest in the mathematic as well as he was hardworking students but due to lack of support of his guardian being far away. .

**Respondent D.** Respondent D was 15 years old girl studying in grade X. Her family has six members. Her father and mother both are uneducated Home environment for learning was not so effective in her family. There was economic problem in her family. Her father worked in India. Her family think that mathematics is a very hard subject, Girls can't read mathematics, so daughter most do house work. Her house far from the school approximately 1:30 minute. So that she is not regular attendance in school classroom. Her family occupation is farmer, so she didn't have

more time to homework, study and practices when she come from school. She helped her mother at house. About the own study she said,

*“I have no longer sufficient time for doing homework and exercise the greater troubles of mathematics”.*

About her study her father told,

*“I don’t know any more about education but I have providing expensive for education. Teacher said me that my children are doing better that of past year”.*

On the basis of these views, researcher concludes that the lock of education of presents affect the education status of their children. Children was busy to their house work. The role of teacher in learning process is no sufficient, present’s awareness, their education way of handling and guiding the family members are also most effective factors if the parents have to enable their children academically.

**Respondent E.** Respondent E was a boy student of grade nine. He is 15 years old. He was talented in mathematics but his family background was poor. All family members are busy on their work so they can’t manage time for children so he didn’t have more time to practice mathematics and he didn’t have more sufficient materials for reading and practices mathematics. About the own study he said,

*“Parents are busy on their work (official or farming) so they can’t manage time for us and there is a lack of guidance on mathematics activities. They are limited to facilities books, tuition classes, fees and advice which are not sufficient for us.”*

According to these views, researcher feels that students were busy of their house work and their parents have not knowledge about importance of mathematics subject. They are busy only on their works.

**Respondent F.** Respondent F was 15 years old girl studying in grade nine. Her father and mother both are busy on their occupation (farming). She was irregular student because she was engaged house hold work so she have no more time for study. Their parents also cannot provide sufficient time to their children for go to the school. In her house there was gender discrimination about son and daughter so parents focused on son.

According to these views, it seems that girls are busy of their house work and they cannot go to school regularly. Parents didn't sufficient time for daughter to their study.

From overall the above case studies, researcher had made common conclusions, like as poverty and uneducated are playing crucial role to less girls' participation in mathematics learning. The main occupation of the girl's parents was farming and parents are uneducated. Researcher observed the classroom activities such as classwork performance and participation, class test performance, homework completion and attendance from the school record of the girl's student. It was found that low performance and participation of girl's student in mathematics with compared to boy's student. According to the mathematics teacher shows the low participation of girls' students with compared to boys' students.

### **Classroom Observation Episode**

#### **Episode one**

*It was the first-class observation; the teacher went into the classroom along with the researcher. All the students stood up and said good morning. Then the teacher told them to sit down. This showed that students were well disciplined and the school has taught them to respect the teacher. There were 57 students presented in the class room where only 23 girls presented. The desk and bench were sufficiently managed in*

*the class. The whiteboard was kept on the right place. The teacher started to teach geometry of topic quadrilateral. Some students didn't have geometric instruments. Teacher wrote down a problem e.g. in a parallelogram ABCD, if  $A = 115^\circ$ , find  $B$ ,  $C$  and  $D$  on the whiteboard and started to solve each step and he asked students whether they understand or not. Some of them answered that they can solve the problem. Mainly the students on the first and second bench were active where most of girls were passive. Again, the teacher wrote another problem from the textbook on the whiteboard e.g. in the adjoining figure ABCD is parallelogram in which  $A = 72^\circ$  calculate  $B$ , angle  $C$  and  $D$ . and started to solve the problem explaining step by step. Teacher asked questions to students about the related question e.g. in the adjoining figure ABCD is parallelogram in which  $\angle DAB = 80^\circ$  and  $\angle DBC = 60^\circ$ . Calculate  $\angle CDB$  and  $\angle ADB$ , and also made them doing that class work. He wrote a problem in the board and asked them whether they could do or not. At last he solved the problem in the whiteboard. Then he told them to do the exercise at home.*

In this episode, the researcher found that most of the girls were absent in the classroom. There was a topic 'construction of quadrilateral' which needs geometric instrument but there was not geometric instrument with all of them. I also observed that they were doing class work with the help of their friends of geometric instruments. The girl students were not so active participate in class. The teaching method was based on lecture and practice oriented. The teacher behaved commonly to all the students. He did not focus the girls. Specially, girls were passive in mathematics class. Only few girls of first two benches seemed to be active and rest of them were passive.

### **Episode two**

*It was the second-class observation. There were 49 students presented in class. There were 22 girls presented. The class was well managed. In this class, most of the student had brought geometric instrument. The teacher checked homework of few numbers of students. Again, in this class teacher started to teach the topic geometry of quadrilateral. He started the class connecting with the previous lesson. Teacher wrote a problem on the whiteboard and solved step by step with the help of geometric instrument and also explained. Teacher also encouraged student in problem solving. Again, teacher provided another kind of problem to solve in the classroom and they could not solve any. Finally, teacher solved the problem too meaningfully. At last teacher told them to do relative exercise at home.*

In the episode, the researcher found that teacher started class after checking homework; he did not revise that problem which was not solved students. Teacher used lecture and practice method but taught only text book's exercise. No doubt teacher was well in subject matter. In this class observation, I found there were most of the students had lack of prior knowledge. Some of them did not get learning environment at home due to the involvement of household work. Some of the students were busy in side talking and careless in class. Where most of the girls were passive, they couldn't try to learn effectively learning. They were not motivated and interacted with the teacher of the class.

### **Episode three**

*One day teacher went to the classroom first then, the researcher also entered into the class. All students stood up and said a good morning sir. The researcher told them to sit down. It was noticed that the school environment has taught them about the respect to the teacher. One the other hand teacher started to teach mathematics. He did not*

*review the previous lesson but directly he wrote problem of mixed type of factorization. e.g.  $(a-b)^2-81$  form practice book and did problem on the whiteboard by explaining step by step. After one demonstration, he gave one more problem to the physically disabled and normal students to solve. It was an individual practice problem. The teacher then just walked among the students and guided them wherever they get difficulty. whenever he found mistake he came to white board and explained to the problem how to solve, again teacher asked the formula of  $a^3-b^3$  and  $a^3+b^3$ , but maximum student didn't answer and he punished them with ruler on their hand and advise them to read and write, and will punished them badly if they couldn't be able to answer tomorrow, he suggested and he leave the classroom, Then finished the class.*

Finally, the above view and class observation, we can say that physically disabled student's main problem is absence of getting conceptual method of teaching. It is also found that the techniques are not enough to learn mathematics for physically disabled students as well.

#### **Episode four**

*"In an observed class, mathematics teacher went to the class and then after the researcher also entered in the class, with him entire students stood up and said good morning sir! The teacher also wished good morning and told them to sit down. It was noticed that school environment has taught them about the respect for the teacher. There were 40 students in class. Teacher took the attendance of the students. Teacher said "open your book please" and he wrote the topic Application of  $a^3+b^3$  and  $a^3-b^3$ . He wrote a problem  $x^3-8$  on the white board and solved that. All the students were busy to copy the solution from white board. The teacher didn't review the previous lesson a related topic for application  $a^3+b^3$  and  $a^3-b^3$  and didn't check*



*the homework. After some time, the teacher asked with the students, whether you understood the lesson or not. Some students said, "yes sir!" but one of the physically disabled students asked with teacher in own language. Teacher didn't understand his language and teacher asked him, "what do you mean?". After these students other physically disabled students did not try to ask again about their problem, they got much depressed and sit on the bench. Again, the teacher repeated the problem on the white board and the situation was the same. Then the class is finished."*

From the above classroom activities, the researcher found that some girls and physically disabled students often remain silent in classroom, frustrated and hesitated to take part in learning activities because of the lack prerequisites knowledge of related chapter. The children generally were afraid of asking questions to the teacher. They felt problem to asked question in the class due to his language that the teacher didn't understand and became angry. Some girls' students most often receive dominated behavior and have to cope with humiliating environment in the class only because of their poor Nepali language proficiency. It shows that the culture of home creates difficulties for learning mathematics. So, interaction also plays vital role in learning mathematics, which creates difficulties.

### **Mathematics Learning Environment of Boys and girls at Home and School**

Learning environment typically include four components: an enabling context, resources, a set of tools, and scaffolds (Hanna, Land & Oliver, 1999). Learning environment also include students can practice mathematics anytime and anywhere; mathematical assignments can be generated 'at random', so that the amount of exercise material becomes nearly infinitely large; activities and answers of students are stored; intelligent feedback on student's work is given automatically (Bokhove, 2006).

Learning environment includes the learning culture reflected in the classroom activities within the school premise. The rule and regulation, relationship among teachers, students, administrations and overall physical condition of the school and their interaction are the culture of the school and these are ultimately the teaching and learning environment of the school. Classroom practice plays the main role for the improvement of the students learning habits. So, more important things for the better learning in the students are the classroom practices. Classroom practices include the interaction between teacher and students. Researcher had asked the question and noted them in their respected voice as below;

*“Our school has proper environment for the getting to recognize mathematics and it moreover lady exceptional school.” (Student’s View)*

*“In my educating technique I have used children-oriented techniques and I have equally supplied gaining knowledge of surroundings both girls and boys school students in study” (Teacher’s View)*

*“I most like arithmetic concern due to the fact our school has proper surroundings for the studying mathematics.” (Boy’s View)*

*“I don’t like arithmetic trouble because the reality my home environment is no longer ideal for studying,” (Girl’s View)*

From the above responses, school is far from the noise and pollution. The teacher used learning by doing theory on learning mathematics. So, there is quite good learning environment in the school it is also female friendly school. The teacher encourages students to practice more problems. At home, the teaching learning activities of boys are totally different from the girls because girls are busy within the household activities.

*“In my house there is no good environment for learning, because our parents force us in farming and household works.” (Girl’s View)*

*“My primary venture is to study, because our domestic surroundings is accurate and I don’t have any family work to do.” (Boy’s View)*

*“There is no exact surroundings for women to exercise at home. They depend on school room solely and therefore they are weak.so, they do now not like mathematics.” (Teacher’s View)*

Most of girl students did household work but boys didn’t do any household work. Through many games' boys learn mathematics. Girls were involved inside housework boys were involved outside work. So, we can say that the environment of home was not good for learning mathematics. According to social cognitive theory, environment impacts in learning. There are social and physical environment. Social environment includes family members, friends and schools and teachers. Physical environment is the size of a room, the ambient temperature or the availability of certain foods, physical setting in the classroom and school. Environment and situation provide the framework for understanding learning. The situation refers to cognitive or mental representation of the environment that may affect person’s learning. In this study, the physical and social environment of students was satisfactory in school only. There learning was enhanced when they have appropriate environment.

Hence, from the observed class and interview, the mostly used problem solving method in teaching of mathematics. The student-centered method was used. These activities indicated that the learning in classroom environment was good. According to this method or strategies in the teaching and learning mathematics, it could be concluded that mathematics teacher was well trained and experienced. The mathematics learning environment of school was good. But home environment was

not good for the girl students, So, Most of the girl students not like mathematics subject. Similarly, one of the researchers, Chatvat (1013) also concludes that home environment and classroom environment affect in learning mathematics. In the same way, my research has also shown that home environment and classroom environment affect in learning mathematics. So, we can say that home and school environment affect in learning mathematics.

### **Causes of Gender Difference in Mathematics Learning at Secondary Level**

According to interview with mathematics students', their parents and mathematics teachers and also from classroom observation the causes of gender differences in mathematics learning are presented as sub-heading;

**Gender Discrimination.** Nepal is patriarchal structure. It seems that women are not given equal position in the society by males and they are in continuous issue for the equal right (Nepali, 2019). In Nepalese society, there is believed that son looks after parents in their old age and daughter for maintenance of household works. Due to these beliefs, sons are given and daughters are kept within the four walls of house. Specially, in rural area there is a discrimination between son and daughter from their parents and society. They learn to do house hold works, to bring pater is only for girls, they also think that it is only the task of the girls. Some girls are forced to accept discrimination and differences. Girls are forcing to do household works, take care of small sister and brother because their mother has been doing it, so they have to do it. Their mother thinks that daughters mostly do household works. On the interview time, the views of respondent are presented as follows;

*"Education has not uses particularly in daughter's existence due to the fact they have to do the family works after marriage." (Parent of Respondent B)*

*"I think this education is not for us. We are poor people and our children cannot read or write as other rich people children can do. It is enough if they know their simple calculation and simple reading and writing skill. Therefore, I expect some occupation for our children as soon as possible without getting higher education. It would be better if they can join farming."* (Parent of Respondent C)

*"I think education has no great significance. So, I don't send our children to the school. Moreover, our female teens usually have to work indoors in our community. Another element is that the women are no longer allowed to do outside activities. There is an inborn concept about the girls that they should not be sent in the outdoor activities because they cannot do. So, think that girls would do only household activities outside the home."* (Parent of Respondent D)

From the above responses of parents, it can be found that there is a gender discrimination at home; as a result, which is the factors that affecting the students' mathematics learning. Because gender discrimination is a psychological factor which has greatly contributed to the learning difficulties of students. The parents have been convinced that education cannot do any good to their children. This has prevented them from building up their confidence. This ultimately affects their children's performance level in mathematics. The social practices that encourage people to send the daughters to household to work and sons to playground are the outcomes of the system that unequally ensure discrimination between sons and daughters. Even though this practice is prevalent in other communities in our society as well, it is rampant in student's community as they lack awareness have been suffering from extreme poverty. So, it found that, some of the students' parents and guardians fail to

motivationally encourage their daughters in learning process which is the factors that affecting students' mathematic learning.

**Teacher's biasness in the classroom.** Teacher's biasness on mathematics learning indicates that the tendency to make decision or take action based on gender. Where teacher fill boys are basically talented than the girls. In our male dominated society who has believed that mathematics only learns boy and teacher only care boys. Researcher has asked the question (appendix C & D) and noted them in their respected voice as below:

*“Our school makes participation to every student in every activity whether they are boys or girls.”* (Head Teacher)

*“During educating duration and different time, doesn't behave in another way to boys and girls. I ask query and provide remarks to them equally and individually”.* (Teacher B)

*“We do not comprehend any behaviors that make us sense instructor behaves us in another way in accordance to our gender. He gives encouragement and rewards us for good performance equally whether we are boy or girls”.*

(Respondent F)

Above responses shows that teachers do not show their behavior as biasness in the classroom. It means they perform their behavior equally to the students whether they are girls or boys. Similarly, I found that students (girls) also do not feel we are inferior to boys in mathematics because our teachers never behave such way. From classroom observation, I found that there was not any sort of discrimination in the classroom whether they are boy or girls in the mathematics classroom. Thus, the teacher had behaved equally with all boys and girls in the classroom and he treated equally on punishment and reward cases.

**Male dominated society and social belief.** In our society is male dominated society and our society believed that women are second class citizen, Girls cannot study hard subject so only boys appear in mathematics. Researcher has asked the question (see appendix D) and noted them in their respected voice as below:

*“In preceding days, boys have been skilled to the society however women have been constrained to their kitchen and most of time engaged in their family workload. This is the traditional effect of gender equity which influences the girl mental development and achievement.”* (Head Teacher)

*“Boys and girls both can learn the mathematics who study work hard can gain good achievement in mathematics subject.”* (Teacher A)

*“I used to be susceptible in mathematics from the establishing of my school. I additionally did now not attempt to examine from distinctive way. But our society does not decide arithmetic is solely for boys' students.”* (Respondent B)

From the above-mentioned interviews, I found that mathematics is not only for the boys learn, there is significance role of society for participation of mathematic. The political, economic, religious and cultural condition of the society can affect in the study of mathematics education for female. If girl students work hard, they can also learn the mathematics because they are not weak than boys. Therefore, mathematics education is very much important for their lives be factor of their social, gender and family roles.

**Parent’s concentration towards their children education.** Desarrollo (2007) refers that the extent to which mother and father or different household members are actively engaged in a student’s schooling had apposite impact on the student’s achievement. Parents’ dependent upon their sons. They want to see their sons as a great person, high-rank professions in engineering, doctor that are regarded as a high

status and high-income profession. They regard agricultural and teaching is good profession for daughters because they do not want to invest much more in other areas of study. From the interview with parents most of the parents were uneducated. From the interview with related respondents, the view of respondents is presented as follow;

*“We ship our sons in Boarding faculty however we ship our daughters in governmental school due to the fact they are our property and they stay with us however daughters are other’s property and they stay with others.”*

(Parent’s View)

*“My parents are illiterate therefore they are unable to guide me well at home as well as they are unable to supply the needed materials too. Some materials supply for only son.”* (Student’s View)

*“No, we don’t have equal possibility in mastering mathematics due to the fact we need to work the entire family works as a result, we don’t have time to find out about whereas brothers have nothing to do the family work at home alternatively than study.”* (Girls Student’s View)

*“Parent’s education plays vital role in all-round development of children. Therefore, I think parent’s education is also an affecting factor in mathematics achievement of girls.”* (Teacher’s View)

From the above responses, it can be said that the parents who are literate seem providing equal access to both son and daughter in learning. But the parents who are illiterate seem only focusing on sons’ learning as a result son’s learning is higher than girls. The teacher also supposes that the parent’s education plays vital role in sons and daughter learning. Similarly, one of the researchers Pantha (2006) also concludes that parent’s education plays a vital role on students in learning mathematics. In the same way, my research has also come to be known that parent’s education affects in



learning mathematics. So, we can say that parent's education affects in learning mathematics. Parents seem irresponsible towards daughter and suppose them other's property as a result they seem less interested in learning mathematics in the class too, such as, in asking questions, in completing homework, in answering the questions and teacher what suppose that they are shy. Similarly Khanal(2017) in the same way, my research has also shown that the interest of parents towards boys and girls affect in learning mathematics. Hence, we can say that parent's interest affects in learning mathematics.

**Culture and Custom.** Culture is a base of human civilization. Different people have different culture also defined as the beliefs, values, behavior, and particular group of people. Culture is a way of life that a number of people have a common. Our culture affects virtually every aspect of our life. Researcher has asked the question (see appendix C & D) and noted them in their respected voice as below:

*"Students do not prefer to come school on the feast and festivals. The most students were absented on the following day."* (Head Teacher)

*"Student engaged in feast and festivals so culture effect on their study."*

(Teacher B)

*"I was engaged in feast and festivals as our culture and our parents do not force to go to school at that time so culture effect on our study."*

(Respondent C)

*"Student not make a time for study and not complete homework and engaged feast and festival."* (Parent of Respondent C)

From the above interviews, I found that festivals effect on the learning environment of the students. Hence, they were absented in the day of festivals, in their

society. Similarly, they did not complete their homework so cultural factor also effect on the learning achievement of the students.

**Household workload at home.** Girls engaged most of the time in household work. Their start their works from the kitchen early in the morning. Which affects their study and they can't balance time for study, which gives poor performance in the school. But some girls' get up early in the morning and they are able to manage their time for study so they do better in their study other girls who are involves in their house hold works. Researcher has asked the question (see appendix C) and noted them in their respected voice as below;

*“Most of time some of the girl students come to school without complete their homework. Some of the student careless and most of the parents do not provide appropriate time to their child”.* (Teacher B)

*“Our children are engaged house hold work in morning and evening. Get our compulsion that they have to do homework at night. Sometime there may be problem of light we cannot provide sufficient time to our child for doing homework”.* (Parents of Respondent F)

From the above-mentioned interviews, I found that most of the girl students present in the classroom without complete their homework due to their house hold works. They have to do their house hold works from early in the morning and evening in the every day except school time. They replied that house hold works were our daily duties we should do these works because our parents did not understand and importance of our study. Similarly, from the classroom observation I found that most of the girl students did not complete their homework.

**Parents' support.** Parents' support is defined as supporting role of parents for effective learning of children and also parent's support is one of aspects of home

environment which bring the children's creativity that's why parents support play the positive roles for effective learning or purposeful learning (Bhatta, 2016). Every parent should have the responsibilities to create friendly environment to bring critical knowledge of student or children. On the interview time I had asked the question "How to affect parents' support on students' mathematics learning?" In this question the responses are presented as follows;

*“Our mother and father are illustrated they ought to now not study and write so our parents ought to now not help and education at home for mathematic learning.”* (Respondent B)

*“Although our parents are literate but they can't give time for us because of busy schedule on their job”.* (Respondent C)

*“Parents are busy on their work (official or farming) so they can't manage time for us and there is a lack of guidance on mathematics activities. They are limited to facilitate books tuition classes, fees and advice and which are not sufficient for us.”* (Respondent E)

From the above view the researcher concluded that most of parents didn't supports their students (child). They can't aware of student's study because of illiterate, lack of time, lack of mathematical knowledge.

**Local culture feast and festivals.** Culture may be defined as the beliefs, values, behavior and material object shared by a particular group of people. Culture is a way of life that a number of people have in common. Culture offers the framework inside which our lives come to be meaningful, primarily based on requirements of success, splendor and goodness and our subculture influences sincerely every component of our lives (Pokhrel, 2017). Cultural diversity is the end result of geographical location, non-secular beliefs and lifestyles.

*“Feast and festival don’t effect on our study rather than the girls because girls have to be involved much more time in feast and festivals.” (Boy’s View)*

*“I must be spent much more time in feast and festivals to celebrate it than the boys that causes to be absent me the previous and following day of fest and festivals.” (Girl’s View)*

*‘Students don’t select to come college on the feast and festivals. The most of female students have been absent on the following day.’ (Teacher’s View)*

*“On the days of feast and festivals, both the girls and boys are affected by these but the girls are more affected by these because they must be involved until and unless the feast and festivals are over that interfere in their study than boys.” (Parent’s View)*

From the above all responses, it came to know that not only household work but also feast and festival is female oriented as a result they must be spent much more time in celebration rather than boys. They have work to cook new-new kinds of food and serve to all the members of family as a result they are disturbed on that day not going to school, not doing homework and so on where boys are free without nothing to do. According to social cognitive theory, learning is affected by the social environment. There are social and physical environment. Social environment includes family members, friends and culture. Environment and situation provide the framework for understanding behavior. The situation refers to cognitive or mental representation of the environment that may affect person’s behaviors. In this study, the social environment i.e. culture, feast and festivals also effect on the learning mathematics.

In the respect of local feast and festivals, all of the parents and teacher accept that the feast and festivals effect their children’s learning mathematics but boy’s

student focus on their study than feast and festival. So, they disagree with feast and festival effect on their learning mathematics. In conclusion, culture, feasts and festivals effect on learning mathematics. Although, the boys celebrated the feasts and festivals, they concentrated on study too side by side but girls could not do so. Similarly, one of the researchers, Lamsal (2016), also concludes that wrong cultural practices, feast and festival used in unmannered way affect in learning mathematics. In the same way, my research also has shown that feast and festival affect in learning mathematics. Hence, we can say that feast and festival affect in learning mathematics.

### **Strategies for Minimize the Gender Difference in Mathematics Learning**

All the teacher and students should enter the school on timely manner in uniform otherwise they should give clarification of being late with the at school's administration. Students are obedient, disciplined and they respect the teachers. But some of students want to go out of school rules and regulation. The school is in peaceful area near the forest to there is no noise from outside the school. School conducts different types of physical and mental extra musical activities that help to pupil to build up their career.

**Provide equal opportunities for boys and girls at home.** In regards to the way of engagement of the students in mathematics learning at home, the environment of the home play a vital role. The home environment is directly related to their culture, social class, economic status of the family, educational background, etc. During the interview time, I had asked the question for respondents "*what strategies do teachers should adopt to improve the interest of girls in learning mathematics?*" In this question I have listed the respondent's view in the following lines;

*"I have to use homemade materials and local materials which help the students to know mathematics and they can solve mathematical problems by linkage with their daily life problem". (Teacher B)*

*"Teachers need to teach mathematical problems in connection with our real-life problems". (Respondent C)*

Supporting this view, I concluded that, to teach mathematical problems in connection with student's daily life is a way to improve the interest of students in learning mathematics. Therefore, to motivate the girls to learn mathematics, teachers need to linkage mathematical problems in our daily life while teaching in the classroom. Thus I found that in the mathematics classroom if the mathematical problems are taught in connection with student's daily life, then the interest of students in learning mathematics can be increased.

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

*"In order to bridge the hole between male and girl students in the classroom, I have additionally given students the chance to show their issues and the work they have achieved in math teaching." (Teacher B)*

*"The school has furnished greater classification is the morning at minimal cost." (Respondent C)*

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

**Use effective teaching method.** A good strategy provides a clear roadmap, consisting of a set of guiding principles or rules, that defines the plan of action designed to achieve a long-term or overall aim. so we reached our goals we must be adopted the good strategies. Only good physical facilities, trained teachers, adequate fund, good libraries, good textbook and good learning materials, their availability does not automatically lead to student achievement. A ‘good’ school must be judged based on its output rather than the input. So, we adopted the good strategies for the better achievement of students and schools also. Then some views about the good strategies for school improve.

*“Some students are more interest in math and some students are felt difficult and boring the mathematics class so teacher encourages and providing the guidance about math for week students”.* (Math teacher view)

From the above responses it can be found that, strategies for minimize the factors that affecting in students mathematics learning are to focus the student centroid learning method, to manage the weekly test, class test and unit test and provide feedback, teacher share positive attitudes about math, to increase the use of materials while teaching learning math, to focus the use of formative evaluation rather than summative, to manage the extra class for week students, to manage the teacher

punctuality and dedication for students, and also teacher encourages and providing the guidance about math for week students.

**Creating good learning environment.** Environment is the big component of learning mathematics of the students. Nepal is a multi-lingual, and multi-cultural country. In the classroom students comes from different cultural background, so teacher need to use appropriate strategies for effective mathematics teaching/learning. For making healthy environment inside class we must have focus on these important issues so that students from different community can feel their ownership in learning. In this regard, one of the mathematics teachers said that;

*"Mostly I teach in Nepali language. But there are multilingual students in the classroom. I feel that some students who come from different community cannot understand the subject matter easily. They ask me questions many times. Sometimes, they feel embarrassed to ask questions in Nepali language. Therefore, I attempt to my language so that they can easily understand in the classroom."* (Teacher B)

From the above data, I realized that language was a major barrier faced by the teachers as a medium of instruction in the multicultural classroom situation.

Therefore, it seems to me that the learning environment as the vital role of learning mathematics for the students. So to teaching mathematics in the local language to the school seemed in suitable environment.



## **Chapter V**

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

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

This chapter concerns in the following heading or sections;

- ) Findings of the study
- ) Conclusion of the study
- ) Implications of the study
- ) Recommendation for the further researcher

#### **Findings of the Study**

The major findings of this study are as follows;

- ) This study found that, teacher's biasness in the classroom, gender discrimination, male dominated society & social belief, lack of parents' concentration towards their children education, cultural & custom, household workload at home, lack of parents' support and also culture feast and festivals are the causes of gender differences in mathematics learning at secondary level.
- ) This study found that, to provide equal opportunity for boys and girl in mathematics learning at home & school, to use local language in mathematics teaching/learning at school, creating good learning environment at home for the students, to improve the school policies, to provide scholarship for the students which family economic condition is weak are the main strategies for minimize the gender difference in mathematics learning

- ) This study found that boys had good learning environment to learn mathematics in their homes and at school in the comparison to girls. Since the local culture is female oriented and the girls had household workload than boys. Girls had no enough time to practice mathematics and the household works were given priority than their study. Although, the learning environment of girls in home was not satisfactory. So, girls do not better in mathematics than boys, Thus, gender difference was found in mathematics learning environment in home.
- ) From this study researcher found that the culture has gender discriminations but it was not noticed in mathematics classroom. The teacher treated girls and boys equally in observed class. Since, the local culture is patriarchal society; all of the household workload was responsibilities of girls. Due to no restrictions to boys, they were not involved in household work. So, girls are not good performance in mathematics subject
- ) This study was found girls much more affected by established norms and values because they had to be involved in the whole household work to festivals, cultures and household work distributions of' work. Girls had to be involved and taken all responsibilities until and unless the celebration got over.
- ) School policy hasn't concerned about mathematics achievement. There weren't extra classes of mathematics for low achiever students. There was no library and sufficient learning materials in school which effect student's achievement.
- ) The learning environment of girls in home was not satisfactory. So, girls do not better in mathematics than boys, girls had no enough time to practice

mathematics. The household works were given priority than their study. Thus, gender difference was found in mathematics learning environment in home.

- ) The interaction among teacher and boys' students was found highly in the comparison of the girls. The talented students were found more involved in the interaction on the one hand and on the other hand the interaction between teacher and girls were found less than of the boys because of girls' shyness, weaknesses, fear, introvert and so on.
- ) The children of educated parents could teach, motivate and guide their children as well as could afford for extra classes if needed. Due to lack of education and knowledge, the laborer and uneducated parents discriminate on the basis of sex. They gave priority to their sons than daughter in the education. Hence, the gender difference was found in the lower socio-economic and uneducated family than higher and educated family.
- ) Undoubtedly, it can be said that the local culture feast and festivals affected the study of gender differences in mathematics learning. This study was found much more affected by established norms and values because they had to be involved in the whole household work to festivals, cultures and household work distributions of work.
- ) The girls were behaved differently by their parents as burden and kept into the boundary of four wall whereas sons are found to be given more freedom, high facility, easy access to practice mathematics and enough time spending on study to be greater personalities such as doctor, engineer, pilot or highly ranked person. Where the girls from same stomach of their parents were regarded to be others' daughter by their own parents. So, girls were found to

be engaged in household work without having freedom, easy access to practice mathematics, spending enough time on study.

### **Conclusions**

There were different values in our society. The duties and responsibilities that sons and daughter holds are different. Boys spent most of time in practices in mathematics study. And girls are sincere in their responsibilities and manage time for practices mathematics even they have not satisfactory environment and not enough time to practices mathematics. Some girls students are not regular in the classroom. The parents love care boys more than daughters. Giving the son a lot of time to study at home also makes the daughter work so the girls pay more attention to less of the house to the daughter.

Girls and boys are biologically different but their roles, status, position, responsibility are somewhat the same. In our male domain society, there is a different way to see the female from the point of view of mathematics education. There is a belief that female is not able to grasp technical subjects such as mathematics science and therefore is unable to teach.

Learning environment at school was good but at home was not good. Most of the people in society had not knowledge about importance of mathematics so that mathematics was valueless in society. Beside that in the society people said that there was no value to teach girls. Because girls handle their family so that must know knowledge about household works knowledge about strong point show the different between girls and boys in learning mathematics. Due to social causes girls are lack of interest in learning mathematics. The teacher behavior and family background are also having some positive and some negative effects on mathematics achievement of girl students. So that the teacher and parents have been sometime equally for the girl

student learning activities in school and create good environment at home for learning can improve the mathematics achievement of girl's students. The teacher expectation of girls is lower than that of boys. Girls were afraid of mathematics subject. Educated parents were more serious about their children's education than uneducated parents.

### **Implications of the Study**

From the above findings and conclusions, the researcher would like to suggest some implication for the improvement of mathematics learning of the mathematics. Therefore, the main implication of this study can be listed as follows;

- ) This study is helpful to reduce the gap between gender and learning mathematics.
- ) This study is helpful to provide proper guidelines for policy makers and educationalists to formulate appropriate policies related to mathematics.
- ) This study helps to support for good parenting in favor of girls in learning mathematics.
- ) This study provides ground for the structural changes inside classroom, school and home environment.
- ) This study is helpful the curriculum designers to design the curriculum according to the need, level and ability of learner.
- ) This study is helpful for students to be aware of the main problems of the mathematics to adopted required strategies for the improvement.
- ) This research helps find out how parents' educational expectations help for the better achievement of their children.
- ) This study helps for students to be aware of the main problems of the mathematics to adopted required strategies for the improvement.

### **Recommendations for Further Researcher**

According to the findings and conclusion provided by the study, the recommendations for the improvement of learning mathematics on gender;

- ) A similar study can be done as a survey type.
- ) A similar study can be extended in another topic of mathematics like algebra, geometry.
- ) The mathematics teacher should be encouraged to give attentions to girls' students.
- ) Girl students should be encouraged to be involved in active participation in classroom activities.

## Reference

- Acharya, B. R. (2017). *Diversity in mathematics education*. Kathmandu: Pinnacle Publication.
- Adkins, L. (2005). The new economy, property and personhood. *Theory, Culture and Society*, 22(1), 111-130.
- Bandura, A. (1986). *Social foundations of thought and action: A social-cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Baroody, A. J. (1987). *Children's mathematical thinking: Developmental framework for preschool, primary, and special education teacher*. New York: Teachers College Press.
- Beaton, A. E., & O' Dweyer, L. M. (2002). Separating School, classroom and student's variants and their relationship to socio-economic status. In D.F. obitual & A.E. Beaton (Eds). *Secondary Analysis of the TIMSS Data* (P.2 11-231).
- Best, J.W. & Kahn, J.V.(2002). *Research in education*. New Delhi: Prentice Hall of India.
- Bokhove, C., & Drijvers, P. (2006). Symbol sense behavior in digital activities. *For the Learning of Mathematics*, 30(3), 43-49
- Brophy, J., & Good, T. (1985). *Teacher-student relationships: Causes and consequence*. New York: Holt, Rinehart, and Winston.
- Campbell, J.R., & Baudry, J.S. (1998). Gender gap linked to differentia socialization for high achieving senior mathematics. *Journal of Educational Research*. 9(1),14-17.
- Chataut, T. (2014). *Achievement in mathematics by gender*. An Unpublished Master's Thesis, T.U. Kirtipur.

- Cresewell, J.W, (2015). *Educational research: planning, conducting and evaluating qualitative and quantitative research* (4<sup>th</sup>ed.). Boston, MA: Pearson Education, Inc.
- Das, K. P. & Wilkinson, M. E. (2011). The effects of gender, class level and ethnicity on attitude and learning environment in college algebra course. *Journal of Mathematics Science & Mathematics Education*, 6(2), 15-20.
- Desarrollo, I. (2007). *The Quality of Education in Latin America and Caribbean Latin America*. Paraguay: Research Work Institute Desarrollo.
- Dhakal, H. (2006). *A study of the factor affecting the girl's students' attitude towards the selecting of optional mathematics at secondary level*. An Unpublished Master Thesis, T. U., Kirtipur.
- E. Fennema& G. Leder (Eds.), *Mathematics and gender*. New York: Teachers College Press.
- Fraser, B.J. (2010). Classroom environment instruments: development, validity and applications. *Learning Environment Research*, 1, 7-33.
- Ghimire, T. (1997). *Factor affecting teaching learning mathematics at secondary level*. An Unpublished Master's Thesis, T.U. Kirtipur.
- Halpern, D. L. (2000). *Sex differences in cognitive abilities* (3<sup>rd</sup> Edition). Mahwah, NJ: Lawrence Erlbaum, Associates. Inc. Publishers.
- Hyde, J. S., Fennema, E., Ryan, M. & Frost, L. A. (1990). *Gender difference in mathematics attitude and affect*. Oxford. OUP.
- Janwali, S. (2007). *Causes that affected mathematics achievement of girl's student* (Unpublished Master's thesis). T.U., Kirtipur.
- Jensen, B. & Seltzer, A. (2000). Neighborhood family effect in educational progress. *The Australian Economic Review*, 33(1), 17-17.



- Joshi, H.(1997). *Determinants of mathematics achievement using structural equations modeling*. Unpublished P.H.D. Dissertation Department of Educational Psychology, Algebra.
- Kerlinger, F.N. (1983). *Foundation of behavioral research*. New Delhi: Surjeet Publication.
- Khanal, K. j. (2017). *Girls perception toward gender discrimination and its effect in learning mathematics*, An Unpublished Master's Thesis, T. U., Kirtipur.
- Khanal, P.(2019). *Research methodology in education* (1<sup>st</sup>ed). Kathmandu: Sunlight Publication.
- Lamsal, (2016). *Causes of gender gap in enrollment in major mathematics course*. An unpublished master's thesis, T. U. Kirtipur.
- Melnuish, E. (2010). Impact of the home environment on child cognitive development. *Scottish government social research in Scotland*. pp.144-146.
- Nepali, S. (2020). *Difficulties faced by the Gurung students in learning mathematics* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Neupane, D. (2001). *A study on the effectiveness of play method in mathematics teaching at primary level* (Unpublished master's thesis).Tribhuvan University, Kathmandu.
- Niure, D.P. (2018). *Research methodology in education*. Kathmandu: Kwest PVT
- Ogbu, J. (1992). Understanding cultural diversity and learning. *Educational researcher*. 21(8), 5-14.
- Pandey, K. (2013). *Relation socio-economic status on mathematics - achievement of primary school students*. An Unpublished master thesis, T.U. Kirtipur.
- Pandit, R. P. (2015). *Foundation of mathematics education*. Kathmandu: Indira Pandit PVT

- Panta, G.R. (2006). *Parental occupation and their children achievement in mathematics in Kathmandu district*. An Unpublished thesis of M.Ed.
- Pearl, K. (2007). Household environment's association with math and reading test score in Ghana. *Research Journal*, 3, 46.
- Poudel, Y.(2014). *Factors affecting mathematics achievement of secondary level students*. An Unpublished Master's Thesis, T.U. Kirtipur.
- Shrestha, P. (2016). *Cultural diversity and difficulties in learning mathematics*. (Unpublished master's thesis). T.U, Kathmandu.
- Upadhyay, H. P. (2010). *Trends in mathematics education*, Kathmandu: Balbatika Education Publication Pvt. Ltd.
- Yadav, H. (2016). *Causes of low enrollment of students in optional mathematics*. An unpublished master's thesis, T.U. Kirtipur

## Appendix A

### Observation Guidelines

Name of school:

Students' participation:

Date of observation:

Topic:

The classroom observation of mathematics was observed on the basis of following main topic;

- ) Environment of the classroom.
- ) Teacher's viewpoint towards boys and girls.
- ) Participation of the boys and girls in classroom.
- ) Interaction of girls and boys with each other and with teacher.
- ) Answering way of boys and girls to the question of teacher.
- ) Any activities or behavior with in classroom.
- ) Interaction of girls and boys with each other and with teacher.
- ) Answering way of boys and girls to the question of teacher.
- ) Teacher's reaction and boy's behavior while girls are not being able to the teacher's question and vice-versa.

## **Appendix B**

### **Guideline for interview with Head Teacher**

Name: Age:

Qualification:

Teaching Experience:

Address:

The Interview guideline with Head teacher as follow;

- ) Participation of girls teaching learning activities.
- ) Teaching method.
- ) Interest of girls in mathematics teaching.
- ) Which strategies taken by school improvement in girls.
- ) Teaching method use in mathematics class.
- ) Participation of girls of mathematics class work and homework.
- ) Classroom management.
- ) Students upgrading system.

## Appendix C

### Guideline for interview with Mathematics Teachers

Name:

Qualification:

Age:

Teaching Experience:

Address:

The Interview guideline with mathematics teacher as follow;

- ) Participation of girls teaching learning activities.
- ) Participation of girls of mathematics classwork and homework.
- ) Interest of girls in learning of mathematics.
- ) Students upgrading system which method selected by school improve in girls?
- ) Teaching method use in mathematics class.
- ) Classroom management.

## Appendix D

### Guideline for interview with Students

Name:

Aim in life:

Roll No:

Occupation of Parent:

Address:

Interested Subject:

The Interview guideline with mathematics student as follow;

- ) Personal history (birthplace, previous school, habit, etc.).
- ) Family background (members, education, economic status, occupation, etc.)
- ) Learning opportunity at home and school.
- ) Opinion about mathematics subject.
- ) Opportunity of the girls to learn at home.
- ) Teacher's behavior towards girls.
- ) Participation of mathematics class.
- ) Relationship between girls and teacher.
- ) Encouragement provided to girls by teacher.
- ) Daily activity at home.
- ) Which factor affects the girls' achievement?
- ) View on the school facility.
- ) Teaching method and materials.
- ) Homework/ classwork.

## Appendix E

### Interview Guideline for Students' Parents

Name:

Date:

Gender:

Age:

Relation with student:

The interview with the students' parent was taken in terms of the following main points;

- ) Economic condition
- ) Parent's occupation and education
- ) Family environment of students for learning
- ) Child's interest
- ) The physical facility at home
- ) Opinion towards child's educational learning:
- ) Activities of the child at home: