

**HOME ENVIRONMENT IN MATHEMATICS LEARNING: A CASE STUDY**

**A  
THESIS  
BY  
YUWARAJ KARKI**

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

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

**NEPAL**

**2022**



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

विश्वविद्यालय क्याम्पस  
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS  
KIRTIPUR, KATHMANDU, NEPAL

TRIBHUVAN UNIVERSITY  
CENTRAL DEPARTMENT OF EDUCATION  
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:

Ref.

मिति: .....

Date:

**Letter of Certificate**

This is to certify Mr. **Yuwaraj Karki**, a student of the academic year **2018/2019 AD** with thesis number **1701**, Exam Roll No. **7428325**, Campus Roll No. **414**, and T. U Regd. No. **9-2-214-300-2014** has completed his thesis during the prescribed by the rules and regulations of T. U Nepal. The thesis entitled “**Home Environment in Mathematics Learning: A Case Study**” embodies the result of his investigation conducted from **2020/to 2021** at the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward that his thesis is submitted for evaluation to award the Degree of Master of Education.

.....

**Prof. Dr. Bed Raj Acharya**

(Head)

Date: 4 May 2022



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DEPARTMENT OF MATHEMATICS EDUCATION**

पत्र संख्या:

Ref.

मिति: .....

Date:

**Letter of Approval**

Thesis Submitted

By

**Yuwaraj Karki**

Entitled

**“Home Environment in Mathematics Learning: A Case Study”** has been approved

in partial fulfillment of the requirements of the

Degree of Master of Education.

**Viva-Voce Committee**

**Signature**

**Prof. Dr. Bed Raj Acharya**

.....

(Chairman)

**Assoc. Prof. Laxmi Narayan Yadav**

.....

(External)

**Mr. Krishna Prashad Bhatt**

.....

(Member)

Date: 8 June 2022



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Ref.

मिति: .....

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**Recommendation for Acceptance**

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

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

(Supervisor)

**Date: 4 May 2022**

## **Dedication**

This thesis is dedicated to my father **Mr. Kul Bdr. Karki**,

and mother **Mrs. Ram Kumari Karki**.

Whose love, support, and encouragement have enriched my soul and inspired me to  
purpose and completed this research.

### **Declaration**

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

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## Acknowledgments

My first responsibility is to the Department of Mathematics Education, Kirtipur for offering me a chance to do a thesis. I would like to specific my honest gratitude and deep grasp to Mr. Krishna Prashad Bhatt, my supervisor from the Department of Mathematics Education, Kirtipur, for his continuous guidance and valuable suggestions in making this thesis completed. And also, my sincere appreciation goes to Prof. Dr. Bed Raj Acharya, Dr. Bed Prasad Dhakal, and also Mr. Krishna Prasad Adhikari for their valuable suggestions, comments, inspiration, and encouragement in improving this thesis.

I must extend my heartfelt thanks to all my colleagues, who directly or indirectly help me in the completion of this study. I wish to express my gratitude to those who may have contributed to this study directly or indirectly.

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

Date: 8 June 2022

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Yuwaraj Karki



## Abstract

The main concern or area of this study was “Home Environment in Mathematics Learning: A Case Study”. The objectives of the study were to explore the home environmental factors that affecting in students' mathematics learning at the secondary level and also to identify the strategies taken by the school administration to minimize the home environmental factors that affecting in students' mathematics learning. The descriptive case study approach was adopted to conduct the study for convenience under the qualitative research method. This study was bounded in only Doramba Gaupalika of Ramechhap district and also this study was only delimited on Shree Kantheswor Secondary School of Ramechhap district. In-depth interviews, classroom observations, and document reviews were used as tools for data collection. This study was conducted with a sample of six mathematics students, their parents, and two mathematics teachers. The researcher observed the classroom for ten days and interviewed related students, mathematics teachers, and parents. Collected information was analyzed and interpreted with the help of a conceptual framework and linked with theoretical construction.

The study found that lack of parent's education, lack of parent's economic condition, lack of parents' occupation status, lack of socioeconomic status, lack of parents' support, students' household workload, students' family size problem, gender discrimination at home, lack of language problem between home and school environment are some home environmental factors that affecting in students' mathematics learning. And also this study found that to provide an opportunity for the students in learning mathematics at home, to use local language in mathematics teaching/learning at school, create a good learning environment at home for the students, improve the school policies, use effective teaching method and materials in the mathematics classroom, to provide scholarship for the students which family condition is really weak are the main strategies for minimizing the factors that affect in students' mathematics learning. Lack of parent's education, lack of parent's economic condition, and student's workload at home/room are some factors that influence students' mathematics learning. For the improvement of students' achievement in mathematics, schools make strategies to improve these students' achievement to make free extra classes, feedback, mathematics quiz competition, motivational speech, etc.

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**List of Abbreviation**

B. Ed	:	Bachelor of Education
DOE	:	Department of Education
HSEB	:	Higher Secondary Education Board
HSS	:	Higher Secondary School
M. Ed	:	Master of Education
MoE	:	Ministry of Education
MOE	:	Ministry of Education
OLE	:	Open Learning Education

## **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**

The home is considered the first school for children. The first step of learning is taught by the environment of the home which is directly associated with students. According to Acharya (2017), parental education is one of the aspects of the family background that influences children's important educational achievement. Parents' educational heritage affects the academic fulfillment of students (Taiwo, 1993). We can find many types of research that blame that parent occupation, education level, and socioeconomic status as the main causes for students' low achievement. In this context, one question arises which is whether parents' education affects students' progress? This contextual question has no satisfying answers. A comfortable and attractive classroom is an environment that enables stimulating learning (Ahrentzen & Evas, 1989). In addition, the presentable physical environment strengthens the role of promoting student achievement (Holliman & Anderson, 1986), (Welberg, 1991) mentioned that a conducive environment is always vital and effective for learning. So, Students have a close relationship with their home environment so they feel easy to learn mathematics very easily. A familiar environment makes their minds enthusiastic About learning mathematics. So many loveable ideas are adjusted to learn mathematics. Mathematics is favorable if the home environment is suitable for the students.

In my experience, there is much research on parents' education and students' achievement in mathematics. Parent's schooling helps and has an awesome effect on students' success in arithmetic additionally, each infant spends greater time at home than at school (Petet, 1999). The home environment of a child affects the children's learning. So, every parent provides a good environment for the learning facility of their child that affects the school performance and higher performance in achievement. Parents' involvement outside of the home environment, such as in extra curriculum activities related to mathematics knowledge, and public knowledge also

helps their children in learning. Parent's involvement means involvement in school education, helping their children, and improving their schoolwork by encouraging If family members are highly educated, then they can develop their child to have their thinking strategies and other less educated parents are unable to do this.

Family background is key to a student's life and out of school, it has the most important influence on students learning and, includes factors such as socioeconomic status, parenting practices, maternal characters, and family size. Well-educated parents participate in the school's education process and encourage their children to learn. Researchers have indicated that a family's socioeconomic status is based on parents' income, education, and occupation. Musgrave (2000), states that a toddler that comes from a trained home would like to observe the steps of his/her household and by way of this, work actively in his/her studies. According to Nannyonjo (2007), pupils with parents who did not finish primary or just finished primary, and pupils with parents who finished senior school or university performed considerably better. These effects perchance mirror the capacity of parents to assist the pupils' college work, and possible interactions of literate parents with their kids in college associated or literacy nurturing things to do as properly as their capacity to assist their youth with homework or assist with hard homework questions (Melnuish, 2019).

Mathematics is the process of calculating using numbers and it is the science of numbers and shapes that originated along with the origin of the human civilization additionally it has been an integral part of our life in this competitive world, (Jayanthi & Srinivasan, 2015). In the absence of mathematics, the world cannot reach the principle of progress and prosperity as well as our life cannot move ahead smoothly. It has been utilized to solve the difficulties of different fields and purposes such as political purpose, economic developmental planning, and other social events perceived from the early history of different civilizations therefore it is very important to solve the various problems of different sectors. The mathematics subject is very useful in a modern and competitive world. Mathematics has occupied the most important place in the field of education, science, technology, and engineering as a result it is known as the queen of all sciences, arts of all arts key, and gateway of all sciences in mathematic achievement. Learning cannot take place in a vacuum; it takes place in a suitable and appropriate environment. According to Khadka (2014) Environment is the circumstance that controls the conduct and improvement or

fulfillment of somebody and the environment plays a vital role in the learning process. It is defined as the condition of the family with different facilities and availability of basic and extra needs. It is a permanent behavior change. Learning is not measurable but it can change behavior. Learning is a lifelong process. Learning is not measurable but it can change behavior learning is a lifelong process. Learning takes area from start to demise that allows the newbies for gaining the ability to resolve each day's trouble/her lifestyles (Yadav, 2008). Gate defines learning as a modification of behavior through experience and training. Ganga (2017) defines learning as a change in human behavior. Learning does not take in place a vacuum. Learning is the product of the environment. Many factors affect learning such as personal factors, mental factors, emotional factors, school environment, heredity, teacher role, and home environment (Pandit, 2068). Many aspects affect the students with different mathematics achievements such as teacher personality, instructional materials, peer group, individual differences, political changes, geographical structure, socioeconomic status, home environment, etc. Among all these aspects home environment is an important factor that affects the achievement in mathematics so the home is the first school of learning for a child to forward their career from zero steps. Parents are the first instructors of a toddler so the expertise given using parents have to be very smart and mindful of their baby in any other case they are unable to make vibrant their career (Rawat, 2011). Normally their schooling starts from home where a child learns how to adjust to the changing world and acquire knowledge.

**Role of the home environment in mathematics learning.** The home environment leads the career of students in the right direction or wrong direction having dependent on home environmental activities (Khanal, 2019). In my experience, the home environment is related to providing education to mathematics without giving any warning and threatening which is a beneficial impact on the mathematics achievement of students. Here the environment is defined as the condition of the family with the different variables of basic and extra needs such that social-economic statuses of the family, parent's education, parent spend time with their children, and parents visiting a school. Mathematics is concerned with tackling the daily obstacle to solve as a tricky way. It produces a different solution to make easy ideas in our daily life. Parents support their children to adjust and teach the basic things at home. The home environment determines the personality and

achievement of a child. If the home environment of a child is favorable, a child can achieve the goal easily. It directly affects the children's behavior and achievement. The home environment not only influences achievement but also affects the mental condition of a child. Therefore, the home environment to the condition of the home changes the behaviors and develops in everybody.

The children, learn preliminary social requisites and acquire primary education foundations in their home before they go to school (Khadka, 2014). The home environment plays a decent role in the social and educational development of a child. The educational development of a child depends not only on the part played by teachers but also on the home environment like family structure, facilities provided at home, parents' awareness, interest, expectations, and knowledge about handling and guiding their children. In other words, a great deal of children's total development, including their academic achievement level, is the combined product of home environment and school inputs. Parents should be impressed with the necessity of showing an interest in what the child is doing and treating his efforts with the respect they should provide the child with a proper place to study where he is free from interruption. Parents at home always should participate with the child in locality materials, making experiments, sharing knowledge, and discussing ideas but they should never do the work for the child.

Several factors affect a student's mathematical achievement. These factors may be related to the school environment or home environment or even individual differences. A sizeable quantity of studies has investigated the position that mothers and fathers play in their children's mathematical learning (Nepali, 2020). Previous research results suggest that parental involvement has a significant impact on students' mathematics achievement and attitudes towards mathematics. Parental aspirations and parents' attitudes towards mathematics have been identified as having a significant impact on students' participation in advanced level mathematics and students' achievement in mathematics.

### **Statement of Problem**

In my experience, the home environment is the most important factor which directly affects the students' achievement in mathematics. Due to the home environment, students cannot achieve their goals as much as they try to achieve. Due



to the home environment, students become mentally and psychologically weak as a result there is no desirable achievement in Mathematics. The researcher became interested in reading this fact and chose this topic for the study to find out the effect of the home environment on students' mathematics achievement at the secondary level.

Mathematics is considered one of the most important segments of the personal, social, economic, political, geographical, scientific, and technological aspects of social life. The degree of achievement level in mathematics of students depends on many internal and external factors. Many studies show that the parent's education and their involvement in students' study plays a vital role in the achievement of students. In the context of other countries, there is much research on parents' education, involvement, and students' achievement in mathematics. Despite the vast research on parental education and the involvement of students in learning mathematics, there is a scarcity of such types of research in the Nepalese context. The first school of the child is home and the first teacher are the parents. To talk about the educational achievement of the student's parental education status which includes income, parent education level, students watching TV or playing mobile, family size, homework checking, and household workload of the parents play a very significant role. So, I want to study this area about which home factors are affecting students' mathematics learning. Therefore, I am interested in a study this area, and I selected this topic.

### **Objective of Study**

The primary objectives of this study have as follow;

- To explore the home environmental factors that affecting in students' mathematics learning at the secondary level.
- To identify the strategies taken by the school administration for minimizing the home environmental factors that affecting in students' mathematics learning.

### **Research Questions**

In this study, the primary research questions of this study were as;

- What are the home environmental factors that affecting in students' mathematics learning at the secondary level?

- How do the impacts of fathers' and mothers' education levels on their children's achievement in mathematics?
- What types of strategies should be adopted by the school to minimize the home environmental factors that affecting in students' mathematics learning?

### **Justification of the Study**

The home environment in mathematics is a necessary tool in every society. As the home environment is straightly connected with the achievements of students, the study was discovering the effect of the home environment on the mathematical achievement of the students (Khanal, 2019). The home environment has played a justification role in the student's mathematics achievement. Thus, the study is justification for the reason that it would help to identify the factor that affects the learning process. Mathematics is a more useful subject of human life. The home environment is an important factor to decorate the lifestyle of students in mathematic achievement. It helps to change mentally, physically, socially, and emotionally students in mathematic achievement.

- This study helps to find out the relation between students' home environment and mathematic achievement.
- This study helps to identify how the home environment affects mathematics achievements.
- This study provides the necessary information to create a better home environment to improve the result in mathematics achievement.
- This research helps find out how parents' educational expectations help for the better achievement of their children.
- This study provides information for concerned agencies and persons especially related to teaching-learning mathematics.
- This study helps to find out the way to decrease the failure rate of the students.
- This study helps students to be aware of the main problems of mathematics to adopt the required strategies for improvement.

### **Delimitation of the Study**

This study was delimited as follows;

- This study was delimited in Doramba Gaupalika of Ramechhap district.

- This study was bounded in only by grade X secondary level students of the Ramechhap district.
- This study was based on Shree Kantheswor Secondary School of the Ramechhap district.
- A total of six mathematics students, their parents, and two mathematics teachers were included as a sampling of the study
- In-depth interviews, classroom observations, and document analyses were used as tools of data collection.
- This study was based on a case study approach under the qualitative research method.

### **Definition of Related Term**

**Home environment.** Environment means the conditions that affect the behavior and development of somebody or something. Here, environment refers to the conditions of different homes (families) with extra books, different possessions (facilities), availability of regular meals, the social-economic status of the family, size of the family, parental education, and parental expectations towards their children that affect children's learning behaviors and ultimately the achievement in mathematics.

**Achievement.** An achievement is defined in terms of having scored in mathematics by students which is related to mathematic achievement.

**Father's education.** Considering the perceived importance of a father's educational status, this variable has been included in this study. A value of 1 has been assigned illiterate, 2 for literate, and 3 for educated.

**Mother's education.** Considering the perceived importance of a father's educational status, this variable has been included in this study. A value of 1 has been assigned illiterate, 2 for literate, and 3 for educated.

**Literate.** In this category, those people are included who can read and write and also acquire primary education.

## Chapter II

### Review of Related Kinds of Literature

A review of literature is an essential part of all the studies and a review of related literature is a source of further study of the research task (Acharya, 2019). It is a way to discover what other research in the same area of the study has been explored. It takes the research task to be undertaken in a better perspective and is essential for guidance of research planning and also it helps the researcher to know the work carried out in the area of his/her research paper (Khanal, 2017). The core purpose of the review of literature is to find out what works have been done in the area of study being taken. It helps to broaden the concept regarding the research topic. The review of the related literature is generally performed under to heading of empirical and theoretical literature.

#### Review of Empirical Literature

The review of the empirical kinds of literature concerns the systematic concise of scientific research and true exploration of their topics, the objective of the study is done clearly, design and sample are concerned in the study, the reason why this study has to have organized, method of the study, data collection tools and methods of confirming their validity and reliability and key findings in the related field. In this regard, the following is the related literature in this study.

Adhikari (2015), conducted a study on the topic 'A Comparative Study of the Achievement on Mathematics of Primary Level Students Related to Parent's income'. His main target was to compare the achievement of the primary level students to their parent's income and orient them to help at home. He used a descriptive survey design, as well as quantitative research taking 88 primary level students as a sample in Nirmalpokhari V.D.C. in the Kaski district. Before administering the real test, he has taken pilot test among 15 students of Jana Jyoti Primary School, Panga. The reliability coefficient was 0.87. For the data, he visited chosen school and administered the test. The ANOVA test was used for the analysis procedure. He showed that high-income students' achievements were significantly higher than middle-income and lower-income students.

Dhungana (2015), performed the learning entitled 'Parent's Mathematics Literacy and Their Children Achievement in Mathematics' is intended to find out the relation between parents' mathematics literacy and their children's achievement in grade VIII students. To fulfill the objectives of this study, the researcher used questionnaires for students and teachers. For the design of the survey research, six different schools were selected randomly from two different V.D.C. The total sample of students was 60 and the 60 parents of the 10 students were selected randomly from each sample school and their parents. The parent's mathematics literacy scores and mathematics achievement test scores of students were divided into six different groups according to the division way of literacy scores of parents. This score was compared by using the Karl Pearson correlation. The major finding of his study was, that there was a positive relationship between the mathematics achievement scores of students and their parent's mathematics literacy scores. Also, the research found that the mathematics score of students is affected by parents' mathematics literacy and their support.

Neupane (2014), perform on the subject matter 'Effect of Socio-Economics Status on Mathematics Achievement' which targeted to discover the correlation between socioeconomic repute 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, a student achievement test, and the parent's questionnaire were used. The Mean and Standard Deviation and correlation, and multiple regression were used for the analysis of the data. He concludes that the mathematics achievement of Gurung students was found to be positively correlated with father education. But the other variable was negatively correlated with mathematics achievement. Similarly, the mathematics achievement of Dura students positively correlated to their father's education. But the other variable was negatively correlated with mathematics achievement.

Neupane (2009), conducted a study on the topic 'Effect of Parental Cooperation on Mathematics Achievement of Primary Students' which focuses to find parental cooperation at a primary level taking a sample of 100 children and their parents from five schools in Tanahunh district. A multi-stage stratified random sampling procedure was followed in the selection of schools. The selected schools

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 correlations. In the conclusion of the research, he found that parents' involvement in-home activities with their children are more beneficial to the children's school learning.

Sharma (2011), 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 are 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 making Dalit a better home environment. The researcher used both descriptive and analytical designs to conduct the study. The researcher had taken as the sample for the study 50 students from 50 different families and 5 different schools in the Parbat district. This study found that most 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 students 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 the mathematical achievement of the children.

Rawat (2011), studied on "Effect of Home Environment on students' Achievement in Mathematics at Secondary Level", he has researched a case study on Kami Students in the Sylan district. In this study, the researcher has used semi-structured, face-to-face interviews with two mathematics teachers, five kami students, their parents, and classroom observation. This study is descriptive and qualitative in nature. The researcher found that the effect of the various home environment factors such as parents' education, parents' occupation, social tradition, family size, poverty, and a load of household work were the main causes of affecting kami students' achievement in mathematics at the secondary level. Therefore, he concludes that the family environment influences students.

Dibyajyoti (2014), conduct a study entitles "The role of the home environment and mathematics achievement for the student of secondary school in Nagaon district,

India". The main objective of this study is to point out the different variables in the home environment that determine the achievement of the student. A researcher was used to design the study was descriptive method though to be appropriate to analyze the impact of attitude toward mathematics in the cortex of selected variables. The sample of this study consisted of 500 students selected from 20 schools in the Nagaon district. A questionnaire was conducted to collect the data and the researcher use it to analyze the data using the method of SD, t-test, and Karl Pearson product. The researcher found this study a positive correlation between the home environment with academic achievement. A parent should also support their children in their endeavors and provide them with all the help possible. A positive home environment with a positive attitude of parents and students is a key factor for the successful learning of mathematics. The paper concludes that a congenial home environment is an essential factor in molding the appetite of the student toward mathematics which influences their overall academic achievement in the long run.

Sharma (2014), studied the title "Effect of Family Environment on Mathematics Achievement" The major aims of this research were to compare the mathematics achievement of students of lower secondary concerning their family environment. The population of the study was the students of grade viii and their parents of Lalitpur District. And the total sample size of this study was 240. It was selected through a random sampling method from four public and four private schools and achievement test paper and achievement test paper and questionnaire were two major tools for the collection of data in this research. The researcher used to mean, analysis of variance test, standard deviation, correlation coefficient, and multiple linear regression for the analysis of data. In conclusion in his study, student achievement was straightly interrelated with a family environment.

Pandey (2013), studied the topic "Relationship of social and economic status on mathematics achievement of primary schools' students". The major purpose of the study was to find the relation between socioeconomic status and mathematics achievement of primary level students in the Arghakhachi district. An achievement test paper was used as the tool to collect data. Altogether 113 students were selected from six schools in the Arghakhachi district including 61 boys and 52 girls. The collected data were analyzed using different statistical tools such as mean, standard

deviation, correlation, and multiple regression. He concludes that the student's achievement was straightly related to their social and economic status.

Saha (2000), conducted a study entitled "A Comparative Study of Achievement in Mathematics of a lower secondary level student of different ethnic groups". The objective of this study was to find the achievement difference of different ethnic groups in the Saptary district. The study was of descriptive survey types and an achievement test paper was used as the tool. 150 students including Brahmin, Sah, and Chaudhary of grade eight from different public school in the Saptary district was the sample population for the study. The content validity of the test was checked and approved by the mathematics educator of the central department of education mathematics teacher. Several descriptive statistical devices and inferential devices were used to analyze and interpret the collected data. The main conclusion of this research was the achievement of Brahmin students was higher than Sha and Chaudhary students and Sha students' achievement was higher than Chaudhary students.

**Research gap.** From the review, most of the research on parental role focuses on their parent's Occupation, Socio-Economic Status, Involvement, and cooperation but some research was found on parent's educational status. Many researchers have an achievement study home environmental factors affecting learning mathematics and causes that affect mathematics achievement. Many researchers found that there are many factors such as home environment, socio-economic background, teaching-learning process, parent education, and motivation that are influential in learning mathematics. In Nepal, some studies have been done to explore whether the achievement in mathematics is affected by different variables such as socio-economic background, gender, instructional material, teacher qualification, and class size. The home environment is the most important factor affecting mathematics achievement. The home environment is strongly related to the student's performance in mathematics. So, this is the reason that I choose this topic i.e. "home environment in mathematics learning" to conduct my research. In this field or area, much other research has been done in only a survey research approach but I followed the case study research approach under this home environmental factors that affecting in students' mathematics learning area.



## Theoretical Framework

There are various theories related to children's learning and development. For this study, Vygotsky's learning theory and cultural difference, discontinuity theory. Vygotsky's theories have been used for the interpretation of the findings of the study they are described as follows:

**Vygotsky's constructivism theory.** According to Lev Vygotsky, the cultural-historical theory of understanding development is emphasized the role of culture in the development of higher mental functions, such as speech and reasoning the children. His theory is related to sociocultural theory and focuses on the importance of society and culture for enhancing the understanding intentionally efficient manner by heartening them in difficult and meaningful activities. We had return to our introductory examples throughout this lesson to exemplify the principle of Vygotsky's theory in our introduction, the father intentionally engaged with his child to help her understand how to fit the blocks into the designed holes, without this help she would have continued to be unsuccessful. But with the meaningful direction from her father, she was able to successfully get the blocks into the holes herself.

In contrast, Vygotsky observed that learning processes lead to the development of students. He had mentioned that learning is a necessary and universal aspect of the process of developing culturally organized and human psychological functions Learning is achieved through social interaction and language. According to Vygotsky Initially, the child has two kinds of neuropsychological and neuropsychological. Here neuropsychological means the child has new knowledge through interaction with others and neuropsychological means the child has knowledge of his inside and new knowledge which is mastered on an individual level. The Zone of proximal development is central to Vygotsky's view on how learning takes place. He described this zone as the distance between the actual development level determined by independent problem solving and the level of potential development as determined by independent problem-solving. Scaffolding is the first step to building interest and engaging the learner. If the learner is actively participating, the given task can be simplified by breaking it into small subtasks. Learners can imitate any task and they also internalize that task. The social context promotes sustained achievement and understanding growth. They work together and construct the knowledge. According to Vygotsky (1945), spoken speech can be

symbolized in writing by the progression form. The child's transition is from drawing things to drawing speech. The curriculum should provide many opportunities to apply previous skills, knowledge, and experiences with authentic activities connected to a real-life environment since children learn much through interaction and curriculum.

According to Piter & Hersh (1997), Vygotsky noted that children grasp language concepts quite naturally, but that mathematics and writing don't come naturally, that these are concepts taught in schools and tend to come along with some difficulty. Melnuish (2019) argues he stated that improvement is a spontaneous technique that is initiated and done using the children, stemming from their efforts additionally he believed that kids would no longer develop very some distance if they had been left to find out the whole thing on their own. Vygotsky (1945) argued that, as a substitute than inspecting what a pupil is aware of to decide intelligence, it is higher to study his or her capacity to remedy issues independently and his or her ability to remedy issues with an adult's help. He mentioned cultural experiences the place kids are considerably helped by way of information and equipment exceeded down from preceding generations.

**Cultural difference and discontinuity theory.** The cultural discontinuity theory (Ogbu. 1982) concerns the cultural difference and discontinuity theory. The difference and discontinuity make hindrances to the students' learning. He says that those children whose home culture is much similar to the culture of a school can face easily the system that can result in better learning achievement. If the culture is not the same as home and school, the progress of learning is slow to understand so the result is not better learning achievements. Ogbu focused on learning not only the product of the culture and language minority Disadvantaged and dominant groups can know about knowledge through the curriculum and textbook. He has identified the feature of cultural differences mainly in three types of minority groups, they are: autonomous, voluntary, and involuntary. Ogbu (1992) focused on two types of cultural differences, i.e. the primary cultural difference of voluntary minorities and the secondary cultural difference of involuntary minorities. There are two groups in the society which are voluntary and involuntary. The voluntary groups get a chance to come into the mainstream of development and they have got the chance 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 relations as well as difficulties in academic work for several reasons.

Discontinuity also occurs in the areas of language, thought, and measurement. In Nepal, many school schools develop through the western influence as a consequence of donor networks, modernization, and the globalization process. Although education is for helping the welfare of the nation, it has too many aspects in business policy. There is no doubt about disrupting the transmission of the traditional culture of people because the curricula of schools have existed based on previous culture's reflections. In addition to this way/style of teaching /learning in school is also problematic because of its formal and unpredicted nature as it occurs only in a rigid ritualistic manner that does not ensure the hearing of children. The language in the society does interact which is a good result for the students in learning the mathematic achievement. Interaction is the activities of social activities that make us maturation and we can handle the nation and country. The interaction may be with people, friends or groups, and teachers.

### **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 (Khadka, 2014). My research study was based on the following conceptual framework;

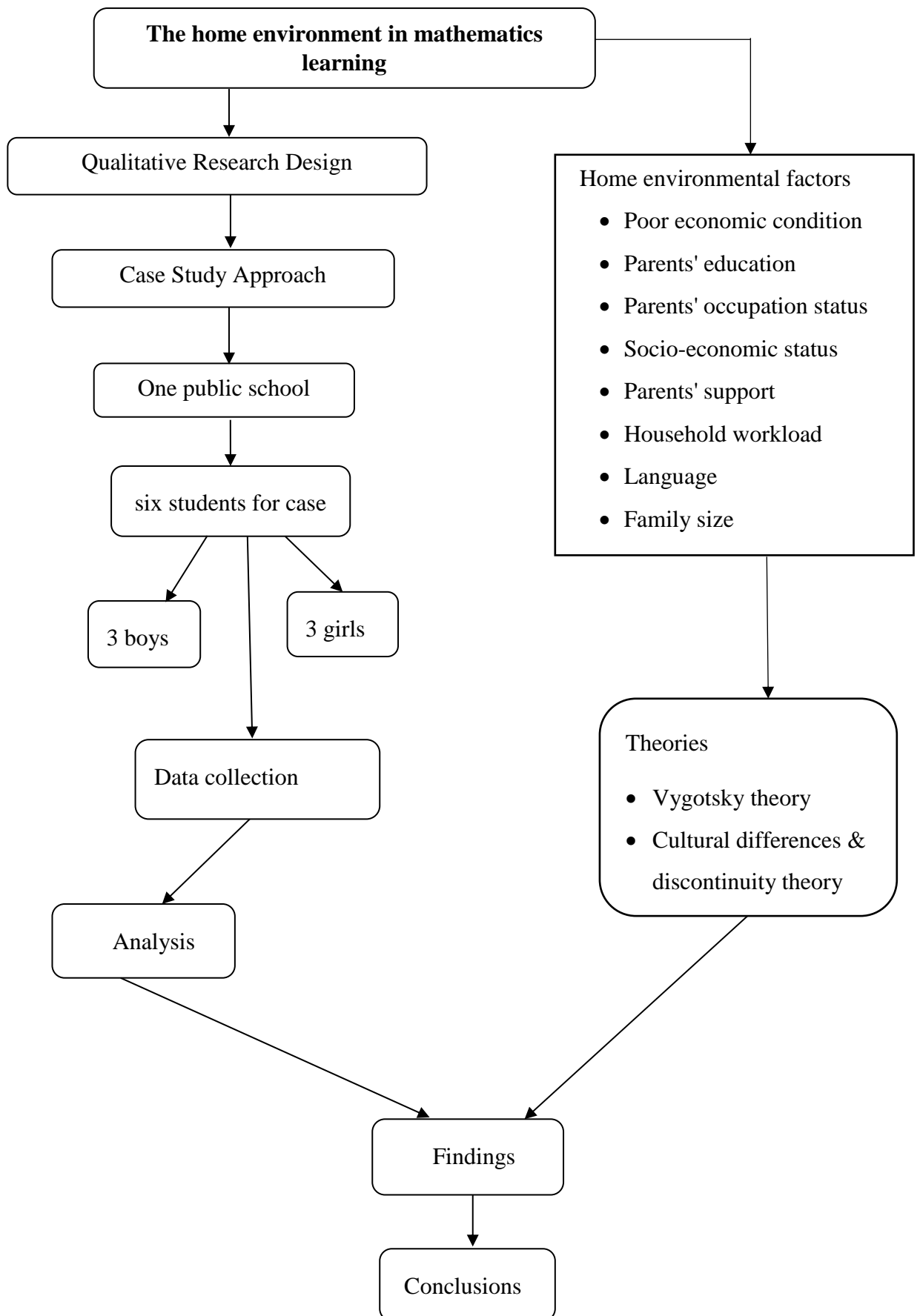


Figure 2.1: Conceptual Framework

Based on the above-mentioned conceptual framework, independent variables are family size, family income, mother education, father education, where do live parents, household workload, students playing mobile or watching TV, and homework checking. The tools were constructed such as questionnaire form and mathematics achievement. By using the tools, the data was collected. Collected data was analyzed based on a conceptual framework. The result of the research was found based on a conceptual framework. In sum, the conceptual framework for this survey is designed in the above diagram based on literature and theoretical understanding. Based on a conceptual framework, to show the factor affecting the independent variable on mathematics achievement was analyzed. The parents' education level is divided into illiterate, moderate level, and high level. Whereas parents' involvement is considered in terms of guidance, progress analysis, home environment, help on homework, educational Interaction, Reward and Punishment, Monitoring and Supervision, Inspiration, and Motivation. The fig conceptual framework shows how illiterate, moderately educated, and highly educated parents with their involvement such as progress analysis, Home environment, Help on Homework, Educational Interaction, Reward and Punishment, Monitoring and Supervision, Inspiration, and Motivation have individually influenced students' mathematics achievement.

## **Chapter III**

### **Methods and Procedures**

The chapter contains the methods and procedures to be done to achieve the objective of the study and to get the answer to the statement of problems. It describes the design of the plans and procedures of the study, which are to be carried out to achieve the objectives of the study. The major procedures in the study are described in this chapter as follows;

#### **Design of the study**

The qualitative research design/method helps to discover the individual views for data collection such as group discussions, individual interviews, and participation of others (Carol, 2016). Research design constitutes the blueprint for the collection, measurement, and analysis of data (Huia, 2004). Qualitative research emphasizes an inductive analysis of data that proceeds to find the theory to explain the data. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Hersh, 1997).

According to Jack & Hersh (2008) case find out about research method is a research methodology that helps in the exploration of a phenomenon inside some precise context via more than a few information sources, and it undertakes the exploration via a range of lenses to divulge more than one aspects of the phenomenon. In the 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). In this study, I used a case study approach under the qualitative method. So, for achieving this research objective the case study approach was adopted under the qualitative research method because according to Creswell (2007) in the case study approach, the data is collected through direct observation in a natural setting, and the actual incident on the spot. Thus, according to my research objective, I thought that only the case study approach would be fruitful for achieving this objective. Therefore, I used this case study approach under the qualitative research method.

### **Area of the Study**

Every study needs a study area, I chose one public secondary school in the Ramechhap district. I selected Shree Kantheswor Secondary School, Doramba Gaupalika, and Ramechhap district for the area of my research. The area of this study was based on grade X students under the one public school in the Ramechhap district. And also, for the study area, I selected only grade X secondary level students studying mathematics in Kantheswor Secondary School of Ramechhap district.

### **Selection of Respondents**

For participants, I selected Shree Kantheswor Secondary School from the Ramechhap district using the purposive sampling technique (based on my convenience). From there I had taken one public school by convenience sampling. And also, I had taken six mathematics students, their parents, one head-teachers, and two mathematics teachers as respondents according to the convenience of the researcher. Based on the school's previous result, I selected medium and low abilities students whose previous mathematics result from achievement level is poor/low.

### **Data Collection Tools**

**In-depth interview.** The interview is the formal or informal communication between interviewee and interviewer (Kurt, 2011). It is also one of the major data collection tools which provide basic and personal information about anything. In this research, the researcher selected home environmental factors and their impact on students' learning mathematics. I am clear about my research, the purpose of research, and the importance of their help. I carried out the open-ended interview along with unstructured interview guidelines. In this study open-ended semi-structured, interviewees will use their own words and developed their thoughts. Before visiting the field, the interview schedule develops concerning research objectives and guidelines of previous research.

**Observation note.** The class observation note was prepared to observe students' home environment and physical environment beginning of class, acquisition of learning used of materials, closures of the lessons, and current evaluation of students during teaching-learning activities. Observation note was used to identify the students' activities, teachers' activities, the interaction between students-students and students-teachers, classroom management and the physical environment of the

classroom while teaching/learning mathematics

### **Data Collection Procedure**

First of all, I visited the selected school and I had the meet headteacher as well as the subject teacher and look the permission to collect the data. To collect the data, I observed the mathematics classroom for regularly two weeks. The researcher observed grade X secondary level students as home environmental factors that affecting in students' mathematics learning. The researcher has used two types of instruments or tools in this study, they are mathematics in-depth interviews and classroom observation. The tools for the study were administered to a sample of six students from the school including in the sample. The students' and parents' interview questions forms were distributed to the student for delivery to the corresponding parents with the help of respondent students.

### **Data Analysis Procedure**

The collected data in qualitative research is not of structured form and it is time for the research has to do a lot in making the workable structure of the collected information to make the meaning or theory (Khanal, 2017). The various themes were generated and using triangulation of field, literature, and my experience interpretation and analysis of data were done. First of all, I organized and edit to the collected information from the interview and classroom observations then I generated the difference code according to the response of the participants. I had gathered those codes according to their similarities and I give the title for them which is known as a theme. At last, I analyzed and interpreted those themes by using the related theory of my theoretical framework and conceptual framework which I have developed in the literature review. The researcher collected data through interview headteachers, teachers, students, and parents.

### **Quality Standards**

Developing requirements of first-class Lincoln and Guba's traditional work shed mild on how to investigate reality in a qualitative file presented four alternate exams of best that replicate the assumptions of the qualitative paradigm (Khanal, 2019).



**Credibility.** Credibility refers to accuracy Description ought to be achievable and identified utilizing members credibility is stronger by, extended time in the discipline persistently watching and interacting with participants, the use of extraordinary data sources, methods, information type, conducting member checks, involving different investigators in the study.

**Transferability.** Transferability refers to the generalizability of the study findings to other settings, populations, and contexts, the report must provide sufficient detail so that readers can assess this, Lack of transferability is viewed as a weakness of qualitative methods

**Conformability.** Conformability refers to the quality of the results produced by an inquiry in terms of how well they are supported by informants who are involved in the study and by events that are independent of the inquiry.

**Dependability.** Dependability refers to the stability and trackability of the changes in data over time and conditions; want to determine the extent to which another researcher with similar training and rapport with participants would make the same observations, this is decided with the aid of an audit trail, including the auditing research process, documenting all the uncooked information generated, and assessing approach of statistical analysis.

### **Ethical Considerations**

If any kind of research involves the person, special attention should be paid to the person's rights, dignity, freedom, and privacy (Khanal, 2019). I had considered some ethical considerations in my study such as I observed the classroom only to take the permission from the head-teacher or teacher of the related school, I had not collected the data for my gain and my benefit, and Respecting the diversity in school, I collected data in a biased manner, I have not published the name and addresses of participants in the statistics without theirs' permission and also I had used comfortable language in data collection process that is easily understandable for the participants.

## Chapter IV

### Analysis and Interpretation of Data

This chapter deals with the analysis and interpretation of the collected data. The main objectives of this study were to explore the home environmental factors that affecting in students' mathematics learning at the secondary level and also, to identify the strategies taken by the school administration for minimizing the home environmental factors that affecting in students' mathematics learning. This study was based on Doramba Gaupalika of the Ramechhap district. This study was based on Shree Kantheswor Secondary School in the Ramechhap district. A total of six mathematics students, their parents, and two mathematics teachers were included as a sampling of the study. And also, in-depth interviews, classroom observation, and document analysis were used as tools of data collection. The data were categorized into different home environment factors such as family income, family size, father education, mother education, the student playing mobile or watching TV, housework workload, where do live parents, and homework checking.

The descriptive method is mainly used in this research for analysis and interpretation of the collected data. The information was collected through observation and interviews with students, teachers, and student's parents. The researcher visited the school, parents, and students. The researcher takes the responses of the respondent during the face-to-face interview were carefully noted. The responses of the respondents during faced to face interviews were carefully noted. I collected the data using data collection tools then the collected information was categorized according to the similar responses of the respondent and then different themes were given in the text of the interview of the observation note. The obtained data were analyzed and interpreted under the following heading;

- Introduction of sample school
- Introduction of case respondents
- Classroom observation episode
- Home environmental factors that affecting in students' mathematics learning.
- Strategies for minimizing the home environmental factors that affecting in students' mathematics learning

## Introduction of Sample School

Shree Kantheshwar Secondary School is located at Doramba Gaupalika of the Ramechhap district. It was established as a community-based educational institution, which is situated in Tokarpur, Ramechhap, Nepal. The graduates of this school had entered into different professions and were working at various levels of politics, government, and various services. According to the first headteacher of this school, it was established with the great effort of local people without getting any funds from the government. The students studied on the mat under the tree. After some years the school building was constructed with the help of local donations. According to KSS

*"Kantheshwar Secondary School (KSS) used to be set up as a neighborhood primarily based academic institution, which is located in Tokarpur, Ramechhap, Nepal. It provides academic packages from ECD to Grade 10 and two programs. Kantheshwar Secondary School Ramechhap offers up to secondary degree schooling with reasonable charge constructions and additionally gives a scholarship scheme for financially susceptible and deserving students. Its salient features are Library, Sports, Science Lab, Computer Lab, Multimedia, Counseling, Scholarships, Classrooms, Dance, Music, Tour, ECA, etc. There are proper community offerings and web connections. The school has services like a pc lab. The school has now integrated the use of multimedia in the study room for a higher appreciation of the subjects. Although the infrastructure of the school is good, a lack of extracurricular things to do and sports activities tools is seen. It has been an extended family of almost 300 students, their guardians, more than 15 teachers, more than 7 office bearers, and many more advisors and well-wishers"*

From the above information about this school, it can seem that this school mainly deposited from lower and middle-class family backgrounds. Different castes are living around the school. Such as Chhetri, Brahmin, Janajati and Dalit etc. Their native language has its own culture. Almost all people in this area depend on agriculture some are busy with other professional work and some are in a foreign country.

## Introduction of Case Respondents

**Respondent A.** Respondent A was a boy of 15 years old studying in grade X. He lived in Doramba Gaupalika ward no. 3. It took twenty minutes to reach school from his house. He had six members in his family. He had very weak economic conditions. His father died in a road accident four years ago when he was seven years. his study was not so good because he had to work at his home. He said, *"My father died when I used to be analyzing in category one. After my father's loss of life, I ought to no longer provide continuity to my study. I had to work in the field, and earn money by doing labor. So, I could not go to school regularly."* He was not interested in the study. He did not do the homework given by the teacher. He said, *"I have no time to do homework because I have to engage in household work. I have to finish all the household work before going to school"*. He added, *"I recognize the significance of schooling however my household surroundings are no longer in prefer of learning about this is why I can't entire my study."* There was no separate room for study in his house.

The above explanation indicates that one of the home environmental factors that affecting in students' mathematics learning. Poverty is the main cause that hinders the students' mathematics learning. It is concluded that mathematics is the most complex subject for the respondent/students. The reason behind the difficulty was the student's unfavorable home environment, poverty, and lack of guidance for his study. The respondent did not get enough opportunity to study at home, and lack of motivation is some factor that affects students' mathematics learning. So, the researcher concluded that the teacher should motivate the respondent toward the use of mathematics in real life. The teacher had to relate class teaching with real-life situations give enough examples concerning the mathematical concepts and practices of the community and should maintain friendly behavior with the student.

**Respondent B.** Respondent B was a 14 years old boy studying in grade X. He lived in Doramba Gaupalika ward no. 2. He had five members in His family. He had very weak economic conditions. He said, *"Our member depends upon the farming but we have no sufficient land We have difficult managing food and other problems. So I have no sufficient time to study at home"*. He reached school quite late every day. He became usually absent in roll call in his school. Because of their weak economic conditions, his father couldn't get any formal education but he was skillful in running

the house by doing simple work. His father works as a carpenter. But his income was very low. So, he could not give enough facilities for his son required for the proper educational environment. Similarly, his mother was uneducated so she could not support her son in his study at home. She was a housewife. She helped her husband also. He also could not ask a question to the teacher that he did not understand. He used the mother tongue language in his house and community. He had to use Nepali as his second language. He said, *"Maths is the abstract subject for me. Arithmetic, verbal problems in algebra, and geometry are a difficulty for me."*

During the classroom observation in the field, the researcher noticed that he had a problem solving the verbal problems of algebra. He had also difficulty in addition to the fraction  $\frac{3}{5} + \frac{4}{7}$  but he easily added the fraction  $\frac{3}{5} + \frac{4}{5}$ . He also fails to draw the different angles by using a compass or protractor. As an observer, I asked the respondent about the problems faced by them in mathematics. He told me he got more difficulty in learning algebraic expressions, multiplied by minus (-) signs, word problems, etc. This is because of the mismatch between the mathematical terms, expressions, and measurement tools used at school and used by their parents at home.

**Respondent C.** In this study, the name of respondent C was Asmita Magar (Pseudo name). She was a sixteen years girl student who studied in grade nine. In her family, there were four members. Her parents were engaged in agriculture. Besides the vegetation in the field, they went to the daily work to gain economic help. She helped her parents both with household work and work outside the house. Her main work was to take care of her little brothers and work the household work when her parents went out of the home. She wants to be a teacher. Play with her friends was her main hobby. About this, her mother said:

*"We are the men who pass out life by working in daily wages. Asmita has to look after her little brother but we supply her threat to learn about when we are in the house. The main problem is that we are economically weak."*

*(Mother of Respondent C)*

*"We are uneducated, we are economically vulnerable due to the fact of the lack of understanding of education. So is any way I will educate her much less till she entire SLC." (Father of Respondent C)*

She had to do the house works rather than study because her mother used to think that a daughter must do household activities. I asked the mathematics teacher about her learning and told her that *"She cannot attain the class regularly she got more difficulty in learning verbal problems because she does not understand the Nepali language frequently as she spoke Magar language at home. So, she had to labor hard to get success in mathematics."*

**Respondent D.** In this study the name of respondent D was Ramesh Chhetri (Pseudo name). He was fifteen years boy studying in grade nine. He lives in Doramba word no 2. It takes him 5 minutes to reach school from his home. There were six family members in his house and they all believed in Buddhism as well as the Hindu religion. His interest subject was Nepali and his aim in life was to be a good teacher. His educational standard was decreased in comparison with his previous class. He had got 8th position in the previous class but later his position was 10th in the class. His parents were uneducated. His parents were not employed a few years ago his father went to Dubai to earn money. Now his father was a farmer and his mother used to sell vegetables in the morning and evening and worked in the house during day time. His two sisters were studying in grades four and two in the same school. While observing the mathematics class, I saw him with regular homework but according to the mathematics teacher sometimes he comes without homework. He had hardly asked the question in mathematics class and also less participated in teaching-learning activities. From that, we can assume that he was interested in physical activities rather than academic activities. When I asked about his educational status, the headteacher gave his view as:

*"He is a properly pupil however his role has lowered then preceding 12 months. He has a good environment to study in the house and there is no guardian in the home who helps them in their study."* (Head Teacher)

**Respondent E.** In this study responder E was fourteen years old girl studying in class nine. She was born in Doramba Gaupalika 4 of Ramechhap district. She has six family members in her family. In her family, she is the elder child of their parents. When the researcher observed her house and family, he found their economic condition to be very poor. The researcher found that as she is the elder child of her family, she always engaged herself in household work. Her family's main source of income comes from the labor in the factory. She was interested in studying but she

did not have the time for mathematics practice. She said, "Our financial situation is very poor." She used to be a laborious and curious student. She could not speak the Nepali language fluently. She said, *"I feel difficulty while writing and speaking the Nepali language at school."* She does homework every day and attends class regularly. She said, "I recognize mathematics in class however I could not be mindful for a lengthy time." Again She said, *"My family's economic condition is very weak, I have no opportunities to learn mathematics at home so I feel mathematics is a difficult subject due to various reasons such as lack of tuition opportunity, poor economic problems, lack of educated people at home."*

**Respondent-F** Respondent F was sixteen years old boy who was studying in grade ten. He was one of the top fifteen students of class ten. He had six family members. His mother was a housewife and his father was a labor of construction. Being the first child of his parents. His father and mother both are normal farmers. He also helped his mother to bring firewood, so he had not enough time to study but he is a laborious student and labored hard. His favorite subject was mathematics but did not have much practice due to lack of time. His parent did not have any awareness to teach the children. The researcher found that there was no anxiety about their children's education. He did not want to male friendship with naughty children who didn't read carefully and dropped out the school. According to the school register, he was often absent. He said, *"I'm very weak in mathematics, I can't understand the mathematical problems in one-time teaching but my teacher behavior towards me is equality with another student."* I study for only one hour in the evening, so he has not had enough time to do more mathematics practice at home. Due to the household work he had no time to study at home. When the researcher observed the class, the researcher found most of the places fully captured by the upper caste student. He said that discrimination against the untouchable prevails more in society and also in school. In society, upper-caste children were not given the chance to meet, play, eat and sit together with the lower castes by their parents.

Overall, from the above case studies, the researcher had made the same conclusions, like poverty and uneducated are playing a crucial role in less participation in mathematics learning. The main occupation of the students' parents was farming and parents are uneducated. The researcher observed the classroom

activities such as classwork performance and participation, class test performance, homework completion, and attendance from the school record of the student.

### **Classroom Observation Episode**

I observed ten days of mathematics classrooms in the selected school. Out of the ten times, mathematics classrooms were observed, here I have presented only the sample of three times classrooms observed in each sample college, which is presented as follows;

#### **Episode one**

*On 5/10/2021, I observed the mathematics classroom of grade ten in Shree Kantheshwar Secondary School at Doramba Gaupalika of Ramechhap district. First of all, the teacher went to the class, and then I also entered the classroom. All the students stood up and said good morning sir. The teacher said that sit down. There were 22 students present in class where 12 boys and 11 girls. The teacher hadn't any kinds of teaching materials to be shown to the students or to be displayed in the classrooms. He wrote the topic 'Triangle' on the whiteboard and started to teach. He didn't review the previous lesson. He discussed a few times about the topic and start solved the questions on the whiteboard after some time he ask the student whether they understood some of the students said that they couldn't understand completely. The teacher equally responded to the curiosity made by the students. Again, one back bencher's student said he couldn't understand then the teacher become angry and warned him- "if u say again like this u will be punished, u must be serious to learn and understand the lesson from my teaching." Students couldn't raise their hands to ask any questions to the teacher. In addition, the teacher did not try to understand them properly whether they comprehend the lesson or not. The teacher even did not go up to the backbenchers. He just made the students remind the formulas and ask them to resent at any rate. One of the students ask the teacher if there is an example to be comprehended the formula easily. He didn't care much for her but he told her to see the textbook and find herself. The teacher said the students to do the remaining exercises as the homework assignment and he said the class was over.*

From the above classroom observation episode, the researcher found that the classroom is teacher-dominated and the students'-oriented class was deductive. The cooperation between teacher and student could not be established. Social



constructivism theory emphasizes on the teacher should help the learner to get to him or her understanding of the content, the teacher should previous guidelines and creates the environment but in the case of school, it could not be found.

### **Episode two**

*On the second day, of class observation; the teacher went into the classroom along with the researcher. Students said good morning and then the teacher said to sit down. This showed that the students were well disciplined and the school has taught them to respect the teacher. There were 34 students in the class, among them 19 were girls and 15 were boys. There were 10 girls presented and 9 girls were absent. The desk and bench were sufficient in the class. The blackboard was kept in the right place. The teacher started to teach geometry of the topic quadrilateral. Some students do not have geometric instruments. The teacher wrote down a problem on the blackboard and started to solve each step and he asked students whether they understood or not. Some of them answered that they can solve the problem. Mainly the students on the first and second bench were active whereas most of the girls were passive. Again, the teacher wrote another problem from the textbook on the blackboard and started to solve the problem by explaining step by step. The teacher asked questions to a student about the related question and also made them do that classwork. He solved those questions in which they were getting problems. He wrote a problem on the board and asked them whether they could do it or not. At last, he solves the problem on the blackboard. Then he told them to do the exercise at home.*

In this episode, it can seem that most of the girls were present in the classroom. There was a topic 'construction of quadrilateral' which needs a geometric instrument but there was no geometric instrument in all of them. I also observed that they were doing classwork with the help of their friend's geometric instruments. The girl students were not so actively participating in class. The teaching method was based on lecture and practice-oriented. The teacher behaved commonly to all the students. He did not focus on the girls. Especially, girls were passive in mathematics class. Due to the lack of sufficient geometric instruments, this situation was created for teachers who were only three years of the learning experience. Because of that, they could not understand the psychology of students.

### Episode three

*"During 2d day observation, the mathematics instructor entered into the study room with every day the use of and different confined educating materials which had been associated to the topics. The teacher left the teaching materials in front of the students' desks and reviewed the previous lesson. He wrote the topic of that day 'area and volume of triangular prism'. He described prisms (both triangular and square prisms) with solid figures. He just wrote the formulae of lateral surface area, total surface area, and volume with geometrical figures. Then he let the students solve the related problems by using the given formulae. Students were asking about how the formulae can be developed but the teacher replied 'formula is a formula so you have to recite.' Then he checked students' copies and guided them to their mistakes. Finally, he summarized the topic and gave homework."*

From this observation, it is seen that trained teachers were also not implementing their skills in the real classroom appropriately. In the observed school, there were some paper-made materials related to the topic but the teacher did not use them. If he used those materials then it would be easier to make students clear about lateral surface area, total surface area, and volume of the prism. The place of placing presentation and summarization skills of instructional materials gained in training sessions were not also found to be transferred in the real classroom.

### Episode four

*On 24/10/2021, in the observed class, the mathematics teacher went to the class, and then after the researcher also entered the class, with him entire students stood up and said good morning Sir! It was noticed that the school environment has taught them about respect for the teacher. The teacher took the attendance of the students. In class twenty-two, students were present on that day. The teacher said, open your book and then he wrote the subject matter indices. He wrote a problem on the blackboard and solved that. All the students were busy writing the solution on the blackboard. The teacher didn't review the previous lesson a related topic for Indices and didn't check the homework. After some time, the teacher asked the student, whether they understood the lesson or not. Some students said, "Yes Sir "but one of the students asked the teacher in his mother tongue language. The teacher didn't understand his language and the teacher asked him, "What do you mean?". After this student, other students did not try to ask again about their problem. Again, the teacher repeated the*

*problems on the blackboard and the situation was the same. Then the class was finished.*

From the above classroom observation, the activity of the mathematics teacher and other language students showed that some students use their mother tongue language in school, and but teacher uses the Nepali language in the classroom but the teacher could not understand their language. There is a language problem between teachers and students so it is the main problem in learning mathematics for some students.

Overall, from the above classroom observation and case respondents, it is found that all the teachers were found to have in favor of supervision of the classroom teaching, however, their supervision was limited to knowing whether the teachers were in the classroom or not and whether the course would be completed in time or not. And also, it was found that the school supervisors were used to coming to their school for some time only and especially talked to the headteacher but they did not observe the classes regularly. supervision is an essential part of classroom teaching that is aware and gives feedback to the teachers for transfer of training in classroom teaching. The headteacher, resource person, and the school supervisor are especially responsible for supervising the class.

### **Home Environmental Factors that Affecting Students' Mathematics Learning**

The home environment is regarded as the first school for all children/learners and the school is the second home for the child (Paudel, 2018). The children learn about many aspects from their parents. They learn how to behave, how to respect elders, and how to cooperate in a home environment. If the home environment maintains the educational environment in society then the school environment becomes good for students to learn about the current knowledge (Nepali, 2020). The students learn how to behave with others, how to respect the elders, how to love the younger, how to cooperate etc. in the home. It is assumed that the achievement in mathematics is highly influenced by the home environment, parent's education, socioeconomic condition of the family, study hours at home, gender bias in the family, and so on. According to interviews with mathematics students and classroom observation home environmental factors that affecting in students' mathematics learning are presented as sub-heading;

**Poor-economic condition.** During observation researcher has found among the sample students, girls students have no more time for mathematics learning at home. They are involved in household work. Most parents of sample students were doing labor work in about like Saudi, Qatar. They do have not a good income source to manage their student's separate study rooms. It implies that house condition is not good for students. The researcher asks the question. "How much time do you spend studying at home?" Respondent presented their view as follows;

*"I have to look after my siblings also there is not a separate study room. So, I can't manage my time to study."* (Respondent A)

*"Most of the mother and father of the college students reading right here are illiterate due to which their kids additionally do no longer provide precedence to studying."* (Teacher A)

*"My children do not get the book and other facilities on time due to poor income which is gained from labor."* (Parent of Respondent C)

The above voice of students is representative the certain students who have separate study rooms but not all students. The above view indicates that due to poor economic conditions they didn't have any more physical facilities at home. The incoming source was not sufficient for their children. So, the children afford their time to earn money at home rather than study. They did not have sufficient time to repeat mathematics at home. But modern research emphasizes that mathematics needs more and more time to get a good achievement. The home environment has much influence on the studies of students (Khadka, 2017). Asset to mathematics teachers most parents are illiterate and have a joint family. Due to this, they can't create an educational environment in their home. So, they can't study subjects like mathematics which should be studied regularly. In the country, some students live in big size of the family despite which they have a good reading environment. Hence, they also have good class performance.

The constructivism theory also elaborated that the opportunity to learn mathematics at home play a vital role in mathematics achievement (Acharya, 2017). It is concluded that the lack of sufficient time for mathematics learning at the home for students is one of the causes of the low achievement in mathematics. Due to poor

economic conditions, students cannot manage their time at home for mathematics learning.

**Parent's Education.** The students pass most of the time at home. The children learn many things from their parents. If the parents are literate, moral, and have good characters, their children also follow the same behavior. If the parents have bad behavior and are illiterate, their children learn that behavior from their parents. There is not only the role of the teacher in the learning process but also of the family members, culture, economy, and environment. The parents teach the basic knowledge of life, practical aspects, skillful concepts, the right vision, and appropriate norms and values to their children. If the parents have a good education, they try their best to enable their children academically. So, they can live easily in society and inspire to the right use of life's every potential and opportunity. During the interview time, I asked about their parents' education, and the following responses were obtained;

*“Our parents are illiterate they could not read and write. So, our parents could not provide guidance at home for mathematics learning.” (Respondent D)*

*“I am helpless, I have no schooling so I can't assist them.” (Parent of Respondent D)*

*“The parents are illiterate. They do not give guidance to them in learning mathematics. Their children do not complete the homework regularly. Due to this reason, they become weak in mathematics. (Teacher A)*

The above-mentioned view manifests that due to illiterate parents' students are not getting the expected achievement in mathematics. The parents do not guide them in the house and always avoid taking responsibility to provide an educational environment in the home. The above view also shows students did not do homework regularly in mathematics, due to a lack of sufficient time at home for practice and lack of guidance from parents they become weak in mathematics. The constructivism theory elaborated that the students had high achievement in mathematics if there is good educational guidance otherwise the achievement would be low (Khanal, 2017). Finally, it can be said that the achievement of students is low because of the parent's education.

**Parents' occupation status.** The occupation of rural community parents is to work in the field and daily wages which are far from the educational background (Khadka, 2015). The occupation also plays a vital role to educate the people. However, occupation is different to make or prepare an educational environment in the home. There is no relation between education and the occupation of students' parents which are barriers or hindrances in education. As a result, the student of rural communities achieved low scores in mathematics. Desarrollo (2007) indicated that the extent to which parents or other family members are actively engaged in a student's education had an appositive influence on the student's achievement. The current study assumes educated who passed class-7 and uneducated who studied under class-8. Most of the parents were uneducated. I had asked some questions of parents (see appendix E), In this question, I had noted the parent's views and the below, I have listed these parents' views as follows;

*"We send our sons in Boarding school but we send our daughters in governmental school because they are our property and they live with us but daughters are other's property and they live with others."*

(Parent of Respondent C)

*"We send our sons and daughter to the same school and provide them equal opportunity in every field."* (Parent of Respondent E)

*"My parents are uneducated as a result they are unable to facts I appropriate at home as properly as they are unable to grant the desired elements too. Some components supply for sole son."* (Respondent A)

*"Parent's training performs a quintessential position in the all-round improvement of kids. Therefore, I think parent's education is also an affecting factor in mathematics achievement of girls."* (Teacher B)

Constructivism theory encompasses the backward cultural occupation which causes low achievement in mathematics (Chaudhari, 2013). The present case study is also one of the backward ethnic groups and has traditional occupations to meet hand and mouth for survival. Naturally, it causes low achievement in mathematics. From the above responses, it can be said that the literate parents seem to provide equal access to both son and daughter in learning. But the illiterate parents seem only to focus on sons' learning as a result sons' learning is higher than girls. The teacher also supposes

that the parent's education plays a vital role in sons' and daughters' learning. Similarly, one of the researchers Panta (2006) also concludes that parents' education plays a vital role in students learning mathematics. In the same way, my research has also come to be known that parents' education affects learning mathematics. So, we can say that parents' education affects learning mathematics. And also, People are involved in different regular work to fulfill their necessities commonly known as an occupation. Occupation of people determines/her economic, social, and educational value. Parents' occupation affects their children learning activities.

**Culture and Customs.** The customs, beliefs, art, way of life, and socio organization of a particular country or group are culture and also culture is the base of human civilization which shapes the psyche of the individual and the society (Khanal, 2016). Culture developed as an occupation in course of time. They sell these items to generate extra income for running their lives. Besides these commodities, types sell firewood, bamboo, and shoots. It is very hard to sustain life by adopting the cultural occupation of some casts on one hand and now this occupation is taken as a profitable occupation and they hesitate to adopt this occupation on the other hand.

The people of these communities had not enough land to work so they pass this time in unnecessary deeds like drinking alcohol, playing cards, carom board, filthy talk, etc. because of these activities social imperfection dispersed in the society which created a negative impact on their children. According to Acharya (2017), culture is the totality of socially transmitted behavior, patterns, arts, beliefs, institutions, and all other products of human work and thought as well as ideas, beliefs, values, and knowledge. In a sense, culture is related to the development of the mentality, which people follow during their life in their learning activities.

**Socio-economic status.** Socio-economic status is also the main cause of the study. The children of rich families study at expensive and qualitative schools but not the children of poor economic families. It is very hard to connect the hand and mouth in the evening and morning for them. Education is the dream away. Most Nepalese people are living in the poverty. In the Ramechhap district of the far western region, weak people are not remaining free away from poverty. It is very hard to buy a pen and copy for their children. Among them, some bodywork in India, and somebody work as land laborers. Also, they couldn't give education facilities for their children which can be obtained from the good socioeconomic condition. During the interview time I had asked the question (see appendix C) In this question the responses as presented as follows;

*"Generally, the students become absent in the class mostly, due to economic conditions. In the second, they do have not to pen and copy consequently. It is very hard to teach them and other students regularity." (Teacher B)*

*"Our household earnings rely upon agriculture and labor which is no longer adequate for us it is challenging to control the everyday expenditure of home. We do not have tuition classes to improve mathematics." (Respondent F)*

To analyze the socio-economic factor from constructivism theory, the present case has a low socioeconomic status which causes spending more time earning livelihood for survival. On the other hand, they spend less time in study for mathematics which requires more time to practice but they do not provide more time. As a result, mathematics learning is hindered. There are consequences of factors that affecting in students' mathematics learning. This shows that poverty is an obstacle to the study of children. Through fees in public schools, the necessary things for students like a copy, pens, books bags, and dress are not provided by the school/ administration. The poor parents cannot provide all these things to their children and these factors are in the learning process of the student.

**Parents' support.** Parents' support is defined as the supporting role of parents for effective learning of children and also parent's support is one of the aspects of the home environment which bring the children's creativity that's why parents support to play the positive roles for effective learning or purposeful learning (Bhatta, 2016). Every parent should have the responsibility to create a friendly environment to bring



critical knowledge to students or children. During the interview time, I asked the question "How to affect parents' support for students' mathematics learning?" In this question the responses are presented as follows;

*"Parents are illiterate and they are no longer conscious of students' study, additionally beginners' economic historical past pressure them to be engaged on mother and father supports." (Teacher A)*

*"I think mathematics is so important subject. I do not know about the relationship between community and learning mathematics. However, mathematics is useful for our daily life, it has related to science, economics, account, etc. so I always support my child". (Teacher B)*

*"Our parents are illiterate they could not read and write so our parents could not support and guidance at home for mathematic learning." (Respondent B)*

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

*"Parents 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 the parents didn't support their students (child). They can't be aware of students' studies because of their illiterate, lack of time, and lack of mathematical knowledge.

**Household workload.** The work for the house is called household work. It is directly linked with mathematics study at home and consequently students' achievement. Girls engaged most of the time in household work. They start their work in the kitchen early in the morning. This affects their study and they can't balance time for study, which gives a poor performance in the school. But some girls get up early in the morning and they can manage their time for study so they do better in their studies than other girls who are involved in their household work. The effect of student Household work on students' achievement in mathematics, was analyzed according to their interview and the researcher found that the students having much workload at the home had low achievement and less workload at the home had high achievement in mathematics. The researcher has asked the question (see appendix C) and noted them in their respected voice as below:

*"Most of the 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 in household work in the morning and evening. Get our compulsion that they have to do homework at night. Sometimes there may be a problem of light we cannot provide sufficient time to our child for doing homework". (Parents of Respondent E)*

*"Usually, I can't go to college due to the fact I have to do family work and others, I do laborious work with my mother and father for making money so I haven't time to find out about mathematics at home." (Respondent E)*

*"My mother and father go to work out in the situation and that time I have to moreover make a contribution my family via working in the place sometimes has carrying items so I didn't get time to locate out about in mathematics at home." (Respondent D)*

From the above views, the researcher found that lack of a time for study mathematics at home, lack of responsible parents for child study, lack of positive thought of daughter studying, lack of study environment at a home, poor family background, poor economical-status, illiterate parents and lack of regularity of students because of a load of household works. Thus, from about all pieces of evidence, the researcher concludes that household work and mathematics study at home has a major effect on students' mathematics learning at the secondary level. And also, on the other aspect, I found that most of the girl students were present in the classroom without completing their homework due to their household work. They have to do their household work from early in the morning and evening every day except school time. They replied that household works were our daily duties we should do this work 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 so it is one of the home environmental factors that affecting in students' mathematics learning.

**Gender Discrimination.** Nepal is a patriarchal structure. It seems that women are not given equal positions in society by males and they are in continuous issue for equal rights (Nepali, 2019). In Nepalese society, there is believed that the son looks after the parents in their old age and the daughter for maintenance of household work.

Due to these beliefs, sons are given and daughters are kept within the four walls of the house. Especially, in rural areas, there is discrimination between sons and daughters from their parents and society. The researcher found that in Doramba Gaupakila at Ramechhap district's society there are great differences existing between son and daughter. They learn to do household work, 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 forced to do household work and take care of their 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 work. She must finish all the work on the house. During the interview time, the views of the respondent are presented as follows;

*"Education has no use particularly in daughter's existence when you consider that 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's 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 school. Moreover, our female kids usually have to work indoors in our community and additionally, some other aspect is that the ladies are no longer allowed to do outside activities. There is an inborn concept about the girls that they should not be sent to the outdoor activities because they cannot do them. 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 gender discrimination at home; as a result, which is the factor that affects the students' mathematics learning. Because gender discrimination is a psychological factor that has greatly contributed to the learning difficulties of students. The parents have been convinced that education cannot do any good for 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 the household to work and sons to the 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 communities as they lack awareness and have been suffering from extreme poverty. So, it found that some of the students' parents and guardians fail to motivationally encourage their daughters in the learning process which is the factor that affects students' mathematic learning.

**Language.** According to Mishra (2017) language is the most essential affecting factor for the failure of students in mathematics and also it is the great medium of human civilization which sets them apart from other living beings. It is the measure component for learning. When the researcher observed a class, it was found that there is a language misunderstanding between teacher and students. Some students usually used informal (mother tongue) language but their teacher and friends didn't speak about it. The teacher and other students wanted all students to speak a formal respected language. Because of this cause, the relationship between teacher and some student and their friend has not been good. From the class observation, the researcher found that some student is always silent in the classroom. Then the researcher asked Respondent-C, "why do you often remind silent in the classroom? In this question he replied;

*"Our parents must speak the Maithili language. We have no opportunity to learn the Nepali language at home but in schoolteacher always teaches us the Nepali language. If the teacher taught us in the Maithili language, it would be easier for us to understand the mathematics problems." (Respondent C)*

*"Some students have language problems they are not a good speaker of Nepali correctly, they speak the mixed language (Maithili language used in the Nepali language), which creates difficulty in understanding the Nepali Language in comparison to other students. That causes them to be a failure in mathematics in the final examination." (Mathematics teacher)*

The above responses show that some student used their language at school and classroom but the teacher used the Nepali language in the classroom. There is a

language problem in understanding the mathematical process and concepts for some students who are spoken own their mother tongue language at home. Thus, it found that language is another home environmental factor that affects students' mathematics learning.

**Family size.** The number of family members affects every aspect of family life. Where is a large number of families there are different kinds of the problem? They always have to fight against basic needs. At the interview time, I asked "How do they invest their children's learning?" and also "do you realize that your family environment has affected your mathematics study?" On this question the following responses were found;

*"It is easy to teach and guide if they are few children." (Parent)*

And also, I had asked "does the family size effects mathematics learning?" participants replied;

*"It's appropriate and fruitful to study mathematics having a few brothers and sisters." (Student)*

*"It is effortless to accumulate mathematics contraptions and different necessities in a small family." (Student)*

From the above response, the researcher concluded that most the parents have realized that a small family was a good environment because it inspires each and facilitates material. From the above response, the researcher concluded that a large family has many problems. Thus, it can be found that family size is another factor that affects students' mathematics learning.

### **Strategies for Minimize the Factors that Affecting Students' Learning**

All the activities conducted in the school lies within the school environment for example: playing with their friends, studying, respect to the teacher, and obeying the rules and regulation conducted by the school. Active participation of students in all activities by a school plays a vital role in the life of students. So, students should obey the rules and regulations to build up their careers. It keeps school from the unnecessary person and domestic animals. All the teachers and students should enter the school promptly in uniform otherwise they should clarify being late to the school's administration. Based on the above home environmental factors that affecting in

students' mathematics learning through the classroom observation, in-depth interview, and review of documents analysis with key responses of a mathematics teacher, students, and their parents the ways to improve/increase the interest and enthusiasm of students in learning mathematics are presented as follows;

**Provide learning opportunities 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 asked the question for respondents "what strategies do teachers should adopt to improve the interest of girls in learning mathematics?" The respondents were replied as;

*"I have to use self-made substances and neighborhood substances which assist the students to recognize mathematics and they can clear up mathematical troubles with the aid of linkage with their day by day existence problem".*

*(Teacher B)*

*"Teachers want to instruct mathematical troubles in connection with our real-life problems". (Respondent C)*

Supporting this view, I concluded that, teaching 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 link 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.

**Use of Local Language in Teaching-Learning Mathematics.** In this school some of the students who are spoken in their mother tongue language they are facing many problems during mathematics learning due to language. If we create language friendly environment for them, then they got actual what we as a teacher want to deliver to them and it is only possible. They start thinking that mathematics is not out there it is something inside their society. During the interview time, the mathematics teacher said;

*"Mostly I use the Nepali language in the classroom but some students use the only mother tongue language so these students face the difficulties in learning mathematics. There are different students whose mother tongues are different so I use the Nepali language in mathematics classroom"(Mathematics Teacher)*

From the above information, I conclude that the local language is the most important part of an effective mathematics learning at the secondary level but there are many problems with language as the learning mathematics. Different students use different mother tongues so which increases the difficulty of learning mathematics for some students in Shree Kantheswor Secondary School in the Ramechhap district. Thus, for improving the student's achievement in mathematics the school community and mathematics teachers need to use the local language in mathematics teaching.

**Creating Good Learning Environment.** The environment is a big component of learning mathematics for the students. Nepal is a multi-lingual, and multi-cultural country. In the classroom, students come from different cultural backgrounds, so teachers need to use appropriate strategies for effective mathematics teaching/learning. For making a healthy environment in the class we must focus on these important issues so that students from different communities can feel their ownership in learning and want to involve. In this regard, one of the mathematics teachers said;

*"Mostly I teach in the Nepali language. But there are multilingual students in the classroom. I feel that some students who come from different communities cannot understand the subject matter easily. They ask me questions many times. Sometimes, they feel embarrassed to ask questions in the 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. The teachers were not competent in multi-language as spoken by the students as their mother tongues. Therefore, it seems to me that the learning environment has a vital role in learning mathematics for the students.

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

*"The school has also provided appropriate scholarships to the students with weak family and financial status to provide them with learning opportunities."* (Head Teacher)

*"The gap between boy and female students in the classroom, I have moreover allowed students to exhibit their problems and the work they have achieved in maths teaching."* (Teacher B)

*"The school has provided extra class in the morning at minimum cost."*

(Respondent C)

Especially, the school provided the extra class to support learning mathematics. So, the students are getting happy to pass the SEE exam. For this, the parents are sending their children to time at school and supported financially. The above views indicated that a lot of improvements will be done for this year and the processes of improvements are 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 the school are mentioned by the headteacher, teacher, and parents.

**Use effective teaching methods & materials.** 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 funds, good libraries, good textbooks, and good learning materials, 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 good strategies for



the better achievement of students and schools also. These are some views about the good strategies for school improvement.

*"Student achievement low because lack of training teacher and the teacher no update the changing school curriculum, so we must be managed the training teacher new section"* (Parent of Respondent B)

*"Teacher by no means encourages students by way of imparting the preparation about studying for our children's golden future. He didn't focus that students should labor hard for a better position in math. so we manage responsible teacher for student's better achievement"* (Parent of Respondent C)

*"There is inefficient the teaching materials, computer lab, math lab because lack of money effort, so we increase the use of local-level materials".*

*[Math teacher view]*

*"Some college students are extra hobby in math and some college students are felt challenging and boring the mathematics class so instructor encourages and supplying the practice about math for week students". [Math teacher view]*

From the above responses, it can be found that strategies for minimizing the factors that affect students' mathematics learning are to focus on the student centroid learning method, 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.

At last from the above overall mentioned study, I concluded that mathematical communications can play an important role in learning mathematics. The exchange of knowledge with one another is the basis of cooperative learning in mathematics. Providing learning opportunities at home, using local language in mathematics teaching, using effective methods and materials in mathematics teaching, and also cooperative learning strategies is the effective culturally responsive pedagogy in

mathematics. When communicating mathematically, students enhance their understanding of mathematics, establish a shared understanding of mathematics, become more active learners, learn in a comfortable environment, and assist the teacher in gaining insight into their thinking.

## **Chapter V**

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

This chapter includes 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 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**

This is a case study research approach. Observation notes, in-depth interviews, and document analysis were used as tools of data collection. The respondents of the study were six mathematics students, their parents, and two mathematics teachers from the undergraduate level. The major findings of this study are as follows;

- This study found that lack of parent's education, lack of parent's economic condition, lack of parents' occupation status, lack of socioeconomic status, lack of parents' support, students' household workload, students' family size problem, gender discrimination at home, lack of language problem between home and school environment are some home environmental factors that affecting in students' mathematics learning.
- This study found that to provide an opportunity for the students in learning mathematics at home, to use local language in mathematics teaching/learning at school, create a good learning environment at home for the students, improve the school policies, use effective teaching methods and materials in the mathematics classroom, to provide scholarship for the students which family condition is really weak are the main strategies for minimizing the factors that affect in students' mathematics learning.
- This study found that students' home environment was not good. They had no separate room to study. They used to sit together. They had poor economic backgrounds. They used to help their parents in their cornfield. So, they could

not get proper time to study at home which is the factor that affects students' mathematics learning.

- This study found that students do not have enough time for learning mathematics at home because of their household workload.
- This study found that school policy hasn't concerned with mathematics achievement. There weren't extra classes in mathematics for low achiever students. There was no library and sufficient learning materials in school which affects students' achievement.
- It is found that lack of parent's education, lack of parent's economic condition, and student's workload at home/room are some factors that influence students' mathematics learning.
- It is found, that the parents' economic condition does not seem to be strong to send their children to school and afford them their future education. Most of the parents were illiterate and they use their children as a means of earning to support their living.
- It is found, that due to the mother tongue, it is difficult to understand mathematics learning. And also, they do not get encouragement and motivation at home and school.
- The influence of society with negative beliefs, fewer practices, and negative attitudes are some factors that influence students' mathematics learning.
- Due to the low economic condition of students, they have to engage in their household work to fulfill their daily needs. So, students did not interest to choose a major in mathematics.
- Home environment, language, economic condition, irregularity in the school, and interpersonal relations are the major difficulties in learning mathematics for the student in Kantheswor Secondary School, Ramechhap district.
- For the improvement of students' achievement in mathematics, schools make a strategy to improve these students' achievement to make a free extra class, feedback, mathematics quiz competition, motivational speech, etc.

## **Conclusions**

Society as a whole believed that female is mathematically less capable than males. Society, home, and college do not provide an environment for girls to take higher education. They are capable to study mathematics but they are made incapable.

Girl failure to acquire the knowledge necessary to achieve in mathematics is a matter of construction of positive attitudes toward mathematics. This is due to a lack of home environment where there are poor economic conditions, agricultural occupation, and bad learning opportunities. Parent education and their interest is to marry daughters at an earlier stage and they are not aware to give higher education to their daughters. The learning environment at home and school as there was no provision of extra classes for weak students and differences in language between school and home.

According to mathematics teachers, language plays a vital role in learning mathematics. Lack of proper understanding of the language has created difficulties in learning mathematics, the culture also plays a vital role in learning mathematics. Due to unmatched culture at home and school, students' difficulty level has arisen in learning mathematics, the learning environments play a vital role in better performance in learning mathematics. The lack of proper environmental school has created difficulties in learning mathematics and the economic condition of the parents has been poor. Motivation plays another role to learn mathematics but they do not get motivation from their parents and teachers. The socio-economic condition play also a vital role in mathematics learning. The poor condition of some students' parents does not afford to provide a good environment at home which is a factor that affecting in students' mathematics learning. In addition, there has not been a favorable learning environment for students at home; and there has been no awareness program for parents. Students have not been provided any extra classes in the school.

### **Implications of the Study**

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

- This study helps to find out the relation between students' home environment and mathematic achievement.
- This study helps to identify how the home environment affects mathematics achievements.
- This study provides the necessary information to create a better home environment to improve the result in mathematics achievement.

- The study helps to know the impact of family structure on learning mathematics.
- This research helps find out how parents' educational expectations help for the better achievement of their children.
- This study provides information for concerned agencies and persons especially related to teaching-learning mathematics.
- This study helps to find out the way to decrease the failure rate of the students.
- It helps to guide the instruction based on individual differences.
- This study helps students to be aware of the main problems of mathematics to adopt required strategies for improvement.

### **Recommendation for Further Researcher**

According to the finding and conclusion provided by the study, the recommendation for the further study can be presented as;

- The study was limited to the Ramechhap district; similar research can be done by covering a large area and a large number of samples.
- A similar study can be done at the same level but in other subjects.
- Awareness programs should be launched.
- A similar type of study should be conducted at all levels of schools.
- Social status, parental attitude, students' attitude, and social factors contributing to students' achievement play a significant role in the achievement of mathematics but this study did not tell anything about these. Further study should be intended on these aspects.
- A similar study can be done for the primary and higher secondary level and also in another subject.

## References

- Acharya G. (2013). *Problem encountered in teaching-learning mathematics in the multicultural classroom* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Acharya, B.R. (2017). *Studies in mathematics education* (2nd.ed). Kirtipur: Dikshanta publication.
- Adhikari, A.B. (2019). *Practices of ICT in teaching and learning mathematics*. Unpublished Master's Thesis, T.U. Kirtipur, Kathmandu.
- Basnet, R. (2016). *Effectiveness of inductive method in teaching mensuration at the lower secondary level* (Unpublished master's thesis). T.U, Kathmandu.
- Best, J.W. & Kahn, J.V. (2003). *Education research*. New Delhi: Prentice-Hall of India Private Limited.
- Bhatta, G. (2017). *A problem faced by students in learning set* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Carol, T. (2016). *Why choose the qualitative research method*. Retrieved from <https://medium.com/@thomascarol1988/why-choose-qualitative-research-over-quantitative-research-8cf3141d99a5>
- Chapagin, D.P. (2019). *Difficulties in Learning Algebraic word problem* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Chaudhari, K. (2004), *A study of causes of failure in optional mathematics in SLC examination* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Creswell, J. W. (2007). *Research design: Qualitative, quantitative, and mixed methods approach*. Thousand Oaks, CA: Sage
- Jayanthi J. & Srinivasan K. (2015). Influence of home environment on academic achievement in mathematics. *The journal of IOSR-JM*, volume 11, pp. 20-31.
- Kafle, G. (2016). *Teaching/Learning Strategies in Mathematics at School Level* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Khadka, G. (2014). [\*Myth-making about women's predicament\*](#) (Unpublished master's thesis). Tribhuvan University, Kathmandu.

- Khanal, A. (2017). *Factors affecting failure in mathematics in SLC examination*. An Unpublished Master's Thesis, T.U. Kirtipur.
- Khanal, K.& Poudel, G (2017). *Impact of the home environment in mathematics learning* (Unpublished master's thesis). Department of Mathematics Education Kirtipur, T.U.
- Khanal, P.(2019). *Research methodology in education* (1<sup>st</sup>ed). Kathmandu: Sunlight Publication.
- Kumar, R. (2011). *Research methodology*. Singapore: Asian Pacific Pvt. Ltd.
- Melnuish, E. (2010). Impact of the home environment on child cognitive development. *Scottish government social research in Scotland*. pp.144-146.
- Nepali, S. (2019). *Problems faced by students in mathematics learning at the secondary level* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- 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 the play method in mathematics teaching at the 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*. Vol. 21, No. 8, pp. (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's 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*, Vol. 3, p. 46.



- Peter, T., & Kaarbo, J. (1999). A Practical Guide to the comparative case study method in political psychology. *Political Psychology*, 20, 369–391.
- Pokhrel, M. (2019). *Mathematics achievement in school leaving certificate examination between public and private students at Kaski district* (Unpublished master's thesis). Tribhuvan University, Kathmandu.
- Pokhrel, U.R. (2018). *Learning strategies of mathematics students* (Unpublished master's thesis). Tribhuvan University. Kathmandu.
- Poudel, B. (2017). *Determinants of mathematics achievement using structural equations modeling*. An Unpublished master's thesis, TU, Kirtipur.
- Poudel, Y.(2019). *Factors affecting mathematics achievement of secondary level students*. An Unpublished Master's Thesis, T.U. Kirtipur.
- Rawat, D.B. (2011). *Effects of home environment on student's achievement in mathematics in secondary level (A case study on Kami students at Salyan district)*. Department of Mathematics Education, T.U. Kirtipur.
- Saud, D.B. (2018). *The attitude of students and teachers toward using audio-video aids in learning on the secondary level in the Surkhet district*. Unpublished Master's Thesis, Department of Mathematics Education T.U. Kirtipur, Kathmandu.
- Sharma, H. (2014). *Effect of family environment on mathematics achievement*. An unpublished master thesis T.U. Kirtipur.
- Timilsena, T. R. (2017). *The attitude of teachers of ICT in teaching mathematics*. Unpublished Master's Thesis, Department of Mathematics Education T.U. Kirtipur, Kathmandu.
- Yadav, P.K. (2008). *A study on the effectiveness of the primary school teachers of the district of Sirha* (Unpublished master's thesis). Tribhuvan University, Kathmandu.

## **Appendix A**

### **Classroom Observation Format**

Name of school:

Students' participation:

Date of observation:

Topic:

#### **Teacher Activities**

- Teacher's teaching style, method, and materials.
- Interaction between students-students and teacher-students in the classroom.
- Collaboration and discussion in subject matter with students.
- Classroom environment and management.
- Classwork and Homework

#### **Students Activities**

- Participation of students in classroom activities
- Students' interest in related topics/content
- Relations between each other students

## **Appendix- B**

### **Interview Guidelines for Mathematics Teachers**

The interview with the mathematics teacher took based on the following topics.

Name:

Qualification:

Teaching Experience:

- School facilities:
- Classroom management:
- Relation with staffs and students:
- Relation with parents/guardians of the students.
- Opinion towards mathematics learning in the classroom:
- Opinion towards low learning in the classroom:
- Policies for low learning in the classroom:

## Appendix C

### Interview Guideline for Students

Name of Students:

Date:

Class:

Roll No:

Age:

Gender:

Permanent Address:  
Address:

Temporary

Position in the Class:

Name of School:

The interview with the key respondents was taken in terms of the following main points;

- Personal history (birthplace, previous school, habit, etc.).
- Family background (members, education, economic status, occupation, etc.)
- Learning opportunities at home and school.
- Opinion about mathematics subject.
- Views about the school environment and teachers' behaviors.
- Parent support in learning.
- View about teacher's teaching technique, materials, and method.
- Participation in extracurricular activities.
- Difficulties in learning mathematics.
- Improve students' interest in learning mathematics.
- Expectations from school, teacher, and parents.

## Appendix D

### Interview Guideline for Students' Parents

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Gender: \_\_\_\_\_ Age: \_\_\_\_\_

Relation with student: \_\_\_\_\_

The interview with the students' parents 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: