# Chapter I

## Introduction

### Background of the Study

Mathematics is an exciting and challenging subject, which iscontinuously developing by a rapid rate across many research areas. It has a natural elegance and beauty. Taking a real world problem, creating, and applying mathematical models to aid understanding is often hugely satisfying and rewarding. Mathematics is used thought the world as an essential tool in many fields including natural sciences, engineering, medicine, finance, and the social science etc. The terms 'Mathematics' may be considered in a number of ways. It is also related to measurement, calculations, discovery, relationship, and dealing with the problems of space. Therefore, it can be considered as an exact science. The term ‘Mathematics’ has been explained in various ways. There are very much diversity to the definition of ‘Mathematics’ and there is no such a word or sentence to define it exactly. According to Oxford Advanced Learner Dictionary (Deuter, Bradbery and Turnbull, 2018), 'Mathematics is the science of number and space including Arithmetic, Algebra, Geometry and Trigonometry'. Mathematics is an abstract area of knowledge. It helps to an individual to develop his/her potentialities creating confidence for personality development. It gives an idea of thinking to any area of knowledge and creates his/her logical views towards it. It makes an individual multi-dynamic and multi-valuable.

According to CollinsWeb linked Dictionary of Mathematics (Borowski and Borwein, 1991), 'Mathematics is a group of related subjects including Algebra, Geometry quantity, shape and their interrelationship, application, generalization and abstraction'. Thus, it is called ‘Queen of Sciences’ due to its role played in the field of science and other disciplines like agriculture, industry, business etc. This is only the sample representation about Mathematics among the vital role its significance. Without Mathematical knowledge, the universal knowledge is paralyzed.

After realizing such a role of Mathematics all around the world, still the human beings are not ready to learn the Mathematics. Many reasons are related in causing the anxiety in Mathematics learning in girl students. Only a small mass of student appreciate and ready to learn about Mathematics but most of the girls students

advocate opposite to it. They learn only compulsory Mathematics by feeling uneasy. Due to this fact, the number of girl students in Mathematics class is going to decreases day by day. The number of girl students in optional Mathematics class is almost negligible in number. This is matter of great concern because the number of girl students will be zero, in recent years if no one gives the method of remedial. Hence, this study chooses this topic to find out the level of Mathematics anxiety of girl students.

**Mathematics Anxiety**

Mathematics anxiety is the panic, helplessness, paralysis, and mental disorganization that arises among some people when they are required to solve a mathematical problem (Tobias,1993). Mathemetical anxiety is a serious and pervasive problem especially in the community in many forms and degrees from 'freezing up'. It can also be explained as a sense of discomfort observed while working on Mathematical problems and is associated with fear and apprehension to specific Mathematics related situations. It is found among elementary school students, high school students. Mathematics anxiety is an emotional rather than intellectual problem. Mathematical anxiety can cause one to forget and loss one's self-confidence.It is very real and occurs among thousands of people. It can also be named as 'math phobia' that is gradually increasing among the large mass of pupils. In Nepalese contexts, there have not been conducted any research in international perspective (Acharya, 2016). Acharya (2016) described Mathematics anxiety as consequences of 'an inability to handle frustration, exercise, school absence, poor self-concept, internalized negative parental and teacher attitude towards Mathematics through drill without real understanding. A more concise description of the causal factors its provided of by Devine and Colleagues (2012) who classified variables systematically related to the development of Mathematics anxiety into three groups, namely environmental variables, intellectual variables, includes the child's level of more general cognitive abilities, while personality variables, include comprise concept, attitude, confidence and learning behavior.

According to the Tobias (1993), the development of mathematics anxiety often taken its origin from a lack of confidence in situation involving the necessity handles numerical information. A recent study with adolescents demonstrates that

Mathematic anxiety can be modeled as a function of both a person's self- regulation skill's and self -efficacy beliefs (Scarpello, 2005). Mathematical anxiety is limited neither to a minority of individuals nor to country.

International comparisons of high school students show that some students in every country are anxious about Math. It is perhaps unsurprising that there is an inverse relationship between anxiety and efficacy. In conclusion, anxiety in Mathematics is going ahead as a long-lasting psychological diseases. Math anxiety is real and occurs among thousands of people. Most of the female anxiety in classroom happens due to the lack of self-confidence, self-esteem, learning style, parental attitudes, high expectation of parent, negative attitude towards Mathematics, and avoidance of math teacher's attitudes, ineffective teaching methods, negative school experiences etc. Today one of the major development of society required Mathematics. Hence, Mathematics should be looked in a positive light to reduce math anxiety. Therefore, the teacher must be re-examined traditional teaching that often does not match students' learning styles and skills needed in society.

The anxiety occurs when their parents or teacher for failing to master a mathematics concept punishes students. According to Acharya (2016), in the first phase, the person experiences a negative feeling to mathematics related situations. This leads to second phase in which the person begins to avoid mathematical situations and second phase is followed by third phase which involves poor mathematical preparations. Finally, there is the phase of poor mathematics performance. It creates a situation in which most of students leave mathematics to learn. Most of the students fear about mathematics, which really develop a form of mathematical anxiety.

**Girl's Mathematics Anxiety**

Girls often believe themselves to be bad at math in accordance with gender stereotyping and often experiences high level of anxiety about the math subject. The anxiety appears to be driven by social influences, gender discrimination and different health problems etc. It is explained that elementary schools may be breeding ground for the Mathematics anxiety in female students. The elementary school female teacher displayed a high level of anxiety about Math, that skittishness was transmitted to their

girl students. Those girl students who spent a year with math-phobic teacher displayed lower math achievement and increase belief in stereotypes about girls Mathematics ability. Still identifying its causes could help to eliminate it at later stages of education and prevent it from making reappearance in young girls.

**Statement of the Problem**

Mathematics is more useful and very essential subject of human life. However, from the beginning of the school life girl students feel very difficulties and anxiety in mathematics learning. Mathematical anxiety becomes the key problem of the most girl students at secondary level of education in Nepal. There are many studies on achievement in different area of Mathematics. However, the study about the causes of Mathematics anxiety focusing to girl student of secondary level at Mahakali Secondary School, Mandan Deupur Municipality, Kavrepalanchokis absent. Thus, there is dare need to explore the anxiety levels of girls students on Mathematics at Mahakali Secondary School, Mandan Deupur Municipality, Kavrepalanchok. This study aims to study mathematical anxiety of girl students answering the following research questions such as:

- What are the major causes of anxiety in Mathematics among girl students?
- How can be mathematical anxiety be reduced in girls of secondary level?

**Objective of the Study**

The main aim of the study was to investigate the anxiety inMathematics among secondary level girl students at Mahakali Secondary School. However the following specific objectives were considered.

- To find out the causes of anxiety in Mathematics learning at secondary level girls students.
- To identify the remedial measures to minimize/reduce mathematical anxiety in girl students.

## Rational of the Study

This research was important for secondary level education to develop girl student's knowledge, competency and interest in the subject areas. Many factors hinder students' progress in the subject. Everybody knows about the importance of Mathematics in the world and the entire development of the world will be paralyzed without considering the role of Mathematics. However, most of the girl students feel a great anxiety while learning Mathematics. In classroom there are different students some are slow learner, some are medium and some are rapid learner. All the students are differ from culture, religion; socio-economic status and other are lack of physical facilities, untrained teacher, unsuitable textbook etc. The main theme of the research is to identify the real causes of mathematics anxiety in female students of secondary levelMahakali Secondary School, Mandan Deupur Municipality, Kavrepalanchok. The results of this research would benefit to gauge mathematics anxiety of the female students of secondary levels and it would be helpful for students, instructor, counselor, guidance, parents, teachers, curriculum designs and coordinators to improve female student’s achievements in mathematics. Further, the results would help to make remedial plans on mathematical anxiety and such studies can be generalized at other schools as well.

## Delimitations of the Study

It concerns with a boundary area of the study. Due to various limitations and resource constraint, it is not possible to conduct the research on the large scale. Hence, the study delimits area of study and sample size. This study was limited on only secondary level girl studentsMahakali Secondary School, Mandan Deupur Municipality, Kavrepalanchok. This study includes all grade nine and ten girl students as sampling unit. The study was targeted to compulsory mathematics only. Other variables such as age level and socio-economic status of the sample studentare not taken into consideration.

## Operational Definition of Key Terms

**Mathematics:** The study of basic number operations and its relationships

**Students:** The participants in the study that are members of a secondary school environment of ninth and tenth grades

**Girl students:** The students that they have female gender

**School:** School refers government community institution in which teaching learning activities are conducted. It reflects both physical and cultural aspects such as buildings, furniture, teaching materials as well as the values, beliefs, and traditions of the school community delineation, the relation among students, parents, teacher, and head teacher.

**Secondary level school:** According to Ministry of Education, Government ofNepal, now school level is divided to two levels. From early primary level to grade 8 is basic level.Similarly, the education level that starts from grad 9 and ends in grade 12 is secondary level.

**Teaching learning:** The overall activities conducted in the classroom for gaining and sharing the knowledge based on definite curriculum.

**Diversity:** The concept of diversity encompasses acceptance and respect. Itmeans understanding that each individual is unique, and recognize our individual differences. These can be along the dimensions of race,ethnicity, gender, sexual orientation, socio-economic status, age,physical abilities, religious beliefs, political beliefs, or otherideologies.

**Mathematics anxiety**: It is a feeling of tension, apprehension fear thatinterferes with math performance.

**Ethnography:**Ethnography is to provide a detailed, in-depth description ofpeople under the study. It describes socio-cultural aspects of student based on detailed observation.

**Focus group discussion**: Focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic of interest.

## Chapter II

### Review of Related Literature

This chapter deals about the review of related theoretical and empirical literature review and conceptual framework of the study. Literature review deals about the theoretical literature, empirical literature, theoretical framework and conceptual framework for the study.

### Empirical Review

Lamichhane (2001) did his research entitled, “Investigating the Leading Units for Causing Higher Failure Rate in Mathematics in SLC Exam”.He had completed his research within the aim that he wanted to investigate the major causes promoting higher failure rate in SLC exam and found that number of student obtains less than 30 percent marks in each unit are not proportionality distributed to these units i.e. Failure rate in each unit/topic of compulsory math is not proportional or each unit is equally difficult for average level student. Number of student obtaining marks between 30 percent and 60 percent in each unit separately is not proportional in unit wise distribution. Number of student obtaining marks greater than 60 percent in each unit is distinctly is not proportionally distributed to these units. Among eight units of parent compulsory math course of secondary, most of the examiners are failed geometry, probability, arithmetic’s and menstruation respectively. Failure rate is other unit in comparison to these four units. Even though SLC results of compulsory mathematics is poor in recent year, most of examines are doing better in algebra position in comparison to other units. Therefore, it was linked these result in terms of the factors promoting mathematics anxiety.

Scarpello (2005)conducted a research for the completion of his doctor of philosophy from Drexel University on entitled "The Effect of Mathematics on the Course and Carrier choice of HighSchool Vocational and Technical Education Students". He generated interesting findings. On his research report, it was found that many factors influence a student’s course and career choice, self-efficiency and peers. There have been explained about the interesting inversely proportional relation: The effect of mathematics anxiety on mathematics efficacy is such that as mathematics anxiety increases mathematics self-efficacy decrease and vice-versa. These two

constructs are interlinked and inseparable. Each directly influences the other and these two together directly influence course and career choice.

Chapai (2008)conducted a research on entitled "Wash back Effort of Examination on Teaching and Learning Mathematics at Secondary Level". According to his study, wash back is defined as the effect of examination on teaching learning process. If a text exerts beneficial influence on teaching and learning, it is sometimes supposed to be the way in which an examination may influence in a backward direction, and considered as a negative wash back. I have tried to link the negative wash back effect with the chosen topic. I would like to suppose that the negative wash back effect plays the role to motivate mathematics anxiety and the researcher concluded following findings:

Dulal (2009) conducted a research for the topic causes of anxiety in mathematics learning. The objective of this study was to find out the causes of anxiety in mathematics learning at secondary level students including both boys and girls. This research was qualitative in nature. This study is based on descriptive, analytic and explorative research design. The data obtained from this study were class observation and exam observation were carried out with the involvement of classroom teaching and learning situation and the exam observation program was conducted while running the exam on the schools. The data analyzing is critically in verbal way and the finding also. There is large interesting part among the information views given by students, teachers and observation.

Theresearch shows that the students are highly responsible to produce anxious feelings. Consequently, the anxiety in mathematics learning was maximized. It was found that there is large intersecting part among the information/views given by students, teachers, and observation. Most of the students lost the habit of doing homework increasingly. Negligence to homework doing implies low practice, low practice implies loss of self-efficacy and loss of self-efficacy implies the maximization of anxiety in Mathematics.

Karimi and Venkatesan (2009) carried out research on “Mathematics Anxiety, Mathematics Performance, and Academic Hardiness in High School Students”. The objectives were (a) to examine the relationship between level of Mathematics anxiety,

Mathematics performance and academic hardiness among school student in Karnataka. (b) to examine the effect of gender on students level of mathematics anxiety, mathematics performance and academic hardiness. The sample of this study included 284 student of eighth grade including 144 males and 140 females, selected randomly from nine different high schools in Karnataka state. To achieve the objectives of this study Mathematics Anxiety Rating Scale-India (MARS_I), Academic Hardiness Scale (AHS) were administered. Parson correlation analysis and two independent samples t-test were used to analyze the data. The result had revealed that mathematics anxiety had significant correlation is detected with academic hardiness. It is also found that the gender differences in mathematics anxiety are significant, whereas no significant differences are detected between boys and girls in mathematics performance and academic hardiness.

Pokhrel (2011)completed in master's thesis entitled "A study of the relationship and achievement among ninth grade students of Kathmandu districts" and the following findings have been drawn. The achievement of the students in algebra in higher than in arithmetic in higher than in geometry. The previous achievement of students was also highly affected by the anxiety in Mathematics. The achievement in geometry is most affected i.e. negative correlated with the anxiety in Mathematics. In the current achievement, it was found that the achievement of algebra and arithmetic is less affected by the anxiety than the achievement in Geometry.

- Exam did not encourage teachers to teach according to the course objectives.
- Exam enhanced learning for passing the exam rather than getting knowledge.
- Exam focused on teacher centered teaching and very low use of materials.
- Examination promoted guesswork.
- Examination promoted to work hard.
- Wash back is a stronger motivating force of an examination.

Regmi (2016) explores the anxiety felt by the Grade X girl students from five private and five-government school of Kathmandu valley. Mixed design was adopted in this study. The total population of this study was 100 students studying in grade X from ten schools of Kathmandu valley. The sample of this study was 100 students from the selected schools. The sampling procedure of this study was random sampling. The data were collected through questionnaire and interview with both

teachers and students. The collected data were analyzed and interpreted by using mean score. The major findings of this study were among 100 sample students, the anxiety was found on 44 students. The other important finding of this study was the cause of anxiety among students had been identified. It was found that student's pre-knowledge and interest, course content, teacher's competency, school management, peer group, economic and educational condition of family and so on were responsible for anxiety in mathematics in some high or low degree.

Pandit (2017) analyzed math anxiety of secondary level girl students of Siraha district. The study took classroom observations and interview techniques to collect the data. The results from 13 samples inferred that there was math anxiety among girl students. Homework by teacher, negative perception about mathematics on society, fixed mindset, mental pressure were major causes of anxiety among the girls.

From the findings of the different literatures, teachers and authoritarian attitude could lead to fear some classroom climate in which student might hesitate to ask question or answer the teacher. The achievement level of educated father’s children is higher than the illiterate father’s children. Mathematics achievement of students has been also found strongly associated with the father and mother’s occupations and their education. Better school environment is essential for increasing mathematics achievement. The motivation of their parent has good achievement than who do not get motivation from their parent. In addition, the language plays an important role in learning mathematics in some ethnic community. These literatures are very useful to investigate the anxiety of Mathematics among secondary level students.

**Theoretical Review**

I used various theories to make theoretical generalization of social realities emerged from my diverse nature of interview and observational data.There are various theories, which can be used to understand the learning problems in mathematics for different cultural groups' children. Among them, John Hold's theory of fear, Vygitskey's theory of constructivism theory of social development and Bandura's theory of learning are briefly discussed.

**Theory of Fear**

John Holt (1964) in his book "How Children Failed" expressed that children fail because of fear in schools. The tedium, confusion, fear, limitless hopes, and expectations of adults all contribute to failure. Fear is one strategy or ideas that schools and teachers have used for a long time to control, discipline, and motivate students. Fear destroys intelligence, and affects a child's whole way of looking at, thinking about, and dealing with life. A fearful mind cannot learn. Fear and failure are very closely linked. Schooling is about fears, and throughout their schooling, children are taught to be afraid of failure. The fear of failure and subsequent experience of humiliation, insult, punishment, and scolding prompts children to refrain from working hard. Children then begin to perceive themselves as incompetent learners. Incompetence not only reduces what others expect and demand but also reduces what one expects from him or herself. Holt concluded that the best think was to help children overcome fear so that they came to believe that they had the ability to learn. He further suggests that the experience of failure is humiliating and it does not lead to more learning. Children should be subjected to honorable and constructive experience that inspires them to learn. Schools need to be organized in such a way that even children with learning difficulties think that they have the ability to succeed and do extremely well. Holt is of the view that learning in schools is scrappy, irrelevant, distorted, and short-lived and does not meet the real needs of children. School experiences are often boring, small, disused, and narrow and that there is limited opportunity to further expand their intelligence, capabilities, and talents. The reality they experience on a day-to-day basis is so different from the reality they are taught in schools that they find school learning meaningless.

**Constructivism**

This Constructivist theory has been reviewed in the context of the theme of my study. It believes on construction of knowledge by participants being engaged in the activities. Social constructivism aligned with Vygotskian theory view mathematics as a social construction and a cultural product. According to Vygotsky (1986), learners first construct knowledge in their interactions with people and activity contexts. From this prospective, knowledge and learning are considered to be social

activities which are mediated by cultural artifacts and resources. This approach centers on the ways in which power, the economy, political and social factors affect the ways where groups of people form understanding and formal knowledge about their world. These bodies of knowledge are not considered to be objective representation of the external world (Richardson, 2003) while Vygotsky (1986) writes meditational means both materials and symbolic resources. He focused much of his empirical research on the examination of the role of language as a central mechanism of learning. Overtime and with repeated experiences with others in social interaction,the individual internalizes learning and this social interaction becomes psychological. Social constructivists emphasize the interdependence of social and individual processes in the co-construction of knowledge. The socio-cognitive learning emphasizes the importance of social process in the mathematical classroom.

Baursfeld (1995) states thatsocio-cultural approaches to learning and development are based on the concept that human activities take place in cultural contexts and are mediated by language and other symbol systems. It can be best understood when investigated in their historical development and organic relationship between external, social events and internal psychic forms. Vygotsky emphasizes the critical importance of culture and the importance of the social context for cognitive development, which rely on four principles of learning and development is a social collaborative activity the zone of proximal development can serve as a guide for curricular and lesson planning for optimal learning meaningful context for school learning out of school experience.

Vygotsky wrote that communication is a cultural tool, a human instrument of communication. Thus, the students create their own knowledge and develop mathematical meaning as they learn to explain and justify their thinking to others. As they learn to speak mathematical language, they transform their thinking into the mathematical concepts. The mathematical language comes from society and thought comes from the individual.

Vygotsky suggested that children should be given scientific language when some degree of understanding already exists. Applying Vygotsky's idea to learning mathematics the growth of mathematical understanding occurs when earlier thought

interacts with new mathematical language in the process of children's sharing and negotiating thinking-taken shared meanings (Cobb, Yacked and Wood, 1994) emerged in classroom. On the other hand, Vygotsky's theory believes that learning is directly related to social development. Good instruction could be provided in determining the level where each child is in his or her development, and in building on that child's pre-existing experiences. Vygotsky (1986) stated that the zone of proximal development is the actual development level determined by independent problem solving exercise through adult guidance or through collaboration with more capable peers. His theory of development has been referred to as a cultural historical theory. He was perhaps one of the first psychologists to suggest the mechanisms by which culture becomes part of each person's nature. The main thing in his theory was the understanding that all phenomena are studied as processes in motion and change. Every phenomenon has its history and this history characterizes by quantitative and qualitative changes. Vygotsky believed that our life experiences affect and influence learning. The social context influences our development and learning as well as shape how and what we think. From his perspective, everything about learning and development is social and hence the name social constructivism Vygotsky (1986) suggests that development cannot be separated from its social context. Language plays a central role in mental development. Children construct knowledge themselves. Learning can lead development. Vygotsky proposed that even when we are carrying out a mental action in isolation, we are not really practicing in an individual mental process, but are rather still operating in a social context. We are using the social and cultural tools of language when reading a book, even doing so alone. Books themselves are social, cultural, and historical artifacts.

According to Vygotsky, the human mind is the product of both human histories. He viewed learning and development as dialectical in nature. For him, cognitive construction is always socially mediated. The social context is part of the development and learning process. Likewise, Ernest (1991) argues that social constructivism views mathematics as a social construction, which makes it a cultural product. Social constructivist position views mathematical knowledge and mathematical objects as humanly constructed.

In my understanding, knowledge is actively constructed by learners, this process serves the learners' organization of the experimental world, and then the learners' experience of situation and context and constructivism depends on situation and context, figurative and social context, abstraction and contextualization. My research has focused on social-cultural dimensions of mathematics education. I believe that every educational institution is a part of society. So, every member of the society is guided by social norms and values. Constructivist theory of learning in qualitative research believes that there is not a single truth; rather all truth is relative and constructed by the individual or society. So as a researcher, I engaged in interaction with my participants to get the idea, generate the knowledge and meaning from their experiences on my research topic.

**Social Cognitive Theory**

In 1986, Bandura published his second book "Social foundations of thought and action: A social cognitive theory", which expanded and renamed his original theory. He called the new theory Social Cognitive Theory (SCT). Bandura changed the name social learning theory to social cognitive theory to emphasize the major role cognition plays in encoding and performing behaviors. In this book, Bandura (1986) argued that human behavior is caused by personal, behavioral, and environmental influences. Social Cognitive Theory (SCT) holds that portions of an individual's knowledge acquisition can be directly related to observing others within the context of social interactions, experiences, and outside media influences.

The theory states that when people observe a model performing a behavior and the consequences of that behavior, they remember the sequence of events and use this information to guide subsequent behaviors. Observing a model can also prompt the viewer to engage in behavior they already learned (Bandura, 1986, 2002). In other words, people do not learn new behaviors solely by trying them and either succeeding or failing, but rather, the survival of humanity is dependent upon the replication of the actions of others. Depending on whether people are rewarded or punished for their behavior and the outcome of the behavior, the observer may choose to replicate behavior modeled. Media provides models for a vast array of people in many different environmental settings.

Social Cognitive Theory (SCT) is a learning theory based on the idea that people learn by observing others. These learned behaviors can be central to one's personality. While social psychologists agree that the environment one grows up in contributes to behavior, the individual person (and therefore cognition) is just as important. People learn by observing others, with the environment, behavior, and cognition all as the chief factors in influencing development in a reciprocal triadic relationship. For example, each behavior witnessed can change a person's way of thinking (cognition). Similarly, the environment one is raised in may influence later behaviors, just as a father's mindset (also cognition) determines the environment in which his children are raised. The reciprocal determinism was explained in the schematization of triadic reciprocal causation (Bandura, 2002). The schema shows how the reproduction of an observed behavior is influenced by the interaction of the following three determinants:

- Personal: Whether the individual has high or low self-efficacy toward the behavior (i.e. get the learner to believe in his or her personal abilities to correctly complete a behavior).
- Behavioral: The response an individual receives after they perform a behavior (i.e. Provide chances for the learner to experience successful learning because of performing the behavior correctly).
- Environmental: Aspects of the environment or setting that influence the individual's ability to successfully complete a behavior (i.e. Make environmental conditions conducive for improved self-efficacy by providing appropriate support and materials). (Bandura, 2002)

Evolving over time, human beings are featured with advanced neutral systems, which enable individuals to acquire knowledge and skills by both direct and symbolic terms (Bandura, 2002). Four primary capabilities are addressed as important foundations of social cognitive theory: symbolizing capability, self-regulation capability, self-reflective capability, and vicarious capability:

- Symbolizing Capability: People are affected not only by direct experience but also by also indirect events. Instead of merely learning through laborious trial-and-error process, human beings are able to symbolically

perceive events conveyed in messages, construct possible solutions, and evaluate the anticipated outcomes.

- Self-regulation Capability: Individuals can regulate their own intentions and behaviors by themselves. Self-regulation lies on both negative and positive feedback systems, in which discrepancy reduction and discrepancy production are involved. That is, individuals proactively motivate and guide their actions by setting challenging goals and then making effort to fulfill them. In doing so, individuals gain skills, resources, self-efficacy and beyond.
- Self-reflective Capability: Human beings can evaluate their thoughts and actions by themselves, which is identified as another distinct feature of human beings. By verifying the adequacy and soundness of their thoughts through enactive, various, social, or logical manner, individuals can generate new ideas, adjust their thoughts, and take actions accordingly.
- Vicarious Capability: One critical ability human beings featured is to adopt skills and knowledge from information communicated through a wide array of mediums. By vicariously observing others' actions and their consequences, individuals can gain insights into their own activities. Vicarious capability is of great value to human beings' cognitive development in nowadays, in which most of our information encountered in our lives, derives from the mass media than trial-and-error process (Bandura, 2002).

An important assumption of Social Cognitive Theory is that personal determinants, such as self-reflection and self-regulation, do not have to reside unconsciously within individuals. People can consciously change and develop their cognitive functioning. This is important to the proposition that self-efficacy too can be changed, or enhanced. From this perspective, people are capable of influencing their own motivation and performance according to the model of triadic reciprocality in which personal determinants (such as self-efficacy), environmental conditions (such as treatment conditions), and action (such as practice) are mutually interactive influences. Improving performance, therefore, depends on changing some of these influences. In teaching and learning, the challenge upfront is to 1)get the learner to believe in his or her personal capabilities to successfully perform a designated task; 2)

provide environmental conditions, such as instructional strategies and appropriate technology, that improve the strategies and self-efficacy of the learner; and 3) provide opportunities for the learner to experience successful learning as a result of appropriate action. Accordingly, the theory itself has numerous implications in classroom teaching and learning practices:

- Students learn a great deal simply by observing others;
- Describing the consequences of behavior increases appropriate behaviors, decreasing inappropriate ones; this includes discussing the rewards of various positive behaviors in the classroom;
- Modeling provides an alternative to teaching new behaviors. To promote effective modeling, teachers must ensure the four essential conditions exist: attention, retention, production, and motivation (reinforcement and punishment);
- Instead of using shaping, an operant conditioning strategy, teachers will find modeling is a faster and more efficient means of teaching new knowledge, skills, and dispositions;
- Teachers must model appropriate behaviors and they do not model inappropriate behaviors;
- Teachers should expose students to a variety of models including peers and other adult models; this is important to break down stereotypes;
- Modeling also includes modeling of interest, thinking process, attitudes, instructional materials, media (TV and advertisement), academic work achievement and progress, encouragement, emotions, etc. in the physical, mental, and emotional aspects of development.
- Students must believe that they are capable of accomplishing a task; it is important for students to develop a sense of self-efficacy. Teachers can promote such self-efficacy by having students receive confidence-building messages, watch others be successful, and experience success on themselves;
- Teachers should help students set realistic expectations ensuring that expectations are realistically challenging. Sometimes a task is beyond a student's ability;

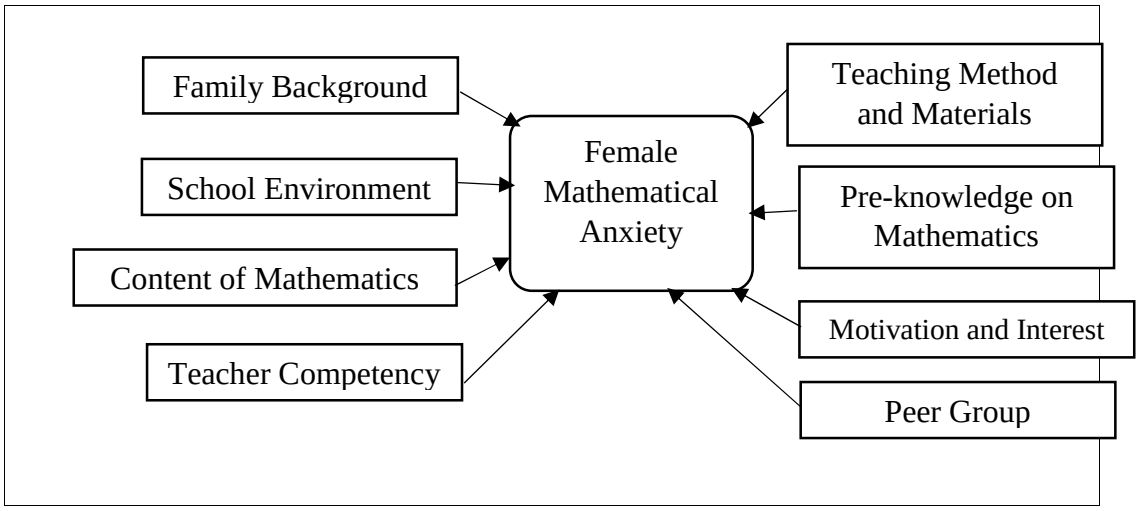
- Self-regulation techniques provide an effective method for improving student behaviors.

**Conceptual Framework**

This section deals about the conceptual framework for the research.The conceptual framework was established based on research topic's possible areas to fulfill the objectives of theoretical framework with the help of review of empiricalliterature for the study of anxiety of mathematics among girl students. Since the study topic is; "Mathematical Anxiety among Secondary Level Girl Student". Therefore, the demand of this study was supposed to be those factors, which exactly fulfill the objectives. The responses given by respondents were supposed to be fallen under the following headings:

- Family background
- School environment
- Content of Mathematics
- Teacher competency
- Teaching methods and materials
- Pre-Knowledge of the students
- Motivation & interest
- Peer groups

Based on the above headings, the framework is presented in diagrammatic form below:



**School environment**: The environment of school can also cause the girl mathematics anxiety. The certain factors like physical aspects of classroom such as neat and clean, light, position of blackboard, desk and students sitting position, toilet and sanitation facilities, teacher student relationship, unwanted noisy environment, and library facilityetc. are responsible for less achievement in learning mathematics which intensify mathematical anxiety.

**Family background**: The family background i.e. economic status of the family, education level of parents or students family members, attitude of parents towards female education, or gender discrimination, family members attitude on their children performance on mathematics and availability of study time at homedue to help in other house labor activities are also major causes for female mathematics anxiety.

**Teaching methods and materials**: The application of good teaching methods and materials adapted for mathematics learning can decrease the mathematics anxiety in female students.

**Contents of mathematics**: If the content of mathematics is very complex then it can cause anxiety in students.

**Students' pre-knowledge**: While learning mathematics if he or she has a lot of basic knowledge in mathematics then he or she does not feel any anxiety in learning it. However, if he or she does not have any pre-knowledge then it may be one of the major factors for mathematics anxiety.

**Teacher's competency:** Student could not be motivated for effective learning if teacher are passive. Most of the teachers are not capable to teach mathematics effectively although they have the qualification and trained, so the difficulty level was increased.

**Motivation and interest:** Lack of motivation to students to study mathematics, lack of teacher training to motivate students for learning play main role to promote anxiety in mathematics anxiety.

**Peer group:** Classroom students of same grade learn from each other. If some of peer group student are more eager and less anxiety on mathematics learning, it has positive externalities on other peer group students.

# Chapter III

## Methods and Procedures

This section explained research methodology of the study in brief. It included a brief description of the manner in which decision has been made about the type of data needed for the study, the tools and devices and method used in collecting data. The chapter also explained design of the study, sample and sampling strategy and instruments used to collect the data and analysis and interpretation of the results.

## Research Design

A research design is the document of the study. Research design is the framework that has created to seek answers to research questions. This study based on the qualitative research design with ethnography approach that especially concerns with exploring meaning and the way people understand things. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Sharma, 2011). Qualitative research can be regarded as "naturalistic inquiry" in a sense that it is conducted in natural setting by trying to avoid any intentional manipulation and distortion of the environment of the informants by the researcher (Niure, 2015).

The study was designed to examine the anxiety of mathematics among secondary level students of Shree Mahakali Secondary School, Mandan Deupur Municipality, Kavrepalanchok,district. The study applied qualitative research design.

## Study Site

The study was conducted in community based government school situated on Mandan Deupur Municipality of Kavrepalanchok district. The selected school is Shree Mahakali Secondary school. The school is selected because it has bad performance in SEE exams for last 10 years. The researcher herself visited the study site to collect information.

**Ethnography Approach**

Ethnography approach is a specific from of qualitative inquiry, It enables us to research the realities embedded in a social-cultural setting. It helps to understand the cultural world of the research from their perspectives. Further, it intends to capture detailed and in-depth description of everyday life practice of people (Rai, 2015). Ethnography focuses on an entire cultural group. Ethnography is qualitative design in which the researcher describes and interprets the share and learned patterns of values behaviors, beliefs, and language of culture shaping group (Cresswell, 2007).

The central aim of ethnography is to provide rich, holistic insights into people's view and actions as well as the nature of the location they inhabit, through the collection of detailed observation and interview (Reeve, Kuper and Hodges, 2008) In this study, I had chosen the ethnography approach because of my research objective and research questions. My objectives of this study were to find out the causes of anxiety in mathematics learning at secondary level girl students and to find out the remedial measures to minimize mathematical anxiety in girls. I thought that only the ethnography approach could fulfill my objectives. Therefore, I applied this approach in this study.

**Respondents**

This is the qualitative inquiry, so the sample size in this study is not fix.According to Anderson, there is not any rules for sample size in qualitative inquiry(Anderson, 2009).Being qualitative research, the size of sample is flexible according to researcher. There is no fixed rule for qualitative inquiry. Therefore, sample size is 10 girl students equally from both grade nine and ten and two mathematics teachers along with the head teacher of the school. All together 13 persons were the respondents of this study. Respondents were limited to small size because of limited time and resources.

**Sampling Procedure**

After continue 5 days class observing, I chose 5 students from grade 9 and 5 from grade 10. I received their pre-grade achievements. So that I could know the performance of the students of mathematics. Among 10 students 3 had high grades, 3 had medium grades and 4 had low grades. The samples are selected on the basis of class observation and their pre-grade achievements. Therefore the study applied purposive sampling research design.

**Data Collection Tools and Techniques**

Cresswell (2007) visualize data collection as a series of interrelated activitiesaimed at gathering good information to answer emerging research questions. Animportant step in the process is to find people or place to study and to gain access toand establish rapport with participants, so that they will provide good data. Datacollection is the important part of the study. Based on the data, the researcher can study and analyze every aspect of the study. Research tools are the basic instruments to gatherdata, to seek possible solutions for observed problems (Sharma, 2011). This study applied classroom observation guideline, in depth interview schedule, focus group discussion questions wereused to collect data. These methods were briefly discussed below.

**Interview Schedule**

Interview is a two-way interaction between researcher and researched as in theform of interviewer and interviewee in which interviewer creates situations that canattract the attention of respondents for a enough period of time in asking questionsand answering the questions which interviewee puts his/her understanding andmeaning (Niure, 2015). Adhikari(2006) describesinterview as face-to-face interpersonal role situation in which one person, theinterviewer, asks a person being interview, the respondent and questions designed toobtain answers pertinent to the purpose of the research problem. In-depth interviewalso known as unstructured interview could be regarded as informal interview. It isused to discover the in-depth understanding of people in the context under the study(Adhikari, 2006). It can be done in a day to dayconversational way in which

interviewer does not know whether s/he had beeninterviewing or not. This interview helped to create a friendly situation that opens upa free feeling environment for both researcher and respondent.

In this study, not all the required information was possible to gather throughthe observation and documents. To go in-depth of the information interview wasmuch more helpful. Therefore, I carried out open-ended interview to clear her difficultyregarding learning mathematics. Since some questions were raised according to thesituation available. I took in-depth interview of all eight key students usingunstructured questionnaires. After the interview of the key students, I also tookinterview of head-teacher and two mathematics teachers. I used this tools as requiredto the key students and their mathematics teacher. Based on objectives, Ideveloped the interview theme in semi-structured form

**Class Observation Guidelines**

Observing in a setting is a special skill that requires addressing issues such asthe potential deception of the people being interviewed, impression management, andthe potential marginality of the researcher in a strange setting (Cresswell, 2007). Observation is a kind of tools that helpsto seek knowledge through the use with sense i.e. eyes, nose, tongue, and skin. It hasgreat importance not only in research work but also in our daily lives. (Adhikari, 2007) writes that direct observation has the advantages of puttingresearchers into first hand contact with reality. In this study, observation was used tocapture the physical setting that is the physical environment of school and classroom,the human setting that is the organizations of students in the classroom and interactionsetting that is the participation as well as interaction of teachers with students and viceversa. Observation guideline was developed with reference to research objectives. Theteachers were pre-informed about the purpose of observation and their permission wastaken before entering into the classroom. My role during the observation will be that ofnon-participant observer noting down the things as it occurred and making notes ofthe things that will be noticed. Observation helped me in collecting detail informationabout respondents, their everyday practices and capture actual experiences of theparticipants.

Since, the Nepalese classroom constituted by different socio-cultural forcesbecause students from different background have their own lived reality and in theclassroom, they are not simply conform norms and values of the school. To getrequired information regarding mathematical concepts, I observed school overall aswell as key respondents individually and collectively during their work at school,classroom, playing with peers, interacting with teachers and friends, school behavior,culture, and participation. I became a friends of students and I always helped them todo their classwork and exercise. Students also felt easier with me by my behavior withthem, which helped me to know their attitude. I also observed teachers collaborationand discussion in subject matter, participation of students in classroom activities aswell as extracurricular activities in terms of gender, caste, religion etc., teachers'behavior towards students in teaching learning process, and teaching learningstrategies of teachers and students.

Participating in a naturally occurred setting,weather either classroom or school, I get a great opportunity to see, feel, test, hear andinteract with the informants very closely through the senses that can producenecessarily data. It needs an in-intensive, close, and continuous visit to the school,class that helped me to be accepted normally by the students, teachers and head teacherin the setting.

**Focus Group Discussion**

A focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic of interest. It is a form of qualitative research where questions are asked about their perceptions attitudes, beliefs, opinion or ideas. In focus group discussion participants are free to talk with other group members; unlike other research methods it encourages discussions with other participants. It generally involves group interviewing in which a small group of usually 8 to 12 people. It is led by a moderator (interviewer) in a loosely structured discussion of various topics of interest.

The group's composition and the group discussion should be carefully planned to create a non-intimidating environment, so that participants feel free to talk

openly and give honest opinions. Since participants are actively encouraged to not only express their own opinions, but also respond to other members and questions posed by the leader, focus groups offer a depth, nuance, and variety to the discussion.

Additionally, as FGDs are structured and directed, but also expressive, they can yield a lot of information in a relatively short time. Therefore, FGDs are a good way to gather in-depth information about a community's thoughts and opinions on a topic. The course of the discussion is usually planned and most moderators rely on an outline, or guide, to ensure that all topics of interest are covered. This study conducted an FGD for 10 students in two groups related with anxiety on mathematics to achieve the objectives of the study.

**Data Collection Procedures**

After selecting and finalizing the tools for data collection, Ivisited the schools under investigation personally for taking prior permission from the Head teacher of the schools for collecting the necessary data. Subsequently, the investigator discussed in detail about her investigation with heads of the respective schools and was sought the permission from them for collecting the necessary data and the subjects (Head teacher, mathematics teacher and students) were explained about the nature and purpose of the study. In the first phase, good rapport with the teachers of concerned schools was established to do the assignment carefully. Before assigning the task, instructions of each test was used in this study was made clear. The mathematics teachers and head teacher were informed on data collection procedures and tools. The procedure of filling the questionnaire wouldmade clear to all of them. The investigator collected all the inventories and thanked them including the head teacher for their friendly cooperation. Similarly, this procedure was repeated to collect information from students.

**Data Analysis and Interpretation Procedure**

Data analysis in qualitative research consists of preparing and organizing thedata for analysis, then reducing the data into themes through a process of coding andcondensing the codes and finally representing the data in figures, tables

or adiscussion (Cresswell, 2007). In this study, the data collected through above mentionedtools from different respondents and sources were processed in different steps. First,the data from interview in the tape recorder were translated in English. The writing andreading of transcripts would allow me to generate common codes and themes as well asthe issue that have anticipated. The text data, the sentences from transcripts ofdifferent respondents were then coded with specific term or concept that it reflected.

Further, this coded sentences that expressed similar meaning were segmented intocommon categories. Finally, after revising those categories, smaller specific themes inline with the research questions were generated.

For the purpose of analysis, the themes were analyzed for answering theresearch questions. The important paraphrases with same meaning were broughttogether and summarized to support the argument whereas less relevant passages withsame meaning are skipped for the ease of analysis. Cross match or triangulation isadopted to maintain the validity and reliability of the results of the study. Mainly thethree sources of the information were triangulated in classroom observation, teachinglearning styles of mathematics and interview with head-teacher, mathematics teacher,and FGD with students. Then after, with the help of theories theanalyzed texts were interpreted and summarized. Thus, analysis of the statementsfrom the specific themes were done and theories were used to interpret the meaning,values, experiences, opinions and behavior of respondents from the analyzed themesand answer the research questions.This research is purely a qualitative research in nature. Therefore, the statistical methods were avoided in this study.

**Quality Standard**

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

### Credibility

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

## Transferability

Transferability replaces the concept of external validity. This criterion refers to the applicability of finding are context to other contexts or setting. To maintain transferability, I had explained mathematical practice found in different community students briefly. I had tried to capture most of scenario by using thick description of observation, interview and by earning making.

### Dependability

This concept replaces the idea of reliability. This is the third standard for judging qualitative standards and refers to stability or consistency of the inquiry processes used over time. To maintain it, I had presented the logic used for selecting people and events to observation, interview and in clued in the study. I would try to maintain credibility and transferability to ensure dependability standard.

### Conformability

A fourth standard is conformability which refers to the quality of the results produced by inquiry in terms of how well they are supported by informants who are involved the study and by events that are independent of the inquiry. I am also the part of students. Therefore, to maintain conformability before concluding information, I reviewed all the information myself several times so that results contain conformability.

# Chapter IV

## Analysis and Interpretation of Data

This section is related to the analysis and interpretation of the collected data.In this chapter, I had addressed my research questions: what are the major causes of anxiety in Mathematics among girl students? In addition, how can be mathematical anxiety be reduced in girls of secondary level?

In order to fulfill the answer of research questions and to achieve the objective of my study, the qualitative research method was used to collect data. It was a case study research design, which searched the causes of anxiety in mathematics and the remedial measure of such causes for secondary level girls.

In order to seek the answer of these questions, I reached Shree Mahakali Secondary School at Mandan Deupur Municipality, ward no. 3, Kavrepalanchowk. I met head teacher of the school and informed him about my purpose of visiting the school. The head teacher gave me permission to observe the classes and to take interview of selected students, mathematics teachers of grade nine and ten and head teacher himself. Further, I conducted focus group discussion with ten students of grade nine and ten.

The collected data were analyzed and interpreted by Coding, theming, categorizing, and triangulation. The themes were set up from the information of students, mathematics teachers, and head teacher. Based on interviews of mathematics teachers, students, head teacher, classrooms observation, and focus group discussion with the students, the main themes were generated below:

## Causes of Anxiety in Mathematics Learning

Causes of mathematics anxiety and their remedial measures were analyzed under the eight specific themes separately. Remedial measures were also suggested according to each theme.

### School Environment

School environment included physical aspects such as size of classroom, sitting position of girl students, sufficiency of desks and benches, appropriate light

and air condition in the classroom, windows, neat and cleanliness, white board position, toilet and sanitation facility, library facility, essential reading and writing materials available to the students, commanding voice of teacher, and time managementetc. were observed. From my classroom observation, I found:

*The classroom was not so neat and clean. The classroom was small according to the number of students. Thus, it looked crowd. Number of benches and desks were not managed according to student number. The natural light and air condition to the classroom was well. Sitting condition of girls as well as boys was same. They sat in two sites with many rows. Student sitting was not managed according to height of the students. The school had only three toilets, one for girls and other for boys. One of the toilet was only for teacher staffs. Toilet were not so clean and they lacked water. The school had no library facility. School had small size white board and there was little space in front of it. All the students easily listen the voice of the teacher. The students had school bags, which they put on their laps. They were using usual textbook, exercise notebooks, mathematics extra textual book and "Old is Gold" i.e. the book that had collection of old questions. The class was not decorated with students' art, or any teaching materials.*

I took an interview with grade ten teacher. I asked him"Why the classroom was not physically managed well." He replied

*Even though classroom management is essential part of teaching-learning process, our school's physical facilities, and classrooms were not in managed condition. The main reason of not having managed physical aspects was destruction all buildings from the earthquake of April 2015. The new school has not been constructed yet. We were running our school in two shifts. In the morning, the classes ran for grade nine to twelve and in the day shift from early child to grade eight because now we did not have sufficient classrooms even to run the whole school at once. The classrooms that we were using now were temporary. Before the earthquake, we had well managed classrooms.*

Then I asked same question to the head teacher. He replied

*The earthquake of the April 2015 had destroyed almost all-physical property of school. Now, we were just running our school temporary physical structure. I knew*

*that classrooms were not managed well. Classrooms were crowd. It would take time to have better managed classrooms as well as other physical aspects. He informed that the school had well decorated and managed classrooms before the earthquake.*

To know the student's response, I asked one of the student "Do you entertain the classroom environment. She replied

*Now, I felt boring in the classroom. There was lack of space in the benches. We four to five sat on single bench. When I started to write, I could not run my arm freely. Others also faced so. After the earthquake, our school's classrooms, benches, space and toilet facility etc. were completely ruined. Therefore, we did not have comfortable learning environment in the school now.*

Finally, I put forward the question of physical environment on focus group. All the students replied on one voice

*We had dull classroom as well as school physical environment. We had uncomfortable classrooms. Desks and benches, toilet facilities were insufficient and sitting position was crowd. After earthquake, we were facing problem of better well-managed classrooms as well as we were staying huts at home. Thus, one side, we had no homes to read and do homework at home. On the other, school had also no better physical for learning activities.*

From the above information, it was concluded that the classroom were not managed well. Rather, they were dirty and crowd. Students sitting were not scientific. Toilets were not hygienic.Students felt uncomfortable in the classroom. The physical environment of the school inferred that it intensified mathematical anxiety among the girl students. Thus, it needed better classroom management to reduce mathematical anxiety among the girl students.

**Family Background**

Under family background, socio-economic status of student was main concern. In this research, student involvement in homelabor activities, lack of income to meet reading writing materials, unable to pay fee of extra class, literacy level of

parents or guardian that they could help their children to do homework of mathematics at their were focused in discussion.

I conducted interview with head teacher and I asked, "Did the guardians educated and could they help their children in doing mathematics homework at home? He replied

*As most of the parents are uneducated, they cannot measure the ability of their kids and cannot coach them. Those who were educated, they also could not help in mathematics because parents were educated only on reading and writing and doing some simple mathematical manipulation. Therefore, they sent their children to study mathematics for tuition and coaching. This showed the supportive behavior but not the creative role.*

I asked a few related questions in the sequence focused on family environment to one of the student, "How was your economic condition? Did you help house tasks? Did you work for wages? Did you have sufficient time to do homework at your home? Or You cannot do homework due to house work burden" She replied

*I had no time to practice at home because of unfavorable situations, poor economic conditions. I was irregular in school and it made me weak. I could not concentrate my mind in classroom thinking that I had to do house works after school. Lack of money to buy materials, books, etc. also destroyed mythe creative environment. My parents did not understand the importance of mathematics. They were illiterate. In addition, due to the poor economic situation, they needed help from me to make money, which did allow sufficient time to study at home. Further, it reduced my time to do my homework and practicing of mathematics. I was always in lack of family motivation to study.*

I asked mathematics teacher, "Did the students have sufficient reading, writing, and other equipment when you conducted learning activities?" He replied

*Most of the students had exercise note copies, textbook, and pen and pencils but they lacked graph copies, instrumental box, and calculator machine etc. Even though, some of the students had instrument boxes, they were filled with pens, or they did not have even protector. They did not know the importance of mathematical*

*instruments in learning activities. Some students were economically unable to buy calculator machine. Students could not bring all the equipment that had suggested to them.*

I put forward the question to the focus group, "Did your economic status, your parents' educational level and house tasks hinder your mathematical capacity?" The focus group discussion revealed

*Most of us are poor. The recent earthquake further reduced our income sources and wealth. Therefore, we had little resources than before. We had to work for wages and own house tasks for livelihood. Most of our parents were illiterate. They could not help us in reading and writing activities. Some of our parents were literate but that did not help in doing mathematics problem. Hence, low-income level, illiteracy, and necessity to help house tasks reduced our mathematical marks. Lower achievements always made us are anxiety with mathematics.*

I also observed the students mathematical teaching and learning materials as suggested by mathematics teacher. I found

*A few students had mathematical teaching and learning materials. When teacher provided them class work, they did not have such materials. Therefore, some students were waiting to lend from those friends who owned such equipment. Some students said to their teacher that they would do their class work at home, because now they lacked the equipment.*

From the above discussion, I concluded that income status, education level, and help, and lack of time due to house labor burden, there was no friendlier family environment for the students to learn mathematics. Hence, it revealed that lack of help to the children in doing mathematics practice from parents due illiteracy or mathematical illiteracy, lack of mathematical instruments to the students due to low-income levels and housework burden intensified mathematical anxiety among the girl students. To reduce the anxiety, family members were convinced to have better family environment to their children in mathematics learning.

**Teaching Methods and Materials**

The teaching methods and materials used while teaching is also an important parameter, which are directly related with the level of anxiety among students. If the teacher uses a good teaching method then most of the students would attract towards it, which consequently decreases the anxiety level. The uses of more instructional materials while teaching create an effective learning environment.

In context of teaching method and materials, from classroom observation I found

*When I entered into the classroom, the teacher was writing on the white board. He was solving the mathematics problem. He was speaking the written words and procedures what he was writing. Except the writing on the white board, there were no other teaching materials. Most of students were copying the solution. A few students were trying to copy from the white board.*

Then, I interviewed the grade ten teacher, "What were the major methods and teaching materials frequently you used in teaching mathematics? He replied

*Instructional materials were not used frequently based due the nature of mathematics contents and I did not made myself any local teaching materials. I frequently used white board, marker pen, ruler, pencils, protractor, divider, graph copies etc.Generally, I used to write on white board and explained the problem solving techniques. I wrote different formula. Students were suggested to memorize them. When I used these formulas to solve the problem, I explained them. After explaining and solving the problem, I provided the students similar problems as classwork. If students asked me question to solve, I did only those except the problems that had same solving methods, were left to students. Although I got teacher training programs andprovided me so many techniques, tools and student centered methods of teaching; the application condition was unmanageable due to large number of students in one class, lack of sufficient time for a period, minimum school opening days, half holiday on Fridays, and lack of entering behavior in the students, lack of physical facilities in the school,*

Then I interviewed on the student, "Were the methods and materials used by your mathematics teacher helpful for you to learn mathematics? She replied

*My teacher always taught us in the same manner. He wrote on the white board and explained the problem solving techniques. He told us to copy the solution what he had written in the white board. We did so.I also followed his instructions.*

Finally, I took the response from focus group of students. They replied on the same question

*Our teacher wrote in the white board. He explained what he wrote. He told to copy it. Then, we followed his instructions. Sometimes we asked some unsolved questions. He solved a few of them, which did follow same pattern of solving technique. This process was regularly carried on daily in the mathematics class.*

From the above discussion, I concluded that the methods and materials used by teachers for teaching learning in the mathematics classroom were highly ineffective to encourage students. Therefore, students could not entertain with the mathematics contents and it enhanced mathematical anxiety among the girl students. Thus, for remedial measure, student centered teaching methods should be used with effective teaching materials.

**Course Contents**

The course content of mathematics might be complex and rigid for secondary level students, particularly girls. This creates frustration among students, which is responsible for causing anxiety in students. Course contents under the study, includes exercises from textbooks, textual, and old question banks.

First, I asked the question on course contents, time to conduct teaching learning activities according to curriculum to grade nine mathematics teacher. He replied

*The course content of mathematics subject is very lengthy. The curriculum managed for nearly 200 days but it needed more hours than the purposed days.Students needed basic knowledge of previous levels. However, I foundstudents*

*were very weak in basic concepts that were needed for running contents. Therefore, students were not actively participate in teaching learning activities.*

Then, I asked same question to grade ten mathematics teacher. He explained

*The course contents were very rigid and they were not managed as sequence of simple to complex. Some of the course contents in mathematics could not be accepted behaviorally, which creates frustration towards it. Students lacked entering behavior that made difficult to finish the required classes on purposed time. He concluded that weak entering behavior was the main problem to finish all the activities in time. Students always kept quit when they were questioned either you learnt it in previous grades.*

On this context, I interviewed one of the student. She replied

*The course study was rigid and the course contents did not bring any excitation to learn it. The course contents were very tough and it was very difficult to solve the problems.I did not understoodlots of symbols and formulas,which were very hard to remember exactly according to their generalizations. When my teacher asked me what this question was asking, I could not answer. Very often my teacher reminded me that the content was already exercised in lower grades but I could not recall it.*

On this area of interest, from the focus group discussion students view came as:

*We ever afraid to complete all the exercises at classrooms as well as at home because of lengthy exercises and weak pre-knowledge on the present contents. Further, it were also provided to do exercises from textual and question bank. Even though we failed in mathematics in earlier grades, we were promoted to upper grade. Thus, we were unable to do the exercises well. Every time our teachers reminded us, it was taught in lower grades. You all must learnt that before to do present exercises. They suggested us to do lower grade exercises before to do the current exercises.*

From the above information, I concluded that the course contents were lengthy for the students to learn and teachers to teach. Students were slow in learning

behavior due to lack of entering behavior. Thus, course contents intensified anxiety on girl students. To avoid the anxiety, students must be taught in such a way that they could get complete knowledge in same grade before to climb the upper grade. Course books and exercises should include games or other easy way problem solving exercises so that students learn mathematics by playing with it.

**Student's Pre-knowledge**

Curriculum is developed in such way that knowledge is developed among the students from lower to upper grades in the same subjects and within the all subjects in the same grade. Therefore, learning activities of present grade are based pre-grades learning activities. If the students were upgraded to upper grade without learning the area of contents of earlier grade, they would not succeed to get better achievements in the current grade. Further, it would reduce students learning speed or sometimes students would unable to understand the contents of mathematics at all. Therefore, pre-knowledge on the contents was also examined among the respondents.

In this context, I interviewed grade nine mathematics teacher. He replied

*Students were very weak in entering behavior. They lacked even the knowledge of primary level. Some of the students were unable to understand basic concepts of mathematics i.e. addition, subtractions, multiplication, and division. Only a few students were able to remind what they had to learn in earlier grades. Thus, conduction the teaching-learning activities smoothly were very difficult. There were very heterogeneity among the entering behavior among the students and it was similar to girl students. Further, lack of entering behavior hampered the time of regular contents. Therefore, I had to revise pre-knowledge contents.*

In the same context, I also interviewed grade ten mathematics teacher. He reported

*Grade ten students were so weak in entering behavior. They were not only lacked even the knowledge of primary level, some of them were unable to solve simple problems that was based on addition, subtractions, multiplication, and division. A few students had good entering behavior. They were also doing well in the class works as well as in the exam. However, most of them were able to remind what they had to*

*learn in earlier grades. Even they were unable to remind the concepts after revising teaching-learning activities on these contents. Thus, it was difficult for me to finish the contents on time. Girls were less competent than boys in grade ten. I observed their achievements for earlier grades and found that all were passed having very low grades. Even a few were passed in all earlier grades even if they failed in mathematics.*

I interviewed the head teacher on this content and he replied

*Among all subjects, in our school from basic level to secondary, students had lowest marks (now grades) in mathematics even if we run extra classes for four months in the last three years. I did regular discussion with mathematics teacher on the problem and we came to conclusion that students were taught basic earlier contents before conduction current regular contents to improve the achievement level of students. It was more needed for girl students because they were more behind in entering learning behavior in comparison of boys.*

From the above presented opinions of the students, teachers, and head teacher revealed that students lacked entering behavior. Therefore, the marks or grades of the students were in bottom range. Students were not capable to understand the current contents. They felt anxiety due to lacks in entering behavior.Hence, students must have gained complete entering behavior to avoid mathematical anxiety.

**Teacher's Competency**

The main factors for creating the suitable environment inside classroom were teachers. The level of anxiety among students could be minimized based on teachers' attitude, behavior, and plan to solve problems. Teachers' capacities in using modern techniques and technology in the classroom were also taken as competencies. If the teachers express negative feelings among students, then it would increase the anxiety level in the students.

I took interview of grade ten mathematics teacher asking the question, "What modern techniques and equipment did you apply to increase students' participation in mathematics teaching learning activities? He replied

*I used traditional equipment such as textbook, curriculum, textual, question bank, cardboards, pintable, white board, marker pen, ruler, protector etc. I did not use any other materials in the classroom yet. I heard smart board was used in teaching mathematics. It was available in my school. Further, I did not have skill to take class on smart board instead of white board. Sometimes, I used charts. It was difficult to do teaching learning activities due to lack of basic knowledge to prepare teaching materials for most of the contents. He further added he had given more time and strength in teaching learning activities, even though better the results were not realized yet.*

I asked same question to grade nine teacher. He answered

*I used traditional usual teaching materials. I did not have knowledge to use computer based teaching-learning techniques including smart board. Further, school had no sufficient teaching learning materials according to number of students. He added that he was doing his best from the available resources.*

I took interview of head teacher asking the question, "What were the modern technologies applied or managed in mathematics classrooms in your school? He replied

*Now, I was along with school management committee were thinking about how to fulfill safe and sufficient classrooms in the new building. We would than manage modern equipment that were used in in the classrooms. I think that building construction was more essential before equipping modern educational techniques in the classroom. As I had already informed that after the earthquake of April 2015, we were only focused how to build safe and comfortable classrooms along with library, science lab etc.*

Similarly, I interviewed one of the student asking him a sequence of questions, "What did your teacher use in mathematics? Did he show loving behavior with when he took class? Did you askfor help for unsolved questions? Did you have interaction with the teacher?" The replies of the student were

*Teachers had not devoted their attention to search the techniques to promote students' self-confidence. Sometimes teacher showed angry look when I asked the*

*same question twice.Teacher never solved the complete problems of the textbook, textual and question bank. Rather he said to do the questions as I did the example in the white board. These questions had the similar technique of solution as I did in the white board. They had just started the problem and left the class. No discussions were conducted from teacher. Student could not be motivated for effective learning due to passiveness of the teacher. Due to the absence of comprehensive teaching-learning activities, the main themes of problems could not be mentioned clearly. I did not learn effectively because of the negligence student to study, teacher's negligence towards effective selection of teaching methods and materials, poor management of classrooms in terms of facilities, unfavorable mathematical environment in class. My teacher always used same materials in the classroom. Teachers did not have time to help us individually.*

In this context, when I observed the class, I found

*Mathematics teacher used usual teaching materials. He had little interaction with students. Students did not ask questions within the whole period. Teacher provided classwork saying just did the exercise questions. Further, teacher did checked the classwork. There was lack of group discussion in the classroom. The teacher neither showed highly energetic nor dull behavior to the students. The teacher provides homework to the students saying did the all questions given in the exercise. He finished his class saying that he would check classwork and homework in the next class. There was no two-way communication in the classroom and some of the students of the last two benches were murmuring with their chats in small voice. Nevertheless, classroom environment was dull and teacher had not control over teaching learning environment.*

Finally, I put the same questions in the focus group of students. They replied

*Our teachers used white board and marker to teach. They sometimes checked our classwork. Homework was checked once a week. Those who did do classwork and homework they stood in the classroom and teacher told them to do all the classwork and homework tomorrow but he had never checked it in the next day. We sometimes asked questions that were asked in our exams. Teachers did solutions of these questions in the white board and we copied it.Teacher became angry if we asked him*

*the question, which he had already solved. So we never asked the once solved question twice to him even if we were not confident to solve it. We ever think that if we were asked the same solved question in our exams, we would be lucky ones.*

From the above information, I concluded that there was lack of competency in the mathematics teachers. There was lack of interaction, two way communication, use of modern technologies of the classroom, and lack of teacher student friendlier relationship. Thus, lacks in teacher competency induced mathematical anxiety in the girl students. Thus, to reduce mathematical anxiety on girl students, competency of mathematics teachers must be enhanced through special training programs.

**Motivation and Interest**

The motivation and self-interest of students increase the encouragement among students to learn something. Lack of motivation and interest would definitely decrease the learning tendency of students. Decreasing the learning tendency is one of the measures of incensement of anxiety level.

In this context, I took interview of the grade nine mathematics teacher, "How did you motivate your students in the classroom? Did students take interest on the motivation that you provided them? He replied

*Students had lacked motivation to studying mathematics. Some of the motivations were lack of teacher training, lack of productive activities performed by school administration to motivate students to study mathematics, lack of activities performed by community and school management committee to promote the curiosity of teachers and students played main role to promote mathematics learning. Nevertheless, students were not motivated in mathematics learning. I encouraged students in the initial classes that mathematics was not hard subject, if you practice more it is too easy. I encouraged them that if you interested in mathematics, you would have better chances to have technical education as well as you could also do better in management and other social sciences. However, students did not interested in learning activities.*

I asked one of the student, "How did the teacher inspire you to practice mathematics? While answering these questions one student responded

*I was less interested in mathematics; I never focused on mathematics classes and was not able to perform the conceptual basis. Therefore, it was always been harder for me and I was just exam oriented. The subject matters, curriculum, teachers, and their teaching methods never influenced me to work hard. Most of the teachers did not know about the technique of motivations. They lacked the knowledge of selection of effective motivation techniques. Therefore, students were not interested to study mathematics. Hence, it seemed the need of motivation skills, closeness of students and teachers, use of teaching materials and ICT. Lack of motivation and students own self-responsible to study were responsible to make student weak in mathematics. Teachers had not tried to increase the courage of students to study mathematics. It effectively decreased the mathematical concepts among students. Hence, students had not sufficient motivation to study mathematics.*

From focus group discussion, it revealed

*We were less interested in mathematics; we never focused on mathematics classes and were not able to perform the conceptual basis. Therefore, it was always been harder for us and we were just exam oriented. The subject matters, curriculum, teachers, and their teaching methods never influenced us to work hard. Most of the teachers did not know about the technique of motivations. They lacked the knowledge of selection of effective motivation techniques. Therefore, students were not interested to study mathematics. Hence, it seemed the need of motivation skills, closeness of students and teachers, use of teaching materials and ICT. Lack of motivation and students own self-responsible to study were responsible to make student weak in mathematics. They said that teachers had not tried to increase the courage of students to study mathematics.*

From the above discussion, I concluded that teachers did not motivated the students well. The students were less interested to learn mathematics. Therefore, students had lost their self-efficacy and consequently the anxiety in mathematics was inflated. Hence, there was need of motivation and interest to reduce mathematical anxiety among the girl students.

**Peer Groups Learning**

In most of the classrooms, weaker students make groups with other weaker students and talents make with talents. This situation would create a learning imbalance inside classroom since there would be less intimacy with weaker and talent students. This would increase the anxiety level among weaker students.

In this context, I took interview of grade ten mathematics teacher,"Did your students learn from each other? He replied

*Many students who were weak in the study were interested to sit with weak students and it was difficult to create the learning environment. They copied the guide and talent's note copy for doing homework but did not devote time for thinking seriously. Talent students did not help to their competitor thinking that they would lose their position. Nevertheless, weak students copied the classwork and homework that they had to do. Weak students preferred coping of other students rather than practicing it.*

I asked the same question to the focus group discussion. The reply came as

*Most of usmade a group. We chose corner in the classroom or any suitable place to sit and copied the classwork and homework. The talent students and weak students haddifferent groups. we copied the guides and talented students note for homework but did not devote time for thinking seriously. Ultimately, we avoided the study and we did not know the application and utility within and outside national and international perspectives.*

From the above discussion, it was found that teamwork spirit among the school family was not balanced. When the peer groups were not intelligent and had no interest on mathematics, it directly affected on other. Rather, there was lack of peer group work that helps students to each other in learning mathematics. Hence, there was mathematical anxiety among the girl students and was downsized by creating peer group learning environment.

## Chapter V
## Findings, Conclusions and Implications

This chapter dealt with the findings, conclusions, and implications of the study. Findings, conclusions, and implications were presented based on the results in the analysis and interpretation chapter.

### Findings

The main causes of mathematical anxiety among secondary girl students and their respective remedial measures were:

- The weak physical environment of the school intensified mathematical anxiety among the girl students. Better and sufficient physical facilities should be equally provided to the students to reduce mathematical anxiety among the girl students.
- Student's family environment measured in income and educational level and housework burden intensified mathematical anxiety among the girl students. To reduce the anxiety in this situation, socio-economic status of student's family should be uplifted.
- Ineffective methods and materials used by teachers for teaching learning in the mathematics classroom were unable to entertain with the mathematics contents and it enhanced mathematical anxiety among the girl students. Thus, for the remedy, student centered teaching methods should be used with effective teaching materials.
- The course contents were lengthy and tough for the students. Thus, it intensified anxiety on girl students. To avoid the anxiety in this situation, students must receive complete knowledge and skill at each grade
- Students lacked entering behavior.They felt anxiety due to lacks in entering behavior. Hence, students must have gained complete entering behavior to avoid mathematical anxiety.
- There was lack of competency in the mathematics teachers. Thus, to reduce mathematical anxiety on girl students, competency of mathematics teachers must be enhanced through special training programs.

- Teachers did not motivated the students well which lost their self-efficacy and consequently inflated mathematics anxiety. Hence, there was need of motivation and interest to reduce mathematical anxiety among the girl students.
- There was lack of peer group work that would help students to each other in learning mathematics. Hence, it induced mathematical anxiety among the girl students and it was downsized by creating peer group learning environment in the school.

**Conclusions**

Based on the aforementioned discussion and the finding of the study, the following conclusions were drawn:

The classroom were not managed well. Rather, they were dirty and crowd. Students sitting were not scientific. Toilets were not hygienic. Students felt uncomfortable in the classrooms. The weak physical environment of the school intensified mathematical anxiety among the girl students. Better and sufficient physical facilities should be equally provided to the students to reduce mathematical anxiety among the girl students.

Student's family environment was weak in term of income status, education level, and unable to help in mathematics, and lack of time due to house labor burden. Lack of help to their children in doing mathematics practice from parents due illiteracy or mathematical illiteracy, lack of mathematical instruments to the students due to low-income levels and housework burden intensified mathematical anxiety among the girl students. To reduce the anxiety in this situation, socio-economic status of student's family should be uplifted.

Methods and materials used by teachers for teaching learning in the mathematics classroom were highly ineffective to encourage students. Therefore, students could not entertain with the mathematics contents and it enhanced mathematical anxiety among the girl students. Thus, for the remedy, student centered teaching methods should be used with effective teaching materials.

The course contents were lengthy for the students to learn and teachers to teach. Students were slow in learning behavior due to lack of entering behavior. Thus, course contents intensified anxiety on girl students. To avoid the anxiety in this situation, students must be taught in such a way that they could get complete knowledge in same grade before to climb the upper grade. Course books and exercises should include games or other easy way problem solving exercises so that students learn mathematics by playing with it.

Students lacked entering behavior. Therefore, the marks or grades of the students were in bottom range. Students were not capable to understand the current contents. They felt anxiety due to lacks in entering behavior. Hence, students must have gained complete entering behavior to avoid mathematical anxiety.

There was lack of competency in the mathematics teachers. There was lack of interaction, two way communication, use of modern technologies of the classroom, and lack of teacher student friendlier relationship. Thus, lacks in teacher competency induced mathematical anxiety in the girl students. Thus, to reduce mathematical anxiety on girl students, competency of mathematics teachers must be enhanced through special training programs.

Teachers did not motivated the students well. The students were less interested to learn mathematics. Therefore, students had lost their self-efficacy and consequently the anxiety in mathematics was inflated. Hence, there was need of motivation and interest to reduce mathematical anxiety among the girl students.

Teamwork spirit among the school family was not balanced. The peer groups were not intelligent and had no interest on mathematics. Therefore, it directly affected others. There was lack of peer group work that would help students to each other in learning mathematics. Hence, there was mathematical anxiety among the girl students and was downsized by creating peer group learning environment in the school.

**Implications**

Every research has implications for different sectors. Teachers, policy makers, and in theory building could implement this study's results. This research is related to mathematical anxiety among the secondary level girl students. Therefore, it is helpful

for mathematics teachers, students, textbook writers, curriculum planners to develop their professional field. Major implications are:

- It is helpful to every teacher to understand causes of mathematical anxiety and apply it to inside the classroom.
- To develop the curriculum that would not create mathematical anxiety among the students.
- This research directly contributes to classroom practices and school leadership. This study created an opportunity for these students to talk about their mathematics difficulties. Students told someone who cared about their anxiety and their coping in mathematics.
- Mathematics classrooms could incorporate activities that involve students in the learning such as hands-on learning activities, computer programs, working mathematics problems on the board alongside peers or at their desks with personal white boards.
- Teachers can act more as a facilitator to learning, rather than with direct instruction, so students are guided through the concepts they need to learn.
- To know the causes of mathematical anxiety, teachers should apply remedial measures to handle them.
- Different training programs should be conducted that increase the competency of mathematics teachers to fight against mathematical anxiety.
- Teachers should develop and use proper useful teaching materials that encourage mathematics students.
- Effective interaction, two-way communication between teachers and students should be conducted.
- Parents of students should be motivated toward effective learning behavior of their children.
- Physical environment of the school should be improved taking support of community.
- Students entering behavior should be improved by planning special classes for those students lack such behavior at their lower grades.
- Modern techniques and technology should be linked to the classroom.

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**APPENDIX I**

**InterviewGuidelines for Students**

- Does your classroom have suitable lighting and windows?
- Is your classroom crowd?
- Is your classroom neat and tidy?
- Is seat management of your classroom well?
- Is there sufficient furniture?
- Do you think the position of white board is correct?
- Do your classroom is noisy while your mathematics teacher is teaching?
- Do your sitting position is worse than the boys?
- Do you have sufficient toilet and sanitation facility in your school?
- Do you have extra helping books facility in the library at your school?
- Does your mathematics teacher enterer in the classroom make you afraid?
- Are your parents or family members literate?
- Do your family members encourage you to have better grade in mathematics?
- Do your family members irritate when they know that your mathematics grade is poor?
- Do your family members help in doing mathematics homework?
- Do you have to help in different tasks (cooking and dish cleaning etc.) that reduce your time to learn mathematics?
- Do your family members provide you sufficient reading, writing, and other instruments of mathematics?
- Do your parents pay money for extra class in mathematics?
- Does your teacher give assignment regularity?
- Does your teacher check your assignment regularly?
- Do you feel that your teacher's behavior toward you is different from others?
- Does your teacher discriminate you?
- Does your teacher ask you questions frequently?
- Does your teacher motivate you practicing mathematics problems?
- Does your teacher describe the problems individually?
- Do you feel difficulty in language used by your teacher?

- Does your teacher teach you according to your mother tone, or do you have language problem when learning mathematics?
- Do you feel the contents of mathematics are lengthy, tough, and boring?
- Do you feel the contents of mathematics boring forever from lower grades to till now?
- Do you think the exercises of mathematics cannot be handled from the examples given in the book?
- Do you solve all the mathematics problems in all grades that you passed?
- Do you know all the contents of mathematics of lower grades that you have passed?
- Do you feel tension when your teacher informs you it was already taught at lower grades?
- Do you get help from classmates and upper grade friends to learn mathematics?

## APPENDIX II

### Interview Guidelines for Teachers

- Is your mathematics classroom neat and clean?
- Is there planning of seats equal managed for the both girls and boys?
- Is your classroom noisy while running class?
- Are the students friendlier with you?
- Does your students greet while you enter the class?
- Do the students bring all necessary lack reading, writing, and mathematical instruments in the classroom?
- Do the students follow your instructions in class?
- Do the students feel difficult to understand mathematical concepts?
- Do you use essential teaching materials while teaching?
- It is easy to address to handle those students that have lower mathematical achievements?
- Do you regularly provide class work and homework? How do you care them?
- Do you give extra time to those students who had less achievement in the test exam?
- What strategy do you adopt to those students that did not do their class work and home work?
- Do you recommend any other helping learning material that helps students better?
- Do you think the contents of mathematics were very difficult for students according to their age?
- Were the course contents and exercises lengthy to finish according to curriculum calendar?
- Do students have pre-knowledge on the contents that they are learning now?
- Do the students show anonymity on the subject matters that they must have to gain in passed grades?
- Is it easy to address the problem of weak students in the class?
- How do you encourage students in learning mathematics?
- What modern techniques do you adopt for below average students?
- Is it easy to link mathematics with daily life problems?

- Do your motivation techniques encourage students of less achievements?
- Are the students less afraid when learning is conducted with the interest of students?
- Do your students learn from each other?

**APPENDIX III**

**Interview Guidelines for Focus Group Discussion**

- Does your classroom have suitable lighting and windows?
- Is your classroom crowd?
- Is your classroom neat and tidy?
- Is seat management of your classroom well?
- Is there sufficient furniture?
- Do you think the position of white board is correct?
- Do your classroom is noisy while your mathematics teacher is teaching?
- Do your sitting position is worse than the boys?
- Do you have sufficient toilet and sanitation facility in your school?
- Do you have extra helping books facility in the library at your school?
- How does your teacher inspire you to practice mathematics?
- Do you involve in classroom participation and discussion?
- Do your teacher use different kinds of teaching materials ?
- Can you do better if you are taught pre-knowledge before learning new concepts?
- Do you think taking extra class would feel you better in mathematics learning?
- Does your teacher encourage you before doing teaching learning activities?
- Do you feel easy to learn from your friends/

## APPENDIX IV

### Interview Guidelines for Head Teacher

- Do the classrooms, desks and benches, and library books for grade nine and ten are suffice according to number of students?
- Does your school have suffice toilet and sanitation facility according to number of students?
- Do you manage all the mathematics teaching and learning materials as suggested by mathematics teacher?
- Does your management discuss and manage extra classes for those students that have lower grades in mathematics?
- Do you encourage mathematics teachers in using modern technologies in mathematics classrooms?
- Do you encourage students to do more class work, homework and take extra classes?
- Do you encourage your mathematics teachers to do action research on mathematical problems faced by students?

**APPENDIX V**

**Classroom Observation Form**

Name of the Observer: ……. Date of Observation: ……Time:……Name of Observed School:……

Class: …….. Period: …….

| **Items** | **Information** |
|---|---|
| Classroom size | |
| Seat planning | |
| Cleanliness | |
| Blackboard position | |
| Toilet facility and sanitation | |
| Teaching materials | |
| Presentation skill | |
| Class environment | |
| Student's participation | |
| Teacher student communication | |
| Student teacher communication | |
| Teacher's behavior with students | |
| Peer group activities | |
| Library facility | |
| Learning materials used by students | |
| Teacher's individual help to students | |
| Time managing by teachers | |
| Student's number | |
| Classroom discussing | |
| Language and voice of teachers | |
| Students participation in classroom activities | |