

**MATHEMATICS ANXIETY: CAUSES AND WAYS OF MINIMIZATION
AT BASIC LEVEL STUDENTS**

**A
Thesis
BY
Hem Raj Bhatta**

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LETTER OF CERTIFICATE

This is to certify that Mr. Hem Raj Bhatta a Student of academic year 2065/066 with exam Roll No 283305, Campus Roll No. 2174, T.U. Reg. No 9-2-29-1018-2005 and Thesis No 1138 has Completed his thesis under my supervision, during the period prescribed by the rules and regulation of Tribhuvan University, Nepal. The Thesis entitled " Mathematics Anxiety: Causes and Ways of Minimization at Basic Level Students" embodies the result of his investigation conducting the period of five months at the Department of Mathematics Education, University Campus, Kirtipur Kathmandu. I hereby, recommend and forward that his thesis be submitted for the evaluation as partial requirement to award the Degree of Master of Education.

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LETTER OF APPROVAL

A

Thesis

By

HEM RAJ BHATTA

Entitled

"MATHEMATICS ANXIETY: CAUSES AND WAYS OF MINIMIZATION

AT BASIC LEVEL STUDENTS" has been approved in partial fulfillment of
requirements for the Degree of Master of Education.

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ABSTRACT

The major focus of this study was mathematics anxiety: Causes and Ways of Minimization of Basic Level Students. This study has addressed the questions; why mathematics anxieties occur? How do we minimize mathematics anxieties in Basic level Students? To answer these research questions, I selected the qualitative design with case study approach. The study site is Janasewa Higher Secondary School Kirtipur, Kathmandu District. Classroom observation, semi structural interview and focus group discussion were the main tools of this study. I went to the study site and observed classes, taken interview with students and teachers. Finally, focus group discussion was conducted for grade VIII students.

I analyzed the information by using different theories to produce the information and draw conclusion on the study. From the analysis of the data it was found that classroom fearful environment, traditional teaching methods, ineffective school environment, low socio- economic status of the child, lack of foundation of teacher, teaching memorizing without contextualizing, lack of responsibility, accountability and transparency of stakeholders, lack of supervision of governmental agencies, school supervisor and School Management Committee were main causes of mathematics anxiety.

And further it was opined that the remedial ways to minimize mathematics anxiety of basic level students were: making teaching learning activities more interesting, teaching mathematics through understanding the mathematical concept, improving school and home environment of the child, teachers help to the students to understand the mathematics concept rather than memorizing, making our mathematics education culturally relevant and contextualized.

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Chapter I

INTRODUCTION

Background of the Study

Mathematics anxiety is a feeling of intense frustration or helplessness about one's ability to do mathematics. In other words, students are feeling tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations (Richardson & Suinn, 1972).

Mathematics pervades daily life and is critical for individual and societal development. However, mathematics is also an area that rises about students' numeracy and achievement, internationally and in Nepal.

However, learning mathematics requires an environment that is supportive, collaborative and promotes creative and critical thinking. It requires a teacher who is well-qualified to teach mathematics—one who is conversant with the mathematical content; is skilled at using a variety of effective pedagogical strategies and who possesses a disposition towards teaching mathematics and inspires, motivates and encourages their students to learn mathematics.

Additionally, the nature of education in Nepal is competitive and examination oriented. This drives an over-emphasis on students acquiring procedural understanding over conceptual understanding of mathematical concepts.

Informal conversation between this researcher and students as well as teachers of Basic school level sparked an interest in this area of study. When they shared their

feelings about mathematics responses included "Mathematics is hard", " I get a headache when I think about mathematics", " Mathematics is only for bright people", "I don't have a math mind", " and Nobody in my family is good in Mathematics".

Research indicates that mathematics anxiety develops in a child mainly at the elementary school level. It is important that mathematics anxiety is identified in a child as possible and that mathematics teacher know how to become aware of mathematics anxiety amongst their pupils and how to deal with it in the classroom. Many causes of teachers' influence on the development of mathematics anxiety for example: a) lack of content knowledge of teacher. b) Attitude of classroom teachers towards mathematics. c) The teaching methods and mathematics anxiety in teacher.

Students who suffer from mathematical anxiety feel that they are incapable of doing activities that involve mathematics. It is actually an emotional rather than intellectual problem which causes detrimental effect on a learner. It is debatable whether mathematics anxiety is acquired, created or caused by other factors. But whatever the causes might be, this problem interferes with a person's ability to learn mathematics, and results in an intellectual problem. It can cause one to forget and lose one's self-confidence. Hence, it is a problem to be dealt with sensitivity and tactfully to stimulate a learner in study.

Generally, the students of different ethnicity, diverse gender, varied previous schooling etc. may exist in the classroom and appropriate measures to such problems play vital role in harmonizing all diversities and facilitate learning process. Failure in creating apt learning atmosphere and proper stimulation may invite hindrance to effective mathematics learning.

Old Chinese Proverbs

"Tell me mathematics and I forget, show me mathematics and I may remember, involve me and I will understand mathematics.

If I understand mathematics, I will be less likely to have math anxiety. And if I became a teacher of mathematics, I can begin a cycle that will produce less much anxious students for the generations to come."

Mathematics Anxiety can be develop in a class as follows:

-) Negative experience in classroom
-) Teaching methodology
-) Pressure of assessment
-) Math anxiety in teacher.

Mathematics anxiety is probably caused by a combination of factors:

- a) Negative comments from either educators or parents. For example: "You will never amount to anything if you can't add!", or "you must be stupid if you can't subtract!", or "fractions are simple, only an idiot will have difficulty with it!", or "you are like your mother, she was no good at mathematics!"
- b) Mathematics is like a pyramid. Without a solid base, there will not be a pyramid. One of the reasons that pupils generally encounter difficulty in mathematics is that they are not taught the basic principles well in primary and junior high school. Since mathematics constantly builds upon itself, prior knowledge is essential. Frequent absenteeism, or a transfer to a new school, could lead to a misunderstanding of mathematics.

c) In English, history or geography, one can write "around an answer". Not so in mathematics, where a single error produces an incorrect solution.

Some misconceptions that people may harbor about mathematics can cause mathematics anxiety such as: Some people have a mathematics mind and some don't; there is a best way to do a mathematics problem, Mathematicians do problems quickly in their heads, Mathematics is not creative, there is a magic key to doing mathematics, it's bad to count on your fingers. Teachers can therefore create anxiety by placing too much emphasis on memorizing formulae, learning mathematics through drill and practice, applying rote-memorized rules, and setting out work in the 'traditional' way. Mathematics anxiety may therefore be a function of teaching methodologies used to convey basic mathematical skills which involve the mechanical, 'explain-practice-memorize' teaching paradigm, which emphasizes memorization rather than understanding and reasoning.

The four most common symptoms of math anxiety can be listed as below:

-) **Panic:** The feeling of helplessness towards a math problem causes panic in the student.
-) **Paranoia:** Feeling that everyone knows the answer except me.
-) **Passive Behavior:** The student or adult decides they will never understand or comfortable with math, so they actively decide they will do nothing about their problem.
-) **Lack of Confidence:** The student or adult anticipate the feeling of helplessness and expect to never know the answer to the problem. They also second guess their math work. They rely on other people in

their life to help them complete math functions such as balancing their checkbook.

There are numerous causes that develop students' math anxiety. More specifically, rote-memorized rules and the manipulation of symbols with little or no meaning are harder to learn than an integrated conceptual structure, and this can result in effective stumbling block for the child. Greenwood (1984) stated that the principle cause of mathematics anxiety has been in teaching methodologies. He said that math classes did not encourage reasoning and understanding. Teachers can create anxiety by placing too much emphasis on memorizing formulae, learning mathematics through drill and practice, applying rote-memorized rules, and setting out work in the 'traditional' way (Greenwood, 1984).

The National Council of Teachers of Mathematics (NCTM) (1989, 1995 b) suggestions for teachers seeking to prevent math anxiety include: Accommodating for different learning styles Creating a variety of testing environments Designing positive experiences in math classes Refraining from tying self-esteem to success with math Emphasizing that everyone makes mistakes in mathematics Making math relevant Letting students have some input into their own evaluations Allowing for different social approaches to learning mathematics

If students have feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems, the teacher needs to understand that the student has math anxiety. The main cause of math anxiety is losing one's self-confidence (Tobias, S., 1993). Math anxiety is an emotional reaction which is based on an unpleasant past and negative mathematics experience which harms future learning. Math anxiety affects students' intellectual factors such as

learning styles, persistence, self-doubt, and dyslexia (Trujillo and Hadfield, 1999). Students can develop math anxiety by the causes of teacher anxiety, societal, educational or environmental factors, and innate characteristics of mathematics, failure and the influence of early-school experiences of mathematics. In order to reduce mathematics anxiety and increase achievement, Miller and Mitchell (1994) suggested that teacher should create a positive learning environment, free from tension and possible causes of embarrassment or humiliation.

To arise the anxiety in mathematics to the students there are many causes. Why Basic level students are not motivated in learning mathematics? What are the causes of anxiety of mathematics? How can we minimize the anxiety of mathematics learning? Question like this occur to my mind and hence I was motivated to carry out research on the topic Mathematics Anxiety: Causes and Ways of minimization at Basic level students.

Statement of the problem

In our context, mathematics takes a central role in school level education. Though it is a major subject, it is linked with new issues and problem, that problem may be attitude related and may be related the methods. Among them, mathematics anxiety is one of the major problems which are prevalent among the school population. Almost all educational surveys of school education in Nepal indicate the low achievement in Mathematics.

CERID (1985) reported that grade 'V' student mathematics scores were less than 45%.

) BPEP (1997 & 1998) found that grade IV and V students' achievement score in mathematics were 28% and 26.5% respectively.

-) CERID (1991) reveal that grade '8' students' achievement in mathematics was 28.87%.
-) NASA Report (2013) found that the students' achievement of three subjects: Math, Social study and Nepali were less than 50%. Among them the achievement of mathematics is least of all.
-) Besides NASA (2013) founded that the main causes of low achievement in mathematics were parents' education, parents' occupation and their socio-economic status and mathematics anxiety.

From the above data I concluded that one cause of low achievement in mathematics is mathematics anxiety. For good achievement in upper classes it is necessary to find out the causes of mathematics anxiety and remedial ways in basic level students.

In my 3 years teaching experience of mathematics, most of the students leave mathematics class or they do not like to do their homework. Most of the students fear about mathematics which has developed as a form of mathematics anxiety. Without removing such anxieties about mathematics, it will be difficult to teach mathematics meaningful and better result can't be achieved.

In the context of Nepal very few researches has carried out in this area. The cultures, context of Nepalese students are different as the country. Therefore, there is an urgent need to explore to minimize the mathematics anxiety of the students. So, it is essential to know the causes of mathematics anxiety and how can we minimize the mathematics anxiety? Hence the above mentioned problems and research gaps encourage me to conduct this study.

Objectives of the Study

-) To find the causes of mathematical anxiety in basic level students.
-) To suggest remedial way to minimize the mathematical anxiety.

Research Questions

-) Why do mathematics anxieties occur?
-) How do we minimize mathematics anxieties in basic level students?

Significance of the Study

This study is concerned with the anxiety of mathematics of the students as Basic level students. At first, its findings will be useful to mathematics at classroom while teaching mathematics. Teachers want to know that their efforts result in positive outcomes for students. Data and information gained through this study will guide the researcher and others to teach mathematically anxious students more effectively.

The study will also provide information on what processes or teaching strategies may work best for students and specifically, any classroom activities that increase or decrease their anxiety as related to learning mathematics. Then activities that may help the student learn could be incorporated into lesson plans and procedures.

This study is a new venture in the field of mathematics education related to anxiety. So it also helpful for policy maker, text book writer, curriculum planner teacher.

Delimitation of the Study

The purpose of this study is to fulfill the academic degree of masters, mathematics education. The discussion of mathematics anxiety of different level students is very broad. It is impossible to analyze the mathematics anxiety of all level students. The study has following other delimitation also:

-) This study is based on Basic level students.
-) This study is based on only one school of Kathmandu valley.
-) This study is limited on qualitative research design.

Operational Definition of the Related Terms

The words related to the study are defined so that no confusion will derive during the study of the user and will provide the clear concept to the related person.

The operational definitions of the terms used in this study are the following:

Anxiety: Distress or uneasiness of mind caused by fear of danger or misfortune.

Mathematical Anxiety: Math anxiety is a phenomenon that is often considered, when examining students' problems in mathematics.

Basic Level: The school level started from class one to eight according to education act, 1971.

Ways: Methods to minimize mathematics anxiety.

Causes: Symptoms occurs in the mathematics anxiety.

Minimization: To decrease the mathematics anxiety.

Chapter II

REVIEW OF RELATED LITERATURES

The literature review helps to avoid the duplication of the work and to synthesis the previous work (Acharya, 2011). The basic purpose behind the literature review is to identify the gaps of the research, develop the conceptual and theoretical framework. A careful and systematic review of the relevant literature and studies is both essential and helpful for a thorough understanding of the subject of one's study. According to Creswell (2007) literature review is the study of higher ongoing dialogue about a topic, filling gaps and extending prior studies. To this end, a researcher must have knowledge of already established theories and researches related to the problem chosen by him or her. Review of literature is an exacting task, calling for a deep insight and clear perspective of the overall field (Wagley, 1995, P.17). So, the review is inevitable in any investigation.

Literature review helps in undertaking new research problems in a way to provide continuity with the past research by avoiding unnecessary duplications. Such a review is likely to enable the researcher to view the study in hand against the background of previous research. The knowledge acquired from earlier research helps in locating sources, for example, selecting procedures and methods, delineation of the problem, interpretation of data and selection of literature. Finally acquaintance with the concerned discipline and their trends helps to update the researcher's knowledge as well. Keeping in view of such importance of literature review, an effort is made here to present some significant views, studies and practices which help in improving its relevance. Cooper (1998) suggested that literature review relates to a study to the

larger ongoing dialogue in the literature about a topic, filling gaps and extending prior studies.

Empirical Review

Empirical review deals with the review of the books, thesis, journals, and Internet and so on. I have reviewed related to the anxiety in mathematics in Nepal and worldwide. So I have reviewed some research related to my study in this chapter.

Shamoon (2014) research on the topic “Understanding the Role of Mathematical Anxiety, Disaffect and Emotion in Learning and Teaching the Subject of Mathematics”. He concluded that, within this field of research, the main approach towards the notion of disaffect has, until recently, focused on measuring individuals’ attitudes, particularly mathematical anxiety. In light of how affect has been viewed as a measurable variable and further distinguished as either cold and stable or hot and dynamic, a deeper understanding about the nature of negative feelings is necessary. In this research, he used qualitative research design with narrative study. So he found that, anxiety towards mathematics have been identified in many parts of the student teachers’ shared experiences and feelings, both in relation to the tendencies of the initiating survey, but also in the narratives from the individual interviews. However, anxiety was only one of the many different feelings expressed where fear, hatred and worry as well as enjoyment and excitement were also identified, sometimes in the same narrative.

Mc Cloy (2010) conduct a research on the topic “Mathematical Anxiety and the college Student”. The main objective was “to find a relationship between math-anxiety and choice of college major”, and Gender as well as the prevalence, severity of math anxiety in college students and the relationship of math anxiety and the need to be enrolled in a remedial math course. He used quantitative research design with

Survey method. Correlation statistical tool used to data analysis and determined the result of this study. He analyzed that, there are no relationships between mathematics anxiety and choice of major in college, the need to be enrolled in a remedial math course or average math grades.

Smith (2004) conduct a research on the topic “Math Anxiety: Causes, Effects, and Preventative Measures.” He thought that, the main cause of math anxiety is the teacher himself, if the teacher has a bad attitude about mathematics his students most likely as well. On his research, he found symptoms of math anxieties, causes and remedial way to overcome it. The research clarifies that teachers need to be aware of the impact that they have on their students' attitudes in mathematics. There needs to be more literature to aid teachers in helping their students overcome math anxiety. Also, it would be useful for teachers to know more about how math anxiety first appears in a child and how it grows into a larger problem.

Reshmi (2011) study of Mathematics Anxiety Amongst Primary Pre-service Teachers enrolled in a Dutch Teacher Training Program. The main purpose of this research was: to investigate if there were any indications of mathematics anxiety in Dutch pre-service teachers enrolled in the study year 2010-2011 in the teacher training program at the PABO of the Hogeschool van Amsterdam; if so,

-) To find out if there was a relationship between the students' mathematics anxiety level and their performance in the mandatory mathematical skills test called WISCAT-pabo; and
-) To explore if they were able to overcome their anxiety and to perform better in a skills test through training sessions and tutoring by peers.

In addition to the mesasurement of mathematics anxiety of first-year students and the exploration of the effectiveness of the given support to overcome this anxiety

and/or pass the mathematical skills test, he also explored the pedagogical content knowledge of prospective teachers who were further in their teacher-training program regarding the subject of mathematics anxiety. Through workshops with third-year students, he investigated what they knew about mathematical anxiety, whether they recognized it in their pupils and what they thought one could do about it.

Terror (2012) studied on “Mathematics Anxiety in Ninth-Grade Pre-Algebra”. His purpose was to describe their mathematics anxiety and how they cope with their anxiety. His thought was qualitative approach gave students the opportunity to explain their ideas and talk about their experience in the interview. So he used qualitative action research design,. After then he summarized the student’s background, self-image, and mathematics difficulties describe the context for the students’ anxiety. While they have encountered some success in mathematics, the students’ descriptions of support from family and student friends, along with teacher support, explain how students cope with the anxiety.

Theoretical Review

The theoretical framework guides and integrates the research study. It is the platform of research program. It helps to the researcher, how investigate in the area. Our concern of the study is “Mathematics Anxiety: Causes and Ways of minimization at basic level students” depends on the theory of causes of anxieties. Literatures that have studied the impacts of mathematics anxiety on a individuals throughout elementary school. Through this examination, one will be able to get a general idea of how and where mathematics anxiety affects not only students but teachers as well. Gender, working memory, teaching techniques, Scholastic Aptitude Test scores, physiological stress ors, learning strategies, test anxiety, math efficacy and math confidence are just a few of the topics examined to support the hypothesis of the

researcher. The most interesting findings from these literatures are summarized in the closest relation to the current research on mathematics anxiety and basic level students.

Furner and Duffy (2002) state that mathematics anxiety can be influenced by any of the following factors: the school system, gender, socioeconomic status, and parental history and prejudices. Negative or positive perceptions of mathematics from parents and teachers are likely to give learners some messages (Sahin, 2008). Parents and teachers might emphasize how difficult mathematics is and, at the same time, tell how mathematical skills are essential for learners' future achievements (Thomas & Furner, 1997). Vann (1993) observed that mathematics anxiety in the mother was significantly predictive of that in children. This implies that mathematics anxiety could be a learned behavior.

Bourdieu's (1992, as cited in Brown & Duku, 2008) notion of social practice focuses attention on habituated activities of ordinary living that people acquire through socialization. Habits is created through social rather than an individual process leading to patterns that are enduring and transferable from one context to another, but which also shifts in relation to specific contexts over time.

John Holt Theory of Fear

About the impact of fear among children Holt says: Fear of failure, punishment and disgrace, along with the anxiety of constant testing, severely reduces students' ability to perceive and remember, and, thus, drive them away from learning. Holt, with his trust children philosophy, believes, perhaps naively, that they have a strong sense of what is right and have an innate self-correcting mechanism that will help them to solve a problem. Most instruction, especially reading, Holt argues, is

self-taught anyway, so why the need for overbearing teachers and parents? Holt believes that learning can be pleasurable and that learning in the form of games can be the first step in having children embrace a lifetime of learning, (Holt, 2000).

Further he states his idea on classroom teaching as: "Holt rejects the idea that children are 'monsters of evil' who must be beaten into submission or computers whom 'we can program into geniuses.'" Neither they are the passive receptacles of knowledge that can only learn in a schoolroom. Instead, he calls upon parents and educators to "trust children" (Holt, 2000).

Teaching Techniques

Teachers and schooling is an integral ingredient of the most important developmental periods in one's life. Looking at this, it is not surprising to conclude that a teacher's inadequacy in a particular subject will ultimately have an effect on a student's current performance, future performance and sense of adequacy in that particular subject. According to Kesici and Ahmet (2009), teachers can cause math anxiety by treating students unfairly because of gender or race, by embarrassing students in front of classmates by having them volunteer in class, by lacking the necessary communication needed for math, holding unrealistic expectations, or demonstrating anger or uncaring attitudes. This lack of empathy for students in mathematics classes causes them to hold lower expectations for themselves in mathematics and to hesitate in taking mathematics classes as electives, majoring in a math related major in college, or pursuing careers that require computational skills. Teachers should also stress less about mathematics lessons and testing themselves; not only can math anxiety be caused by one's teacher, it can also be passed on through one's teacher; this is why Gresham (2007) exemplifies the importance of requiring

those majoring in pedagogy to enroll in math preparatory courses. It is also of importance that teachers try to focus on increasing student's self confidence in math. Because of this research, a question pertaining to the environment in which math was taught in is included in the current math anxiety survey.

Environmental Influences

As with the influences of teachers, environmental influences are just as important when examining the concept of math anxiety. Parents, friends, family, the media, and general perceptions of math are among the most influential. If parents are harsh in punishment for bad grades received in math; stress, anxiety and avoidance of the subject may only increase. Tocci and Engelhard state that "achievement in mathematics represents direct experiences with the attitude object, providing students with information that might affect their belief systems, feelings, and intended behaviors." By what one hears and sees in regards to math ultimately sets up future experiences in the subject. If one is constantly faced with statements such as 'math is not important in the world' or 'you are not a math person,' these statements could eventually turn into one's beliefs about their own competency in math. Not only is what one hears about mathematics important, but the seemingly social acceptance of having less than great abilities in math also plays a vital part (Chinn, 2008). If society views a lack of mathematical skills as adequate or just enough to get by, one may be simply ok' with not doing so well in the subject; this belief could account for possible findings of mathematics anxiety at the Basic level students.

Working Memory

Ashcraft and Krause (2007) based their research on working memory and its effects on math performance and math anxiety. Working memory is strongly needed

to perform well in mathematics in order to perform multiple operations and to hold numbers and answers in memory while performing multiple operations, especially when numbers become increasingly larger. Because of this effect, Ashcraft and Krause (2007) make the statement that since "larger arithmetic problems occur less frequently, and [hence] are stored in memory at lower levels of strength" that give the current researcher insight as to the ratings of more complex problems. As stated in Beilock (2008) "if the ability of working memory to maintain task focus is disrupted, performance may suffer." Because of these conclusion drawn by Ashcraft and Krause (2007) and Beilock (2008) the current researcher can make the inference that the more complex problems included in the survey will be rated as more anxiety provoking than the less complex problems presented.

Perfectionism, Self-efficacy, and Confidence

Confidence in a subject, as one can guess, can either make or break a grade. Having the trait of being a perfectionist is either something to love or loathe. In the case of math anxiety, perfectionism may get in the way of accurately solving certain math problems. Because of one's tendency to be a perfectionist, math anxiety may be elevated in timed and untimed testing conditions where one may challenge their self to move faster or do better than previous testing situations. In this case, perfectionism contributed to math anxiety by having individuals over-think the given problems. In any situation where math is given, being a perfectionist may contribute to falling grades since one is over occupied with thinking about getting the right answer, quite similar to the findings on working memory.

Learning Strategies

Learning strategies are unique to individuals and are said to play important roles when examining math anxiety. Most importantly in mathematics is the learning strategy of self regulation. This strategy can either increase success in mathematics or contribute to failure in mathematics. Those who are self regulated learners set goals and develop plans to realize their maximum potential when presented with a task. Examples of self regulation include motivation and cognition, self-determination, interest, self-worth and values. A study by Kesici and Ahmet (2009) looked at these self regulated learning strategies and found that cognitive strategies, such as rehearsal and elaboration, were of particular significance in Primary student's math anxiety. To be more specific, about "3% of the variance in math anxiety was explained by rehearsal cognitive learning strategy, while about 7% of its variance was explained by rehearsal and elaboration cognitive learning strategies" (Kesici and Ahmet, 2009). Therefore, if one is able to cognitively regulate the mathematics task at hand, their math anxiety can be significantly reduced.

Gender and Mathematics Anxiety

Given previous findings and stereotypes of gender gaps in mathematical achievement the researcher finds it necessary to review literature that has examined the relationship between these factors. As with environmental influences, women may be less encouraged or supported in their efforts at mathematics since it is seen as a "male" subject. Given this view, many women's anxieties in mathematics may be raised, thus hindering their outright performance in the subject. As early as first grade gender stereotypes surrounding the fields of science and math can be developed and are difficult to get rid of given the perpetuations of such beliefs. This leads one to view math anxiety among females as a universal anxiety. When Beilock (2008)

reminded female participants of the stereotype that "men are better at math than women," women under this condition performed more poorly on math problems than those receiving no stereotype. These women also reported "worrying more about the experimental situation and its consequences than controls did" (Beilock, 2008).

Test Anxiety

As with math anxiety, test anxiety has been measured in many studies. Of those reviewed for the current experimental research, some conflicting results have been found when taking into combination test anxiety and its relation to mathematics anxiety. According to Tsui and Mazzocco (2007) math performance was found to be less accurate during timed than untimed testing conditions. In fact, when students were not timed in taking the sample test, they took twice as long to complete it as opposed to when they were timed. By looking at these results, test anxiety may be provoked by having to finish a set of math problems in an allotted amount of time. If one is affected by math anxiety as well as test anxiety, both anxieties may combine causing a student's performance to drop significantly.

Overall, much research has been conducted on the phenomena of math anxiety, although the research seems limited in the age groups of those tested. It is important to indicate that gender has been found to have significant effects on mathematics anxiety and performance. Math anxiety has also had a tremendous effect on mathematics performance and self-confidence as well. Through self-report surveys given to school students, the current researcher hopes to uphold the previous findings about math anxiety in regards to gender and self confidence at the school level.

Filling the Gap

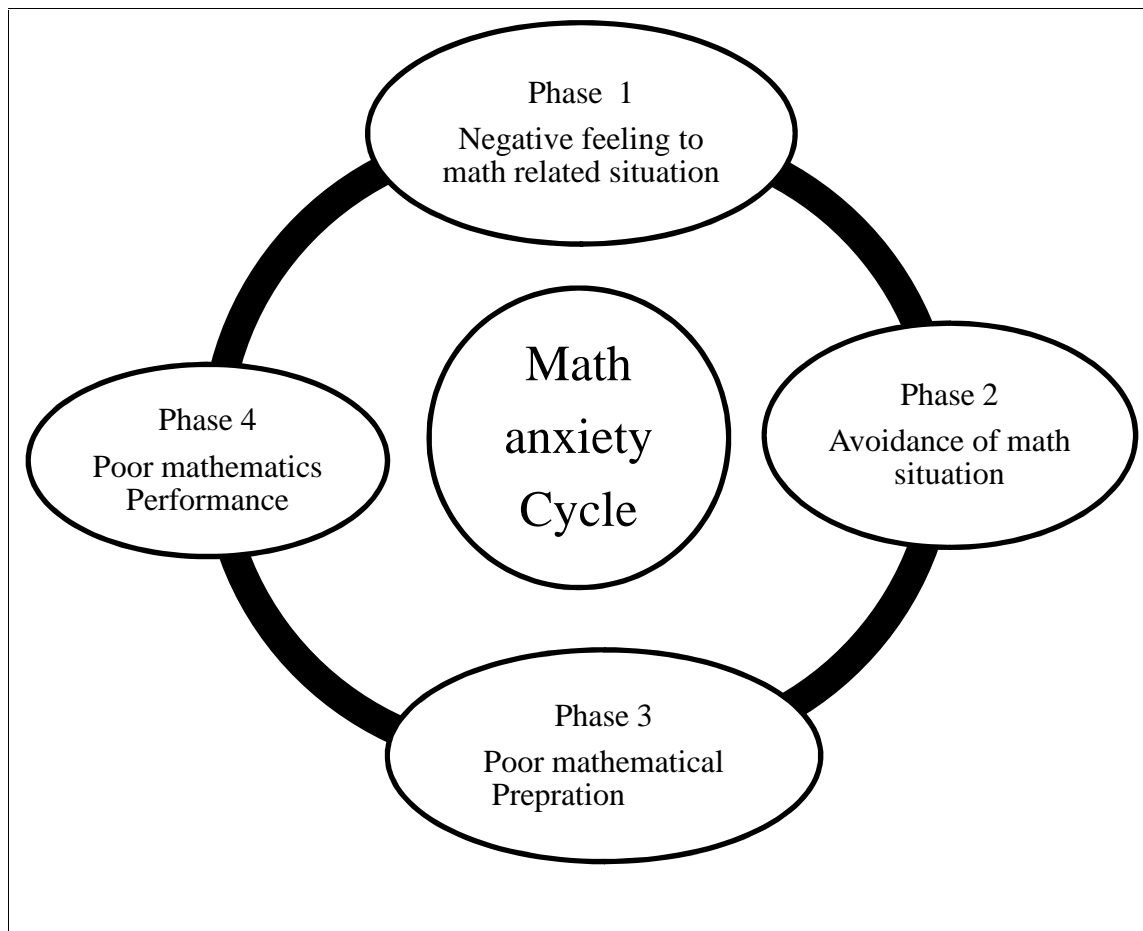
As I know that very few researches have been carried out on the mathematics anxiety in students in the qualitative paradigm. I studied many previous research works. They have not discussed in this area. I found the gap between the reviewed literature and my proposed title of study. Thus, to fulfill the gap, I would like to study on the topic Mathematics Anxiety: Causes and ways of minimization at Basic level students. So, I believed the topics for the dissertation is suitable for carrying out a research.

Conceptual Framework

From above discussed point of views in related literature, mathematics anxiety of Basic level students are depend upon different variables. These variables are society, culture and custom, home environment, teaching learning process and school environment.

This is the case study related to causes of mathematics anxiety of Basic level students. Peris and Biggs (2001) described mathematics avoidance and performance as a cycle.

Fig: 1 Conceptual Framework



Source: Peris and Biggs (2001)

In the first phase, the person experiences a negative feeling to mathematics related situations which could be a result of their past negative experiences with mathematics. This leads to the second phase in which the person begins to avoid mathematical situation followed by third phase which involves poor mathematical preparations and finally there is phase four characterized by poor mathematics performance. This cycle becomes repetitive and difficult to break when the math anxious individuals conclude for themselves that they cannot sustain in any math related situation.

Chapter III

METHODS AND PROCEDURES

This chapter presents the procedure of the study, which was carried out to achieve the objective of the study. This chapter explains design of study, the population, the method of sampling and sample of the study and the instruments were used to collect the information.

Design of the Study

The conducted study is essentially qualitative in nature. So that the sample size of this study is not fixed. The research design has been considered a “blueprint” for research, dealing with at least four problems: what questions to study, what data are relevant, what data to collect and how to analyze the results (Patton, 1990).

According to Patton (1990), qualitative research accepts that people know themselves best and can describe, interpret and talk about their own environment. Qualitative research involves the studies and collection of a variety of empirical materials, case study and personal experiences.

As one of the non-probability sampling the researcher was used purposive sampling to select the informants that were done with a specific purpose, and that purpose reflected the particular qualities of people or events chosen and their relevance to the topic. The parents of the case students, mathematics teacher and the head teacher of the school are taken as respondents.

Study Site

As this study is qualitative nature, it does not seek for representative characteristics for the large population or universe (Gay, 1987). Such qualitative study only seeks for analytic or theoretical generalization (Blaxter, 1996). Keeping this in

mind, I focused my study in Kathmandu. The research site of my study was Shree Janasewa Higher Secondary school, Panga, Kirtipur, Kathmandu.

Sample of the Study

This is qualitative inquiry. So, the sample size in this study is not fixed. According to Anderson, there are no rules for sample size in qualitative inquiry (Anderson et. al 2001, p.123). Patton has mentioned that main difference between qualitative and quantitative research lie on the sampling approaches. Qualitative inquiry typically focus in depth relatively small samples, even single case (n=1) can be selected purposefully. So, the sample size of this inquiry depends upon the researcher what s/he want to know, what is the purpose of inquiry, what can be the credibility of the study and what can be done with available time and resources. I selected the students who has lower achievements in mathematics. So, the respondent of this study were 14 students of grade VI,VII and VIII and 3 mathematics teachers, 1 head teacher were the sample of the study.

Tools of the Study

One of the most important parts of study is data collection. Every aspect of the study can be analyzed and studied on the basis of data techniques. The outcome and the validity of the study depend on the techniques of data collection. There are many tools for the qualitative research to get the information from the people about their experiences, ideas and believes.

Data were collected from school, written documents and previous researches. But the primary data were collected from the targeted students, guardians and teachers. Classroom Observation form and interview guidelines were the main tools used for the data collection. I have developed classroom observations form and

interview guidelines for students as well as teachers. To prepare the observation form and the interview guidelines, I have developed indicators and sub indicators with the suggestion that are already made under the verification of experts. Furthermore, I have used unstructured interview with students, teachers and parents to get the actual information. The brief discussion of study tools which is used in my study, such as observation form, focus group discussion and semi structure interview guidelines are as follows.

Class Observation

Observation also enables a researcher to look a fresh at every day behavior that otherwise might be taken for granted expected to go unnoticed. Observation class was observed directly and indirectly. A classroom observation is a formal or informal close watching of teaching while it is taking place in a classroom or other learning environment. With the permission of sample school's administration and facilitator I was done 30 days participant observation of grade VI, VII and VIII.

Interview Schedule

On the basis of objective of the study the researcher had developed the interview schedules in unstructured form for the students, mathematics teacher and parents. Qualitative research needs natural setting data. Thus interview stands as one of the prime source of data collection. It gives depth understanding of the problems and identifies key information for the solution. But open indeed interviewing is not to put things in some one's mind, to access the prospective of individuals being interviewed. Interview such highly purposeful task that goes beyond more conservation (Anderson, 1998).

In my interview, I used guidelines to make the interview more focus on the subject of investigation. In the first meeting with the responds, I appeared informally. After class observation, I took interview of the class teacher of those students.

Focus Group Discussion

A focus group discussion (FGD) is a good way to gather together people from similar backgrounds or experiences to discuss a specific topic of interest. The group of participants is guided by a moderator (or group facilitator) who introduces topics for discussion and helps the group to participate in a lively and natural discussion. In this study, focus group discussion was made among those students sample schools. A focus group discussion was held among a group of 9 students of grade VIII.

Related published and Un-published Documents

Students attendance register, school result sheet, teachers profile and other records was received for this study.

Quality Standard

After completing the construction of the research tools, it is necessary to maintain quality standard. For quality standard I have used member checking and triangulation. Furthermore to maintain the quality standard Guba and Lincon (1998) suggests the following criteria. For quality standard I followed the following ways:

Credibility

This concept replaces the ides of internal validity, by which researchers seek to establish confidence in the 'truth' of their findings. Guba and Lincoln (1998) recommend several techniques inquirer may use to enhance the credibility of their research: prolonged engagement persistent observation triangulation, peer debriefing,

negative case analysis, progressive subjectivity checks and member checking. To maintain credibility of my research I tried to spend as much as time for observation and engaging with different people 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 findings in one context (where the research is done) to other contexts or setting (where the interpretations might be transferred). To maintain transferability I had explained mathematical practices found in different community students briefly. I had included photos of different cultural tools and practices in my research. I tried to capture most of scenario by using thick description of observations, interviews and my meaning 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 observe, interview and include 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 an inquiry in terms of how well they are supported by informants (members) who are involved in the study and by events that are independent of the

inquirer. This is sometimes referred to as the audit trail (a record of how decisions were made throughout the study). I am also a part of mathematics students, so, to maintain conformability, before concluding information I reviewed those information myself several times and sometimes I conformed those information to my other students/friends before concluding information as well.

Procedure of Data Collection

Data collection procedure is a techniques or process to collect data to fulfill the research objective. The primary and secondary data are necessary for reliable and valid output. So, data were collected conducting interview, observation, document analysis and FGD.

To collect the primary and secondary data, class observation was done regularly during teaching learning activities. I observed, listening, interaction and recorded the essential data from the information on the basis of observation from classroom behavior, interest and needs in mathematics learning and other essential information were carefully observed and noted every day.

With the help of interview schedule and questionnaire, the in-depth interview was taken with focused children, math teacher and head teacher. The interaction with the above respondents was carefully listened and noted properly. The schools attendance, regularity, mark ledger and other behavior or activities were noted from school record.

Data Analysis and Interpretation Pcedure

Data analysis is taking the data apart to determine individual responses and then putting it together to summarize it (Creswell,2012). Taylor and Bagdan (1998)

state that data analysis supports the theory, the type of data collected and the research questions of the study.

In the qualitative research design, data are gained and analyzed by descriptive and interpretive method. Primary data were organized according to individual respondents on interview, observation, document analysis and focus group discussion. The collected data were analyzed by the help of different theories and literatures.

As Patton (1990,p.379) mentioned ;

Analysis of qualitative data is painstaking process requiring long hours of careful working going over notes, organizing the data, looking for patterns against the data, cross-validating data source findings and making linkage among the various parts of the data.

In qualitative research, information is also synthesized through different forms of theories and literature. Denzin and Lincoln (2005) said “ the qualitative research is process, which go by a variety of labels, including theory, analysis, ontology, epistemology and methodology.” They further stated that data analysis includes creation of field text consisting of field notes and documents from the field, recreates research text, produce working interpretative documents and finally public text. The different stages of data analysis are confessional, realist, impressionistic, critical, formal, literary , analytic, grounded theory. In this manner, data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial proposition of a study. While I started to analyze the field information, I tried to understand the whole information in the form of the themes. I read one or more themes. First, I tried to put the information in to the number of categories the themes. While developing the themes, I read a number of

research books, articles, research reports and other relevant materials. While doing so, I recognized and rearranged the collected information. I also realized that it was necessary to link the field realities and findings with the theoretical knowledge (Strauss & Corbin, 1996).

To analyze and interpret data, I had classified according to homogeneity and heterogeneity nature of data then I compared and analyzed the vision of teacher, students and parents from the data collected through interview and observation through triangulation way of analysis. As argued by Patton (1990), theory implies facts, models or laws about the phenomenon and attempt to represent the reality adequately. So, I was brought literature and field together and tried to understand their connection and inter connections. Different theories and literature helped me to analyze and interpret the data gathered from the field.

Ethical consideration

Ethical issues arise in discussions about ethical dilemmas and their potential solutions (Punch, as cited in Creswell, 2003). In the process of my research, initially I had explained the purpose of my study to the participants to convince them.

In addition, I used unbiased language or words against gender or age in writing this research. I respected self-termination and autonomy of researcher and provide information on all the aspects of the research and its possible result. I never tried to ask about their private information to make them feel embarrassed or uneasy. While analyzing data I maintained their privacy.

I mentioned the name of the institution of interview with their permission. It is considered as the ethic of my research. Being qualitative researcher I did not claim objective realities.

Chapter-IV

ANALYSIS AND INTERPRETATION

This chapter is mainly focused on the analysis and interpretation of the collected information. In this chapter I have addressed my research questions; why do mathematics anxieties occur? How do we minimize mathematics anxieties in Basic level Students? In order to answer first research question systematically, the qualitative information was collected for answering the research question related to student's mathematics anxiety.

I researched the respective sample school and necessary information was taken during the time of classroom teaching. Different episodes of different classrooms were observed and taken interview with my student participants and carried the FGD to students. For answering the second research question, I took the interview with mathematics teachers, students, coordinators and conducted the FGD with students. The interpretation of analyzed data was done using different theoretical perspective as explained literature review section. For this, this chapter is organized in to two sections. Section I discussed about the causes of mathematics anxiety occurs in the students and section II discussed ways to minimize the anxiety of the basic level students.

Section I: Causes of Mathematics Anxiety of the Students

In this section I deal the causes of mathematics anxiety of basic level students. For this I observed grade VI, VII and VIII and took interview to the students. The

process of classroom observation, interview and FGD presented below:

Classroom Observation

Janasewa Higher Secondary school Kirtipur was chosen for the observation class of grade VI, VII and VIII which is governmental school. There were 460 students. Most of the students were middle class and lower class family, more than 60% student were girls. There are two sections in each grade VI, VII and VIII. To answer the first research question I observed 8 different periods of grade VI, VII and VIII of compulsory mathematics class and optional mathematics class of 8th class and the interview was taken with students. In grade VI, there were around 48 students in compulsory mathematics class. In section A, there were 25 students and 23 students in section B. Similarly, in class 7, there were 55 students and 28 students were in section A and 27 students in section B. Similarly, there were 45 students in class 8, among them 23 students were in section A and 22 students in section B. The classroom infrastructure was satisfactory.

Observation I:

My first class observation was in grade VI section A compulsory mathematics. There were 25 students and only 23 students were presented that day. Different students from different community, different culture and different caste had gathered together, like Newar, Brahman, Kshetry, Tamang, Magar and some students were Dalit too. I entered the classroom with subject teacher and sit on last bench. After then subject teacher started the lesson Inequality. In the classroom observation I noticed that

Subject teacher was middle aged. Class was quite, teacher ordered students to show the homework. Some students hadn't done homework. After then

teacher angry with the students and scolded them. After then class was being silent, students seems reluctant to ask the question because they were fear with teacher. Teacher taught continuously and going ahead. Teacher did not use any teaching material except marker and duster. So that students became confused to solve the problem. They were done what teacher do, they copied the answers. Teacher was moody mind but confident. After than some questions were asked by students, teacher solved the questions and students copied the answers. Then teacher gave homework and he added that the students who had not done yesterdays homework, they have to do. Students note down the homework and being afraid.

In this class, teacher was strict; some students were afraid and could not ask any confusing part and step. Teacher did not use any teaching material which was very necessary for that lesson. Students did not know basic concept, so they were confused and feeling complicated to solve problems and chapter became very hard and difficult. In this regards Holt theory of fear (1964) claims that 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. Next point is, teacher was trained and experienced. But he did not use any instructional materials. He did not use different teaching learning methods. In this line Alaina Hellum-Alexander argues by using teaching materials students learn mathematics meaningfully and that a supportive and encouraging good classroom environment. Fearful environment and lack use of instructional materials producing the causes of anxiety.

After classroom observation I took interview to my student participant S₁ of class 6. I asked how you feel to learn mathematics. Then he replied,

"Really I feel that mathematics is very difficult. I do all other subject well but I cannot do well in mathematics. Due to mathematics subject my marks is decrease. So, I afraid of mathematics and mathematics teachers too."

From the interview of the student mathematics is difficult subject due to this whole percentage is decrease. When we talk about mathematics, most of pupil says I am less interested to learn mathematics and afraid both mathematics and mathematics teacher. In this context, Holt theory of fear (1964) claims that fear is one strategy of 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. So we set up enjoyable environment in the mathematics classroom.

Observation 2:

My second classroom observation was grade VI section B compulsory mathematics .There were 23 students, only 22 students were present that day. I entered the classroom with subject teacher and sit with students. Teacher started to teach the lesson factorization and I observed class. Teacher wrote the rule of factorization on board and gave some related examples. In the classroom observation, I observed that, Teacher solved that problem by only one method to solve the problems. i.e. factorization. He did not clearly present basic concept and previous related knowledge. The teachers directly solve the problem without linked the prior knowledge of the students. Then the students copy this in their notebook. In this way the teachers memorized the formula and solve the problems to their students.

In this classroom observation I found that teacher was more active in his teaching and his teaching style was memorizing the subject matter without connecting the prior knowledge of the students. In this line Skimp (1986) argues that rote learning as an initial cause of mathematics becomes more advanced.

After finished my classroom observation I talked my student participant S₂ who was actively participated in classroom learning. Why you were not actively participated in learning mathematics in classroom learning? She replied me:

"Mathematics teacher is very strict when did mistake he punished me. He told us to memorize the formula and use this formula to solve the problems as given in the book but I am not understood how the formula come and some time if I forgot the formula I cannot solve the problems"

From the above interview I found that because of the strictness of mathematics teacher students produced anxiety and rote memorization is the other cause to occur the anxiety to the students. In this issue Fogelman and Warren (1979) deal that mathematics has long been associated with the pressures of performing and being evaluated and far too frequently, the associations are not pleasant ones.

Observation 3:

My third classroom observation was in grade VII section A of compulsory mathematics. There were 28 students in section A. Among them only 25 students were presented there. I entered the classroom with subject mathematics teacher sat down with students. Teacher started the class without discussing pre knowledge of students about the lesson. The lesson was related to geometry. He taught the theories sum of the angles of a triangle is 180.

After the observation, I interacted with my participant student S_3 and asked question. Are you interested with mathematics subject? Do you motivated by mathematics teacher?

Then participant s_3 gave his feeling.

“I was poor in mathematics from lower class. I had no interest to mathematics. Geometry part of compulsory mathematics is very hard; Teacher never motivated us in teaching geometry. Teaching materials are not shown in our class. Teacher motivated only talent students.”

In the above line, I concluded that teacher's experience and qualification doesn't help the lower achiever students. Teacher was of science background so did not use learning theories of mathematics. According to P. Van Hiele's model of learning geometry (1050 A.D); there are five level of teaching geometry. He argues that teaching process of geometry is from simple to complex. It is ladder learning. The five levels of learning geometry are visualization, description, relationship, deduction level and axiomatic level.

Similarly, I took interview with my participant student S_4 . I discussed same question maintained above with her. After my question she answered.

“We could not interact with mathematics teacher. He neglected the teacher taught himself mind is never concentrated with his teaching. He solved theorem only on white board but how was solved the problem he did not tell us”.

In this line, I declared that teacher did not teach students individually. He had to give remedial teaching the students. Geometry is learning by doing the mathematics teacher must be four foundation of mathematics education i.e. psychological foundation mathematical foundation, cultural foundation and

technology foundation. Vygotsky (1978) argues the students are active to learn who ask question. Do research and reach to the new understanding. They seek help use peer learning, co-operative provide self regulation. The constructivism theory assumes the reader to be critical and discover new knowledge. Through social participation beothhel and dimock (2000) emphasizes six assumption of constructivism: learning is an adaptive activity. Learning is situated in the context where it occurs knowledge is constructed by the learner. Social interaction plays a role in learning. Experienced and prior knowledge plays a role in learning process.

Observation 4:

My fourth classroom observation was grade VIII section A optional mathematics. I entered the class with subject teacher. Subject teacher started to teach Trigonometry chapter and I started to observe how he taught the students in the class. There were only 23 students in section A. The teacher and students activities in the class were observed as follows:

Teacher directly presented the subject matter without giving the concept and previous related rule. He solved problem without understanding through drill and practices. After that teacher asked one question to the Ramesh, "Come and solve this problem in white board' then he try to answer the question on board. But he cannot solve because he was afraid when going in front of all classmate. After then teacher return back and took his seat and a girl came to solve that problem on board. Again she was also very nervous and only three step done and return back on seat. Mohit had solved that problem on his copy but when he started to write on board, he was nervous and fearing. He forgot formula and solving process. Then Mohit said, " Sir I forget solving process and formula". After then sir said, "Sit on your bench and look

at your copy, how you solve before"? Mohit feels shy and little bit smiley. Again teacher told to other students to solve that problem on board. But nobody be ready to go in front and solved.

After that classroom observation, I conclude that lack of self confident and drill and practice without understanding also the cause of mathematics anxiety has been in teaching methodologies. He said that mathematics classes did not encourages reasoning and understanding. Teachers can create anxiety by placing too much emphasis on memorizing formula learning mathematics through drill and practice, applying rote memorized rules and setting out work in the traditional way.

After finished my classroom observation that day I talked my student participant S₅ about the causes of anxiety. I asked my participant S₅, Do you like mathematics if yes why? If not why? In this issue my participant replied, "*I do not like mathematics because it is dry subject and learned very hard. To learn mathematics it remember so many formula without it practical application and it practiced many time. If we forgot the formula, we can't solve remaining part of that problem.*"

In the above views of my student participant, I claimed that the students feel anxiety because of its monotonous types of subject and it is believed that mathematics is a hard subject because it remembered so many formulae. In this issue Smith and Smith (1998) said that mathematics anxiety is a feeling of intense frustration or helplessness about one's ability to do mathematics, and can be described as a learned emotional response to participating in a mathematics class, listing to a lecture, working through problems, and or discussing mathematics but a few examples. If it is once established in our life, it interferes with everyday activities and further learning

of mathematics. Student's negative math experience also influences mathematics anxiety. This occurs when students are punished by their parent or teacher for failing to master a mathematical concept or embarrassed in front of a sibling or group of peers when failing to correctly complete a math problem. Similarly the student's mathematics anxiety can trigger teacher anxiety, societal, educational or environmental factors, and innate characteristics of mathematics, failure and the influence of early-school experiences of mathematics.

Observation 5:

My fifth observation was in grade VII section B of compulsory mathematics. I went into the classroom and observed the teaching learning process. Teacher started his lesson simple interest. He asked all students about homework and some students had not done their homework because they did not understand yesterday's lesson. This day he checked pre-knowledge of students about this topic. There were 20 students were presented on that day.

At the end of that period, I understood the views of my participant S₆. Why you didn't submit your homework? She replied that:

"I did not understand yesterday's lesson, no one in my family member help me to do the homework. They did not know how to solve mathematics problems"

The above view of my participant student S₆ is about home environment. If family members helped to do the homework, students would have done their homework properly and they did not feel fear about mathematics. In the context H.J Walberg (1981) proposed a "Theory of education productivity" that was its own theoretical foundation. Walberg all have identified key variables that effect student outcomes student ability/prior achievement, motivation, quality of instruction, home

environment. So, home and school environment are most important factors to minimize the mathematics anxiety.

Observation 6

My sixth classroom observation was in grade VIII section B optional mathematics. I entered the class with subject teacher. Subject teacher taught addition of matrix. In the classroom I recorded the following information in the classroom:

Teacher asked the process addition of matrices with students tell but maximum students could not tell, so teacher was angry with students. Yesterday teacher used teaching material to give concept of matrix and wrote formula with example on board, and informed to students to ask next day, but student did not rote. Few students told but other students did not tell. Teacher said " Lazy students, why do not remember the process of addition of matrix? How could you passed if you became this type of laziness? After then one student stand up and said," Sir opt math is difficult, I read formula at home but I forget at now." Another student said, " Sir I did not do practice ," other students said," When I open math book , my head become overloaded, hang, I read but forget quickly, I think I must be passed and get lots of marks but every senior and family said to me math is hard subject and also told me, can you pass the exam? Teacher felt, student have pre-concept about math which was very difficult to read and pass the exam. Then teacher encourage the students to read opt. He said," Do not make wrong and negative concept about math and do not listen discourage talking, it is not hard subject. But it's making people hard. Many people think we cannot read opt math and they review previous senior who failed but they do not review laborious and passed students.

After then teacher take one example of matrices, teacher again repeat formula and rule with each and every example. Teacher solves on board and then asked next question, student solved and show the teacher. Teacher was cool and frank, so students were not afraid with class teacher; they asked question where they became confused. In this class, students shared a concept about optional mathematics. Many student feel optional mathematics is hard subject. It's become myth and settled pre-negative concept about math. Next point is, students also lazy, they do not like to do practice at home and did not provide necessary time to read at home. Every time teacher trying to change misconnects, negative thinking about mathematics of all students. He used teaching materials to present, classroom is not boring, gain lots of idea and useful teaching. He also clarify that practice makes man perfect, if students do not practice at home and at leisure period in school, they are not be a success and gain mark. So he encourage to the students do always practice and provide necessary time to read and write at home daily. Which implies that negative concept, myth, laziness, working memory and teacher behavior with students may create mathematics anxiety of the students. Similar situation/result obtained other remaining 2 classroom observation of grade VII and VIII students.

Moreover, with a view to deal with the research question having a theme of causes of mathematics anxiety faced students in mathematics learning, I conducted a Focus- Group Discussion (FGD) with the students at Janasewa Higher Secondary School comprising of 9 students of grade VIII as my research participant. The discussion were open- ended, they were guided by the theme under investigation. During FGD, I found that the main causes of mathematics anxiety are: De-contextualization of mathematics teaching activities, the notion of culture free mathematics. Teaching mathematics through memorization without meaningful. In

this line Norwood (1994) emphasized that math anxiety did not appear to have single cause, but was, in fact, the result of many different factors such as poor self image, poor coping skills, teacher attitude and emphasis on learning math's through drill without understanding. The feeling of helplessness towards a math problem and lack of confidence of the subject matter.

Section II: Ways to Minimize Mathematics Anxiety

In this section, I deal the ways to minimize the mathematics anxiety of basic level students. Many factors play important role for encouraging learning mathematics. This section focuses on the ways to cope of mathematics anxiety of the students. For this I took interview with mathematics teachers, students of grade VI, VII and VIII, school co-coordinator and conducted the FGD with students, teachers and head teacher and making themes for answering the second research question which presented below:

Make Teaching Interesting and Lively

To minimize mathematics anxiety we apply different teaching learning approaches. To make our teaching more meaningful by reducing mathematics anxiety. In this issue my teacher participant T₁ said:

"I believe that where there is reflection there is perfection. It really makes teaching and learning process lively and interesting then it can minimize the mathematics anxiety. Better learning is possible through reflection. To minimize the mathematics anxiety by using different students centered techniques that can be used in the teaching, which will make our mathematics learning and teaching interesting and effective. Ultimately reduce the mathematics anxiety."

It makes me remember as to how to be a good teacher, a good way to teach and control class. Because as a teacher, we sometimes forget that our students are not of the same levels in a classroom. The reflections given would serve as a guideline in future presentation or in carrying out activities in the classroom. Through making teaching more meaningful and lively obviously reduce the mathematics anxiety.

In the same line I asked my student participant, Mohit said,

"Our teachers in the teaching process don't linkage subject matter to student's daily life activities. If the teacher teaching mathematics by linking student's daily life the mathematics became interesting and minimizes mathematics anxiety."

From the above view of my students participant, Mohit I found that by linking student knowledge to the subject matter then we can minimize the mathematics anxiety.

Again this issue I asked school head teacher he replied,

"Actually I am not mathematics teacher, but in my view the math anxiety can be minimize by teaching mathematics through contextualizing and providing local examples."

In the above view of school head teacher I found that the mathematics anxiety can be minimize teaching mathematics through contextualizing and providing local examples. This made me realize that every mathematics teacher can relate mathematics with their local context. If the teacher relates mathematics with our local context, we can get conceptual understanding of mathematics easily so that it helps to reduce mathematical anxiety.

Understand the Mathematics Concept Rather Than Memorizing

Mathematics anxiety is a real problem facing students today. The mathematics teacher especially needs to understand the causes and effects of mathematics anxiety as well as ways to help students overcome it. There are many symptoms of math anxiety including unwillingness to attempt mathematics problems, a fear of talking advanced mathematics classes and being unusually nervous when in mathematics class. The main cause of mathematics anxiety is the teacher himself. It has been shown that students tend to internalize their instructor's interest in and enthusiasm for teaching math. If the teacher has a bad attitude about mathematics, his students most likely will as well. The more a teacher understands mathematics anxiety the more he will be able to prevent it and help students overcome it. In this line I asked my teacher participant T₂, he replied,

"Most of the mathematics teachers teach mathematics by memorizing formula. By the help of the formula they solve problems given in the text book. Teacher says that I solved some problems likewise you have to solve remaining problems in the similar way Instead of this we teach mathematics by making concept clear so that minimize the math anxiety."

From the above view of teacher I found that mathematics subject become difficult for memorizing different formulae. And mathematics anxiety can be cope by teaching mathematics by making clear concept of subject matter without meaningless drill exercise. In this line (Schwartz, 2000) claims that teacher can take many steps to reduce mathematics anxiety including reviewing basic mathematics skills, by making sure students understand the mathematical language, and providing a support system for their students. In this issue I asked my student participant Rasila and she said,

"My teacher teaches mathematics through practicing on note book, thinking about steps and remembering the answer. We are unable to give it's meaning of real life. Rote memorization is our teaching technique instead of this it should be better to teach mathematics meaningful then understanding of concept clearly."

From the above view of my participant I found that deep understanding of concepts is very necessary in teaching. Students often memorize through rote memorization, but do not conceptually understand because humans interpret their world based on the concept that makes their own understanding of the world. There are several versions of conceptual understanding. In order to release their concrete preconceptions as students, they must find a more satisfying concept.

Making Mathematics Culturally Relevant

Mathematics is taken as a difficult subject in our context because of our teaching and learning practice. Lerman tried to relate the culture and individual because both are two sides of one coin, culture and society regulate the individual can generate his subjective meaning by the help of culture and society. Culturally relevant teaching is using the cultural characteristics, experiences and perspective of ethnically diverse students as conducts for teaching them more effectively. I asked my teacher participant T₃ how we can minimize the mathematics anxiety of the students. In this issue my participant T₃, replied,

"I argue that mathematics can never be culture free. Mathematics and culture are strongly related. If we related mathematics with students daily life activities then the students feel that mathematics is our self. Then slowly reduce the math anxiety."

In the above view of my teacher participant it concluded that mathematics is culturally relevant and it is not culture free subject. Mathematics creates culture and

culture creates mathematics. Then minimize the mathematics anxiety of the students. In this line Gay (2000) identified five element of culturally relevant mathematics as: developing a knowledge base about cultural diversity, including ethnic and cultural diversity content in the curriculum, demonstrating caring and building learning communities, communicating with ethnically diverse students, and responding to ethnic diversity in the delivery of instruction.

Role of Teacher

Teacher's role is very important to carry out responsibility in changing and shaping student's behavior in school. In order for teachers to be more effective with diverse group of students. The teacher can help his students overcome mathematics anxiety. The mathematics teacher needs to be excited about teaching mathematics and he must believe that there is a reason for his students to learn the mathematics. If the teacher is not motivated to teach the subject, then one cannot expect his students to be motivated to learn it. It has been shown that students tend to internalize their instructor's interest in and enthusiasm for teaching mathematics. If the teacher is not happy about teaching mathematics or he/she does not enjoy being with students in the classroom, then students are less likely to be motivated to learn the mathematics. In this regards my participant school head teacher said,

"To minimize the math anxiety the role of teacher is great. If the teacher plays the positive role to motivate the students to learn mathematics the students learn mathematics easily. The teacher helps the student to think critically and not say directly wrong about the response of the students. Teacher emphasized the process rather than product. Flexibility in the mathematics classes can help facilitate cooperation, reduce stress of students by the teachers."

It was found the mathematics teacher needs to encourage his students to think critically, share their thinking process, not right or wrong answers. In this line Schwartz (2000) correct answers are important, getting the students to think critically is even more important. Students of mathematics also need to realize that it is more than just computations. Flexibility in mathematics classes can help facilitate cooperation, reduce stress, and create positive attitudes. In this issue another my student participant Ramesh, said,

"I believe that child is just like kacho mato. It can make what we want.

So to minimize the mathematics anxiety the role of teachers is crucial. If the teacher encouraged learning mathematics then the students learn mathematics well. Teacher helps students to better understand that help to overcome the anxiety."

From the above views of my student participant I concluded that teacher plays the main role to cope the student anxiety. A better understanding of mathematics anxiety is needed in order to help students overcome this problem. In this regards Upadhyay(2070) claims that to minimize the mathematics anxiety we teach mathematics by linking mathematical concept with students daily life and use learner centered teaching methods.

Instead of interview of my participants, I conducted FGD with to deal with the research question having a theme of minimize the mathematics anxiety of the students. For this, I conducted a Focus Group Discussion with the students at Janasewa Higher secondary school comprising of 9 students of grade VIII as my research participants. The discussions were open ended; they were guided by theme under investigation. During FGD, I found that the main remedial ways to minimize of mathematics anxiety are: Makes teaching interesting, making mathematics culturally

responsive and learning mathematics through meaningful way. In this direction Upadhayaya (2070) said that to minimize the mathematics anxiety by using concrete teaching materials.

A new path opened up from the FGD with the students was the theme of structure of mathematical content and student's familiarity with it. While talking to students, they confessed that complexity of mathematics content and their lack of fundamental knowledge regarding it caused worries in them learning mathematics.

On the basis of this study, it is revealed that students' mathematics anxiety is the product of interaction between cognitive, behavioral and environmental influences.

Chapter- V

FINDINGS, CONCLUSIONS AND IMPLICATIONS

This chapter describes the major findings drawn from the analysis and interpretation and discussion result from the collected data. Conclusion is described from the result of interpretation of data. The chapter closes with implication of research. An implication of the study is given for the area where this study can be applied.

Findings

Mathematics anxiety is a growing concern for many around the globe. It's prevalence among teachers, elementary and high school students as well as college students is on the rise. The purpose of this study was to find the cause of mathematics anxiety, and minimized mathematics anxiety. The major findings are grouped according to the theme derived from the objectives of the study.

Cause of Mathematics Anxiety

The causes of mathematics anxiety were found from the study:

-) Classroom fearful environment.
-) Teaching memorization without contextualizing.
-) Lack of confident and practices without understanding.
-) De-contextualized mathematics teaching.
-) Complexity of Mathematics
-) Fundamental Knowledge
-) Inadequate illustration
-) Uncomfortable classroom

-) Environment inadequate
-) Assignment and classroom practice
-) Lack of willingness of excel in mathematics
-) Discouraging prior experience
-) Lack of compliments from teachers, parents, peers, seniors etc.
-) Lack of guidance
-) Absence of information
-) Pessimism
-) Depressing previous result
-) Unanticipated tests

Ways to Minimize the Mathematics Anxiety

Similarly, the ways to minimize the mathematics anxiety were found from the study:

-) To minimize the mathematics anxiety making teaching-leaching activities more interesting and lively.
-) Teacher help to the students to understand the mathematics education culturally relevant and contextulazed.
-) Teachers must be made aware of the causes, symptoms and remedies to decrease mathematics anxiety and foster the development of mathematical literacy.
-) Teachers play positive role in providing the subject matters and use appropriate teaching materials and methodology.
-) Teacher should not transmit their own negative feelings and anxiety to their students.

Conclusions

Problem of mathematics anxiety among students was basically caused by the lack of foundational knowledge of students and complexity of mathematical content. It further revealed that those problem faced by students in mathematics learning were imbedded with their passion towards mathematics, classroom association, asymmetrical content and their preparedness for the tests.

From my finding of the study, I have concluded mathematics anxiety can be produce by students through classroom fearful environment, teaching memorization without contextualizing lack of confident and practices without understanding, de-contextualized mathematics teaching. So mathematics anxiety is a complex issue that can manifest itself in a wide variety of ways, and there for teachers should not adopt just one method for treating it.

Another conclusion that to minimize the mathematics anxiety making teaching-learning activities interesting, understanding the mathematics clearly making mathematics culturally response. The more methods a teacher is able to employ, the more likely that they will be successful with the highest percentage of students. If students motivated towards mathematics and are convinced on they can lean mathematics by their own effort they can be actively participated in learning mathematics and produces better result and obviously minimizes the mathematics anxiety of the students.

Finally, mathematics anxiety is both acquired and learned behavior. Some students lack mathematics foundation and can't learn mathematics well where as others find problem with mathematics learning due to various factors like classroom

environment, lack of preparedness etc. As a result, the students perceive mathematics learning and evaluation.

Implications

This study clearly shows that the causes and ways to minimize mathematics anxiety to the students. This research helps to improve pedagogy of the teachers. Ultimately it helps the students and teachers improve their field. Teachers have a special position, power, prestige and ethic in the society because of enhancing the knowledge. To keep these all things in balanced form, such as power, prestige, value and ethic in the society teacher have to be more skill to minimize the mathematics anxiety and making mathematics interesting in this direction this research will be applicable.

Last but not the least, it is my hope that this research study, contributes to the larger literature on mathematics anxiety among teachers and encourages teacher education programs to be more responsible to the mathematics and consider this as a critical aspect in the progress of prospective teachers and students, similarly, this study is applicable to textbook writer, curriculum planner, police maker and myself to improve my professional development.

REFERENCES

- Acharya, B. R. (2011). *A critical inquiry of culturally relevance of primary level school mathematics Education of Nepal*. An unpublished mini research division, T.U., Kathmandu.
- Anderson, G. (1998). *Fundamentals of Educational Research (2 no ed.)* London
- Ashcraft, H.M., & Krause, A. J. *Working 11 memory, math performance, and math anxiety PsychoriOmic Eufletin and Review*, 2007, 14 (2) 243-248.
- Beilock, S. L. *Math Performance in stressful situations. Current Directions in Chinn, S. Mathematics anxiety in secondary students in England. Dyslexia*, 2008, 1561-6R.
- Bourdieu, P. (1986). *'The forms of capital' Handbook of theory and research for the sociology of capital*. J.G. Richardson. New York: Greenwood Press: 241-258
- Butterworth, B. (1999). *The mathematical brain*. London: Macmillan.
- Cemen, P. B. (1987). *The nature of mathematics anxiety*. Eric Document No. ED 287 729.
- Chavez, A. & Widmer, C.C (1992). *Math anxiety: Elementary teachers speak for themselves*. Educational Leadership, 39(2), 387-388
- Chen, C., & Stevenson, H.W. (1989). *Homework: a cross-cultural examination*. Child Development, 60, 551-561
- Creswell, J.W. (2003). *Research design Qualitative, quantitative and mixed methods*

approaches. Thousand Oaks, CA: Sage. Psychological Science, 2008, 17 (5) 339-343.

Greenwood, J.: 1984, 'My Anxieties about Math Anxiety', *Mathematics Teacher* 77, 662- 663.

Poudel, Krishna Chandra (2015). *Mathematics Anxiety: Acquired, Created or What else?* Second National Conference On Mathematics Education, 66-71.

Sahin, T. (1998). *The effects on achievement in the social sciences and mathematics of equalizing teacher-students interaction frequency in primary school*. *EgitimveBilim*, 22(108), 9-15.

Skemp, R.R.: 1986, *The Psychology of Learning Mathematics*, Penguin, Harmondsworth.

Smith, B. S., & Smith, W. H. (1998). *Coping with math anxiety*. Retrieved 20 June, 2003, from http://www.mathacademy.com/platonic_realms/mini-text/anxiety.htm

Trujillo, K. M., & Hadfield, O., D. (1999). *Tracing the roots of mathematics anxiety through in-depth interviews with preservice elementary teachers*. *College Student Journal*, 33(2), 11.

Tsui, J. M., & Mazzocco, M. M. *Effects of math anxiety and perfectionism on timed versus untimed math testing in mathematically gifted sixth graders*. *Roeper Review*, 2007, 29 (2), 132-139.

Williams, W. V. (1988). *Answers to questions about math anxiety*. *School Science and Mathematics*, 88, 95-104.

Appendix- A**Classroom Observation Guideline****Name****Date****Qualification****Address**

-) Dealing with subject matter by the teacher.
-) Response the teacher to the students.
-) Classroom Environment.
-) Encourage or disc-courage to students.
-) Teacher co-operation to the students.
-) Sharing problem in classroom with students.
-) Interaction between teachers and students.
-) Student's behavior in the classroom.
-) Interest of the students toward mathematical problems.
-) Participant of students on mathematical task.

Appendix- B

Interview Guideline for Teachers

Name of the School:

Name of the teacher:

Age:

Sex:

Teaching Year:

Education:

Caste/ethnicity:

Address:

-) Relation with students.
-) Why the students produce mathematics Anxiety?
-) Causes of mathematics anxiety of the students.
-) Interest of students toward mathematics subject.
-) Participation of your students in solving mathematics problems.
-) Ways to minimize the mathematics anxiety.
-) View toward mathematics.

Appendix- C

Interview Guideline for Students

Name of the students:

Age:

Sex:

Class:

Position in class:

Caste/ethnicity:

Address:

The interview for students can be taken on the following main topics.

-) Mathematics like or unlike subject.
-) Participation in mathematical programs.
-) Interest in mathematics or mathematics related subject.
-) Cause of anxiety.
-) View toward mathematics.
-) Any way to learn mathematics by feeling easy.
-) Ways to decrease mathematics anxiety.

Appendix- D

Interview Guideline for Head Teacher

Name:

Date:

Address:

The interview for school coordinator can be taken on the following main topics.

-) View toward mathematics.
-) Your students and teachers feel easy or uneasy toward mathematics.
-) Participation in mathematical programs.
-) Cause of anxiety.
-) View toward mathematics.
-) Any way to learn mathematics by feeling easy.
-) Any ways to minimize mathematics anxiety.

Appendix- E

FGD Guideline for Students

Place:

Date:

The FGD for students can be on the following main topics.

-) View toward mathematics.
-) View toward mathematics teacher.
-) Main causes producing mathematics anxiety.
-) Main causes mathematics anxiety.
-) Any way to learn mathematics by feeling easy.
-) Ways to decrease mathematics anxiety