IMAGE OF MATHEMATICS AMONG SECONDARY LEVEL STUDENTS

A

THESIS

BY

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Thesis

By

Bhim Prasad Koirala

This thesis entitled "**Image of Mathematics Among Secondary Level Students"** has been approved for the partial fulfillment of the Requirement for the degree of Master of Education

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This is to certify that Mr. Bhim Prasad Koirala, a student of the academic year 2065 with the Campus Roll Number 860, Exam Roll number 281062 and T.U. Registration Number 9-1-29-263-2001 has completed this thesis under my supervision during the period prescribed by the rules and regulations of T.U., Nepal. The thesis entitled "Image of Mathematics among Secondary level Students" has been prepared based on the results of his investigation conducted during the period from June 2013 to June 2014 in the Department of Mathematics Education, Tribhuvan University. I recommend and forward that his thesis be submitted for the evaluation for awarding the degree of Master of Education.

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ABSTRACT

The main aim of this study was to find out the image of mathematics among secondary level students and the difference and similarities of images of mathematics due to gender. It was a qualitative research and respondents were determined by sample survey.

The researcher developed an opinionaire form related to image of mathematics. Inside it, attitude and belief were taken as two pillars. In total, fifteen boys and fifteen girls were chosen from public school of grade IX and fifteen boys and fifteen girls from grade X respectively. Similarly, fifteen boys and fifteen girls were chosen from private school in grade IX and fifteen boys and fifteen girls from grade X

Students believed that mathematics is neither easy nor difficult subject but it is more time, more practice and more concentration needy subject. It has not any relation between gender and mathematics achievement and similarly no one born with math-mind. Mathematics is enjoyable subject and mathematical puzzles and quizzes are its entertain part.

Many formulas and process oriented nature are the main bother factor of mathematics. Students want all solutions from different types of questions and they see answers from book.

Students don't angry with mathematics teacher and mathematics but some students think it is useful subject but they cannot study mathematics well. Mathematics build up personality and it fulfill public many daily necessities as well.

Using of calculators and formula tables is not good habit but many students have a habit of using calculator. Rough paper are needed but it should used only in

needy situation. Mathematics homework must be done and it is enjoyable job when students know and understand it. Otherwise, it is boring and headache to students.

In summary, mathematics is useful, applicable in every field, useful in day to day life and very necessary subject for future but its learning depends on teacher's motivation, student's activity and mathematical environment. It is sex free, technique needed, useful, job chancing and valued subject.

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CHAPTER I

INTRODUCTION

Background of the Study

Mathematics is the back bone of the human life. Mathematics has an important role for the development of science and technology. Mathematics helps people to understand and interpret very important quantitative as well as qualitative aspects of natural phenomena. The International congress on Mathematics Education (ICME) realized the importance of Mathematics through the plenary lectures of the congress. One of the plenary lectures was addressed by Prof. D' Ambrosio (Brazil) on "Socio-Cultural Bases for Mathematics". He stated the role of Mathematics in the following words.

"Mathematics is clearly identified as the core discipline for scientific and technological careers, which are more and more associated with better social position and more stable and secure job situation. Mathematics plays the central role in a new employment structure. It is widely accepted that the growth in job opportunity aims at information related with mathematics. The pressure of computer in all levels of the labours structure also calls for mathematics"

Mathematics is essential for understanding any other disciplines like economics, physics, and chemistry and so on. Without the knowledge of mathematics, it is very difficult for better management and solving any kind of daily problems of human being.

Roger Bacon Says, "Mathematics is the gate and key of Science"

Day by day, necessities are increasing in human life. The invention of mathematics is the result of their needs. In present time, people cannot exist without mathematical knowledge. People have been utilizing mathematics to solve the difficulties arisen due to natural calamities, political propose. Educational activities, economic

provisions, exchanging developmental planning etc. Other social events can be perceived from the early history of mathematical of different civilizations. Mathematics is taken as the science of all sciences and art of all arts. It is also considered the queen of science.

Gold and Futter (1982) stated: "Knowledge of mathematics is indispensable to our daily life. Counting objects, reading and writing numbers are tasks most people perform in their life. A strong background in mathematics is necessary for almost all technical careers in society. Competence in mathematics has been identified as a critical skill directly related to educational and occupational choice."

Probably no area of human activity is as afflicted as mathematics with a gap between the public perception of its nature and what its practitioners believe it do be. (Barbeau, 1990)

Mathematics is found all over the world. Different people have different views about its nature and its attitude. People have different beliefs on it and they have different images about mathematics. The researcher has focused this research on "**Image of Mathematics**" in two main branches: attitudes towards mathematics and belief about mathematics.

Mathematics is very difficult subject. It is only for talented students, it is male domain, more practice needed subject and used in war and destruction are common myths of mathematics. In Nepal mathematics is compulsory subject in secondary level and prestigious for taking optional mathematics in school level.

Attitudes affect everything that attempt. They affect relations with other people and their opinions to new experiences. If attitude toward a task is positive, then people will most likely enjoy the process of doing it and look for opportunities to do it. If attitude is negative, people will most likely avoid or delay the occasion of doing it and, if people

must do the task, then probably not enjoy it or do well at it. Attitude toward mathematics affects how well or how often it does, and how much enjoyment derives from it. Many students taking mathematics courses in school and college have a negative attitude toward mathematics that can be described as "math anxiety" or "math avoidance". Math anxiety is a state of such tension or fear that the learning process in mathematics is blocked or interrupted. Math avoidance usually occurs because this fear or tension causes a person to react negatively to mathematical situations and therefore avoid them as much as possible.

The math anxious or avoidant student has difficulty doing well in mathematics. But this difficulty is not related to ability but rather is related to their attitudes about mathematics. Researchers have found that one of the traits of mathematical problem solvers is a low level of anxiety. If you feel you have this fear of mathematics, it is important to recognize that can change the attitudes that cause fear and prevent mathematical competency.

Identify the negative statements that make self-defeating and that cause to do poorly merely because you "expect" to do poorly. People can stop making those negative statements and practice making positive ones about mathematics and their ability regarding it.

Statement of the Problem

Image itself is a subjective concept. However, researcher would be aware on the problem of this study concerned with following questions.

- What is the attitude of students towards secondary mathematics?

- What is the belief of students towards mathematics?

- Is there any gender difference to learn mathematical skills or not in secondary level students?

Significance of the Study

Mathematics plays the important role in every part of human life. However many students in school have a common myths that its useless subject, boring subject and some have positive attitudes towards it. Till now no systematic enquiry has been found in the area of image of mathematics in Nepal. There are no sufficient discussions held about current social inequalities which are positively or negatively influenced by mathematics. The result of this study provides systematic empirical data on image of mathematics even if it is limited to the boundary of secondary students of Nepal.

It is expected to assist parents, teachers and counselors to provide guidance and counseling to the children concerning the study of mathematics. At the same time students will find the sense of freedom when they talk freely from their inner core about mathematics and its nature instead reading always within it.

The examination of the different images, attitudes, beliefs and myths of mathematics in a secondary school helps to make a public image related to mathematics. The popular image of mathematics raises a number of important questions. How widespread is the popular image described above? Can any change in educational practice lighten? The findings of the study are helpful to answer these types of questions. The study has the following significant.

- This study assisted parents, teachers, students and counselors to provide guidance and counseling to their children concerning the study of mathematics.
- It would provide positive attitudes related to mathematics who are mathematically depressed.
- It would help to find out the causes of failure of students in mathematics.

Objectives of the Study

Every scientific and systematic project has its objectives as the roadmap for the successful completion of the research mission. The objectives are the key points of research destination. This research has set the following objectives to achieve the goal of this mission:

- To investigate the image of mathematics among secondary level students.

- To compare the image of mathematics between boys and girls students.

Research Hypothesis

The research hypotheses formulated for this study were as below:

- There is significant difference in the image of mathematics according to gender among secondary level students of Kathmandu.

Definition of the Terms

Attitudes

The way someone behaves towards somebody or something that shows how s/he thinks and feels is attitude (Oxford 7th ed.). Affective responses that involve positive or negative feelings of moderate intensity and reasonable stability are attitude.

Beliefs

Beliefs are an opinion about something. It is the confidence that somebody or something is good or right. It is in cognitive and affective domain. Beliefs form from our assumption by different sources like our experiences, by reading different literatures and so on.

Image of Mathematics

Image of mathematics is a vague word but here we define it is a mental representation or view of mathematics constructed by different experiences, interaction and influence of parents, teachers or public reputation. Image is related to attitudes, understanding, anxiety, belief and view of learners towards mathematics.

Anxiety

The state of feeling worry, fear and eagerness nervous about something is anxiety (Oxford 7th ed.). In this study, any physical, emotional, emotional, psychological problem aroused due to mathematics or its learning have been considered as mathematics anxiety.

Secondary School

A school running classes up to class X is denoted as Secondary School of Nepal.

Delimitation of the Study

Image of mathematics includes all visual and verbal representations, beliefs, attitudes and feelings related to mathematics and mathematics learning experiences. But in this research the collective form of attitudes and beliefs is considered as the image of mathematics, Liking, confident, enjoyment, anxiety under attitudes and nature of mathematics, learning mathematics and value of mathematics under belief is considered as key images due to the limited time and resources. This study was limited in the following areas.

- Only the Kathmandu Valley was included in this study.

- Only class IX final exam appeared and just starting class X students and S.L.C. result waiting students were selected.

- Comparatively girls and boys were covered equally from private and public schools.

- Attitudes and beliefs towards mathematics were taken as image of mathematics.

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CHAPTER II

REVIEW OF THE RELATED LITERATURE

Review of related literature is an exacting task, calling for deep, insight and clear prospective of the over all field. The main purpose of review of related literature is to find out what works have been done in the area of the research problem under study and what have been done in the field of the research study being undertaken.

No particular research has been conducted on image of mathematics in Nepal. The attitude related studies by Master's Degree students are found. There are some researches related to students and teachers attitude towards mathematics and effect of gender difference in mathematics achievement.

Adhikari (2001) concluded that no gender difference in attitude towards arithmetic was detected. The lower secondary students and their mathematics teachers had positive attitude towards arithmetic. Dhakal (2002) concluded all the students had negative attitudes towards their mathematics classroom and they had positive attitudes towards mathematics textbooks and reference books. Pandit (1980) concluded that both the students and their parent's ranked mathematics the highest and social studies the lowest preferred subject. It is also concluded that the mean measure of the attitude of male students towards mathematics as a school subject was significantly greater than that of female students.

The popular image of mathematics as read in literature is that it is difficult, abstract, ultra-rational and vital. Many persons operating at high levels of competency in numeracy and competency in their professional life still say "I am not good at mathematics, I never could do it". They take mathematics as only theoretical matter.

Lim Chap Sam (1999) has found five common themes, as given in her PhD thesis report, emerged as components of respondent's image of mathematics. These are utilitarian, symbolic, absolutist, problem solving and mysterious views. This study explores the range of images, beliefs and attitudes towards mathematics as reported by a sample of 548 adult members of the public of the United Kingdom. It also explores in greater depth the possible casual factors of influence on the formation of these images of mathematics for a smaller sub-sample. In this study, the term 'image of mathematics' is conceptualized as a mental representation or view of mathematics, presumably constructed as a result of social experiences, mediated through interactions at school, or the influence of parents, teachers, peers or mass media. This is also understood broadly to include all visual and verbal representations, metaphorical images and associations, beliefs, attitudes and feelings related to mathematics and mathematics learning experiences. The design of this study was explorative and modestly interpretative. Both quantitative and qualitative methods were used to analyse the data collected from a questionnaire in stage one (N=548), and by semi-structured telephone interviews, in stage two (N=62).

There have been a number of studies that documented Asian American students' higher achievement in mathematics as compared to students from other ethnic groups (Sue & Okazaki, 1990; Tsang & Wing, 1985). Some of these studies attributed Asian American students' higher achievement to culture and heritage, including their family lifestyle, home language, and the values that these students shared with their parents (California State Department of Education, 1986; Obgu & Matute-Bianchi, 1986; Karkhanis & Tsai, 1988; Kennedy & Park, 1994; Schneider & Lee; 1990). Some examined learning environments of Asian American students and the expectation they

share with their teachers and peers (Huang & Waxman, 1995; Huang, 1996; Schneider & Lee, 1990). Others explored the relationship of these students' academic success to gender, socio-economic status, and/or other factors (Dolly, 1988; Peng,1995,Whang Hancock, 1994).

They have been found to be particularly "good" in mathematics and teachers often expect them to be "good" in it (Pang, 1990). Yet in reality, a recent study based on the National Center for Education Statistics database revealed that about 24% of eighth-grade Asian Americans failed to achieve basic achievement levels in mathematics (Huang, 1996) Furthermore tenth grade Asian American students' dropout rate has more than doubled between 1980-82 and 1990-92 (McMillen, Kaufman, & Whitner, 1994, P.41). The inaccurate and biased interpretation can greatly affect Asian American students' academic self-concept and school experience. Little is known about the actual classroom processes of Asian American students in mathematics. Since there are research findings suggesting that classroom processes influence student outcomes (Fraser, Walberg, Welch, & Hattie, 1987; Teddlie, Kirby, & Stringfield, 1989; Weishew & Peng, 1993), it is necessary to provide an objective and accurate account of Asian American students' behaviour in their mathematics classrooms in order to explain Asian American Students' achievement in mathematics. One of the best approaches to investigate classroom processes is to engage in classroom observation research.

Classroom observation research has evolved in the last three decades as an important research pattern for the improvement of mathematics education (Kulm, 1993; McMullen, 1993; Pechman, 1991). Many studies have used systematic classroom observation techniques in order to investigate effective teaching and learning at the elementary,

middle, and high school levels (Anderson & Burns, 1989; Brophy & Good, 1986, Stallings & Mohiman, 1988; Waxman, 1995) Medlay (1982) defines systematic classroom observation as a "scheme that specifies both the events that the observer is to record and the procedure to be used in recording them." Among the various techniques, the most widely used observation procedure for educational research is based on interactive coding systems that allow the observer to record specific and easily identifiable behaviors that students and teachers do during a given time interval (Stodolsky, 1990).

The results are presented in the mean percentage of time the specific behavior was observed. In the middle school mathematics classes, the predominant setting was whole-class instruction, accounting for 63% of the time being observed, followed by individual or independent work (31%). In these settings, the students interacted with their teachers about 52% of the time for instructional purpose and nearly 9% of the time for managerial purposes. They interacted with other students about 8% of the time. The most prevalent activity they were observed was watching and listening, accounting for 43% of the time being observed. It is followed by working on written assignments (25%), talking (10%), and taking quizzes (7%). They were on task about 84% of the time observed, diverted nearly 8% of the time, and disturbing about 2% of the time.

The drawing from the 476 surveys in this international study show many similarities from the different cultures. Examination for commonalities among the five countries Finland, Sweden, USA, United Kingdom and Romania, identified many themes related to image of mathematics. For the past decade there has been increased discussion and research about images of mathematics and mathematicians (Furinghetti, 1993; Henrion, 1997; Lim and Ernest, 1998; Rock and Shaw, 2000) as well as what has been

referred to as the "mathematics' image problem" (Howson and Kahane, 1990: Malkevitch, 1989, 1997). Furinghetti (1993, P. 34) points out that mathematics "is a discipline that enjoys a peculiar property: it may be loved or hated, understood or misunderstood, but everybody has some mental image of it." For many people this mental image is not a good one, which may be in turn why the public image in most developed countries is so poor (Howson and Kahane, 1990).

Rock and Shaw (2000, P. 50) Suggest that understanding what children think about mathematicians and being able to change children's views of them, may "facilitate and broaden children's thinking about their roles as future mathematicians." The importance of this can not be underrated for, if pupils' images of mathematicians indicate that they perceive mathematics to be an unattractive field of study (NSF, 1998), then the decline in enrolment of students in advanced mathematics courses (Garfunkel and Young, 1998) is sure to continue unabated, fulfilling predictions of an increasing shortage of mathematician and teachers of the subject (National Research Council, 1989).

Lim and Ernest (1999) point out that it is only through ascertaining how popular or unpopular mathematics is, that measures can be created to change and improve its public image. And if, as Jaworski (1994, P. 218) seems to imply, learning mathematics is related to being a mathematician, what she calls "being mathematical within a mathematical community," then where pupils' have images of mathematicians which are inaccurate or stereotypical it may delay their studies of mathematics. The decision to investigate pupils' images of mathematicians came after seeing a group of images produced from a class assignment given to her pupils by a colleague in New York City.

Henrrion (1997, P. xix), suggests through a research that imagery can provide insight into belief systems and that this imagery is important because "it reveals

underlying beliefs, assumptions and expectations. Moreover, imaginary not only reflects but affects who goes into mathematics."

Sewell (1981) in his research proposes that "teachers' attitudes, the formality of mathematics teaching, the lack of relevance to everyday context, fear of the subject, literacy problem, gap in schooling and parental expectations" are the few possible causes. Bell (1989) speculates that most people initially have the capacity to appreciate the beauty of mathematics as an art, but sadly this appreciation "often get suppressed by distasteful school experience" Likewise, Ernest, (1996) claims that experience of learning mathematics in school, especially the negative ones, are possibly the dominant sources leading to the public image of mathematics.

These propositions seem to suggest that three of the possible factors that influence negative public image of mathematics are parents, teachers and school experiences. Past literature indicates that parents have significant influence on their children's image of mathematics (Cain Caston, 1989). Studies suggest that teachers' image of mathematics could have influence on their teaching instructions (Pajeres 1992, Lerman 1993). Henderson (1981) argued that many people viewed and learned mathematics in a rigid and rote way that has hindered their creativity. This condition is further "Systematically reinforced by our culture, which views mathematics as only accessible to a talented few. It is conjectured that Eastern countries tended to value one's effort more than one's mathematical ability where as Western countries attributed ability more that effort to a person's success in mathematics.

In Nepal there are very few researches held on attitudes' images and belief of mathematics but there are some international studies found on this topic. There are some concerns on these researches that mathematics is difficult subject, mathematics is only for

cleaver once, mathematics as a male domain and teacher, society and cultures influences on mathematics learning which affects to build image of mathematics. Therefore the researcher decided to study on this field so that it will be very helpful for those who are interested this domain.

Conceptual Framework

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                        │  Enjoyment   │
                        └──────┬───────┘
                               ↕
┌───────────┐          ┌──────────────┐          ┌───────────┐
│  Kinking  │◄────────►│   Attitudes  │◄────────►│  Anxiety  │
└───────────┘          └──────┬───────┘          └───────────┘
                               ↕
                     ┌───────────────────────┐
                     │  Image of Mathematics │
                     └──────────┬────────────┘
                                ↕
┌──────────────────────┐  ┌──────────┐  ┌──────────────────────┐
│ Nature of Mathematics│◄►│  Beliefs │◄►│ Learning Mathematics │
└──────────────────────┘  └────┬─────┘  └──────────────────────┘
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                    │  Value of Mathematics│
                    └──────────────────────┘
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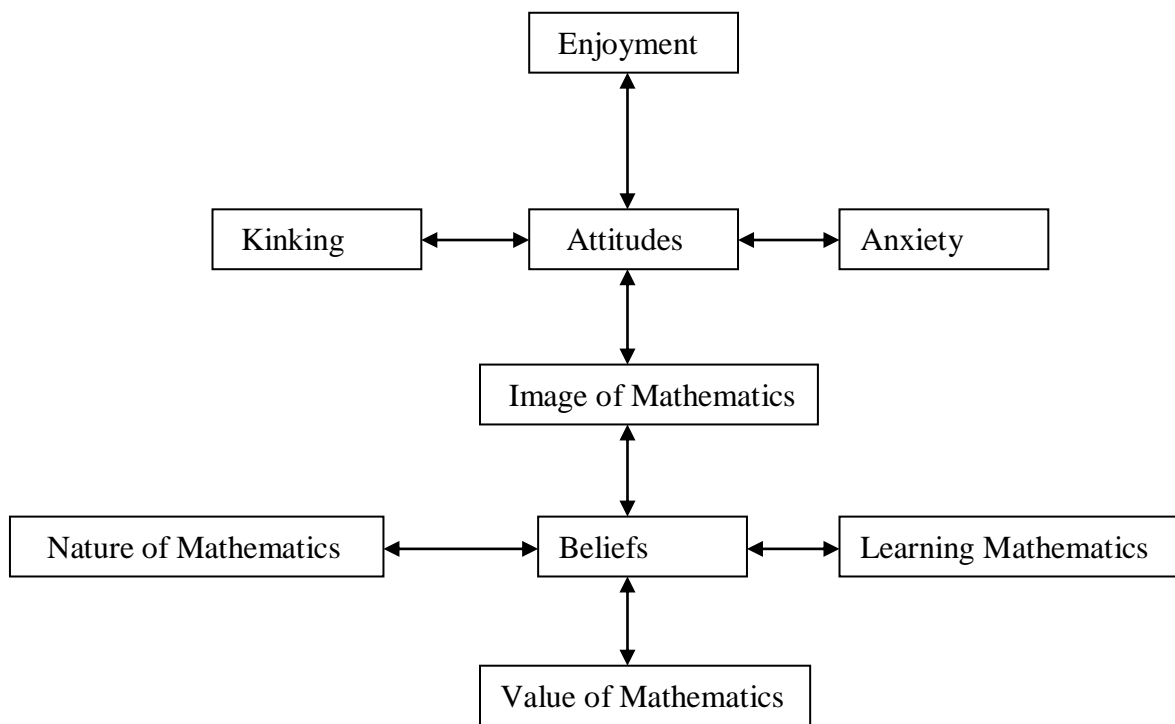
CHAPTER III

RESEARCH METHODOLOGY

Research methodology is a science, which determines how the researcher becomes complete the systematic. Research methodology does not mean only collect total information but also means the use of appropriate research methods. This research is the initiation in the way of finding the public image of mathematics.

Design of the Study

It was a qualitative research however descriptive survey and interpretative approach has been applied and some quantitative interpretations also have been made. It is exploratory because the main aim of this study was to explore any general trend in image of mathematics among the secondary level students.

Population of the Study

The population of the present study included the secondary level students from the Kathmandu Valley. Researcher has tried to select respondents as possible as from different communities, gender and places.

Sample of the study

One hundred and twenty Secondary students were selected from eight schools that four from Pubic and four private schools. Then again another one higher secondary level entrance preparation bridge course teaching institute in Kalanki was chosen. Among students, half were from grade X students who just passed grade IX and other half were grade X were waiting S.L.C. result. Details of those students were given in Appendix II.

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                        ┌─────────────────┐
                        │  120 Students   │
                        └────────┬────────┘
              ┌──────────────────┴──────────────────┐
   ┌──────────────────┐                   ┌──────────────────┐
   │ 60 From Public   │                   │ 60 From Public   │
   │ School           │                   │ School           │
   └────────┬─────────┘                   └────────┬─────────┘
      ┌─────┴─────┐                          ┌─────┴─────┐
┌──────────┐ ┌──────────┐            ┌──────────┐ ┌──────────┐
│ 30 Girls │ │ 30 Boys  │            │ 30 Girls │ │ 30 Boys  │
└────┬─────┘ └────┬─────┘            └────┬─────┘ └────┬─────┘
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15 From Class IX	15 From Class IX	15 From Class IX	15 From Class IX
15 From Class X	15 From Class X	15 From Class X	15 From Class X
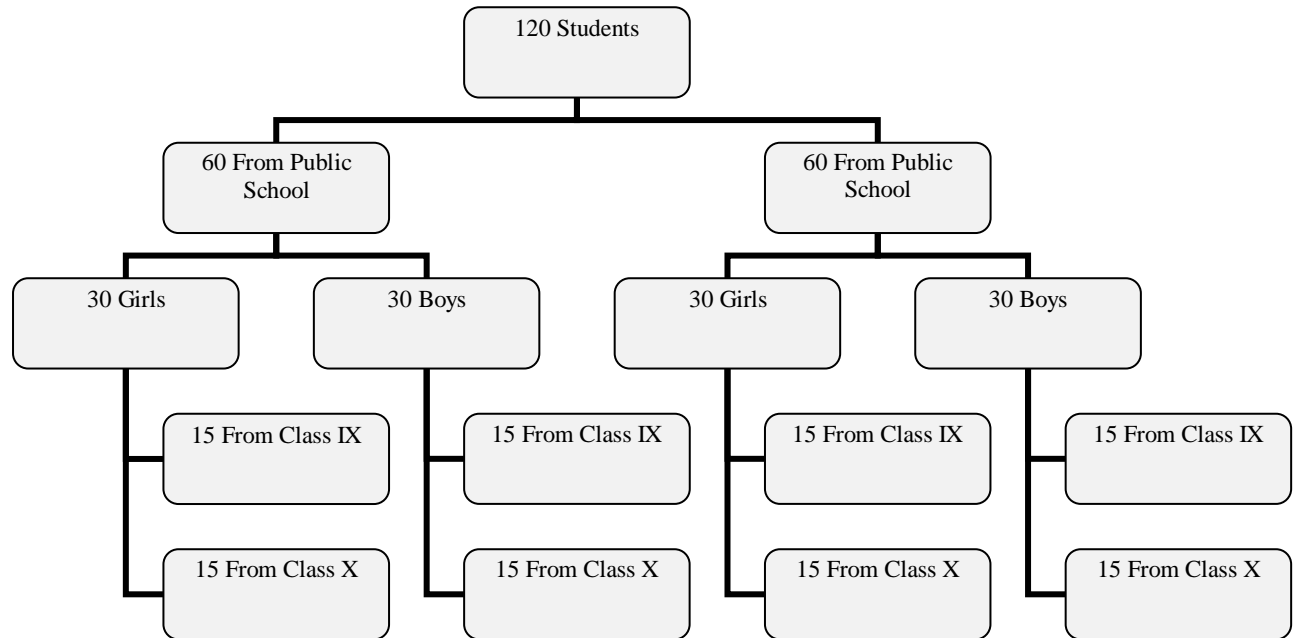
Tree Diagram I: Sample of the Research

Instruments/Tools

Opinionnaire was the tool. The filled up opinionnaire was the fundamental bases for the analysis of the data and interpretation of the result. Attitude and belief was considered as the two major deminsions of image as included in the tools. There were 20 statements in attitude and 15 in belief. An opinionnaire was developed addressing image of mathematics related to the objectives of the research.

Procedure of Data Collection

The researcher visited each of the selected schools. the researcher met the head teachers of the school and chairman of the institute, explained in detail the purpose of the visit and requested permission and appointment to visit the school on the next day. The researcher tried to catch up S.L.C. result waiting students from different sources like entrance preparation institutions. Before administrating the questionnaire, the researcher explained the answering procedure so that they felt good time to share experiences about

mathematics and concerns. Researcher tried to minimize unnecessary interpretations and effects that influence students opinionative in data collection time.

Data Analysis Procedure

At the stage of data analysis and interpretation, attitudes and belief was taken as two main pillars according as the developed theoretical framework. Numerical interpretations were done when possible on the basis of gender, public and private students. Attitude deals with liking, confidence, enjoyment and anxiety then belief deals with nature of mathematics, learning mathematics and values of mathematics. Numerical interpretations with tables and other mathematical figures were also shown as more as possible. To test the effect of gender about image of mathematics among secondary level students x^2 test was used by making 3×2 contingency table on 0.05 level of significance.

CHAPTER IV

ANALYSIS AND INTERPRTATION OF DATA

Image of Mathematics itself is a qualitative topic. Different students have different thoughts about this topic and they responded accordingly. In total 120 students, 60 from private school and 60 from public school were selected as sample and researcher collected and analyzed their opinion. Researcher built an opinionaire form (Appendix II) related to image of mathematics and sent this to selected students. Students took two days to fill up this form so that they could give their true opinion.

Attitude

Research centering on students' attitudes toward mathematics study has received increasing attention. Moreover, instructional strategies may also support student needs in order to increase student achievement. It was found that when mathematics problem were interesting and engaging, students with learning disabilities were able to solve problems that emphasized higher level thinking skills. The important factors were the teacher and students' academic level; while age, gender, and language were weakly associated with attitudes. Rural and urban students' attitudes toward math and career aspirations positively affected their performance. Attitude towards mathematics has not related to gender difference. Attitude towards mathematics included liking, confidence, enjoyment and anxiety.

Liking

Which subject and subject teacher were favourite, how much did they like mathematics, did they like mathematics were the focus point of this topic. The following sub-topics are analyzed.

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Favorite Subject

Mathematics was fourth liking subject among hundred and twenty students. Twenty-four students among 120 students liked mathematics subject most. There were 30% boys and 20% girls who like mathematics among sixty boys and sixty girls. there was no vast gender difference in liking mathematics.

There were only five choosing subjects in research group. Forty five students choose mathematics as a optional subject. In one private school, mathematics was compulsory to choose.

"I choose mathematics because it was compulsory in my school" Anjan Shrestha

Students with poor mathematics took economics, environment science and computer. Computer science was second choosing subject in private school and economics is in public school.

Table : 1 Students Liking Different Subjects

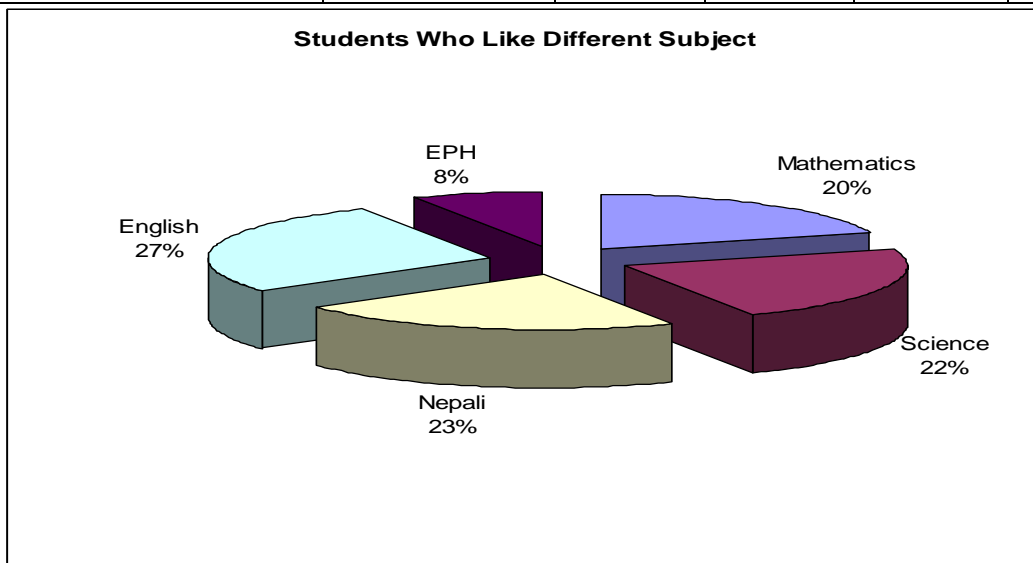| Like Subject	Mathematics	Science	Nepali	English	EPH
Number of Students	24	27	27	33	9

Chart: 2 Students Like different Subjects

Researcher found that among 120 students 24 (20%) students like Mathematics 27 (22.5%) likes science 27 (22.5%) like Nepali 33 (27%) like English and 9 (8%) students EPH. From the table the researcher concluded that most of student likes English. Only 20% students like mathematics.

Afraid with Mathematics teacher's Presence

Most of the students are not afraid with mathematics teachers' presence but the students who are poor in this subject are frightened seeing mathematics teachers. All of the students who were afraid of mathematics teacher secured less than 50% marks in mathematics. Only15 students (12.5%) out of 120 students are afraid with mathematics teachers' presence but 6 students mentioned that they were afraid when they did not understand and tried to ask questions.

There was question "Do you afraid when your mathematics teacher enters in the class room?" One responded gave me on reply as,

"No, Mathematics teacher is strict with only those students who are out of discipline"- Pinkey Dheke.

Table: 2 Afraid when mathematics teacher enters in class room

Afraid when math teacher enters in class room			
Yes		No	
Number of Students	Percentage	Number of Students	Percentage
15	12.5%	105	87.5%

Favorite Teacher

Many of the students like practical subject like computer. Only 33 students (27.5%) liked mathematics teacher and many mathematics teacher liked students securing

more than 60% marks in mathematics. Clever student selected mathematics and science teacher as a favourite.

Students like frank, caring and helpful teachers, nobody wrote that they wanted strict teacher.

Table: 3 Favorite Subject Teachers

Like Subject Teacher	Mathematics	Computer	Nepali	Social Studies	EPH
Number of Students	33	30	18	21	18
Percentage	27.5%	25%	15%	17.5%	15%

The researcher found that among 120 students 33 (27.5%) students liked Mathematics, 30 (25%) students liked Computer, 18(15%) students liked Nepali, 21(17.5%) students liked Social Studies and 18(15%) students liked EPH teacher. From above table researcher concluded that talented students like mathematics and science.

Time Allocation to Study Mathematics

Researcher found that students give more time to study mathematics and they feel mathematics is more time needed subject. Average 2.22 hrs per day is their study time and 18 students gave four or more than four hours per day for mathematics study. Maximum number of students *i.e.*60 students out of 120 students gave two hours per day and only 9 students spent about half an hour per day.

27 students out of 120 had not any fixed reading timing schedule and the only studied hardly in examination time, as their mood and homework load. Researcher asked a question related to time allocation as "How much time do you spend to study mathematics in your house?"

Table: 4 Time to study mathematics in house

Hours per day	½	1	1 ½	2	3	4	Total
Number of Students	10	20	11	40	18	21	120

Among 120 students 10 students gave only half an hour in a day, 20 students gave 1 hour in a day, 11 students gave 1 and half an hour in a day 40 gave 2 hours, 18 gave 3 hours and 21 students gave 4 hours in a day.

The researcher found that the average time allocated by these students to study mathematics in their houses was 2.17 hr per day; mode time was 2 hours per day.

Using Calculators and Formula Tables

Calculators, geometric instruments, log tables and formula tables have important role to solve mathematical problems and students should know its importance and utility. Here, researcher collected student's opinion that 78 students (65%) said that mathematical problem solving without using calculators was good and remaining 42 students wanted to use such mathematical instruments.21 students use calculator but they think it makes them dull and passive 6 students used calculator because of their habit.

Only 9 students used calculator in difficult problems. Students from private schools have more habit to use calculator *i.e.*48 among 60 students. from public school don't like to use calculators which was 30 among 60 in public school.

"Yes I solve mathematical problems without using calculator and formula tables but for some hard questions I need calculator" – Raju Tamang

The instruments are used in school level but formula table was not used and students must rote formulas related to mathematics. They believe that using calculators is essential and it makes them fast to solve mathematical problems.

Using Rough Papers

Mathematical knowledge depends upon practice. Many concepts come from regular practice. So using rough paper is essential but there were 15 students who always write in rough paper then only copy down in fair paper. 51 girls and 42 boys use rough paper but their rough paper using style was different. 27 (22.5%) students do not want to use rough papers among 120 students.

"First of all, I use rough paper then use fair copy to solve mathematical problems." – Raju Tamang

Six boys thought that using rough paper is most useful and needed so that they focused using on it.

Checking Answer sheets

Answer sheet is given in most of the mathematics books in secondary level. Students see answer sheet for two purpose. First they check their solution whether their solution is correct or not and second when the problem is difficult and for searching any clues of solution. There were only 3 students from class who never saw answer sheet but rest of them *i.e.* 117 students saw answer sheet in many ways 6 students saw rarely and 30 students saw twice when problem was difficult.

Table: 5 Checking Answer Sheets

	Never		Rarely		Once		Twice	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Name of Students	3	0	0	6	39	42	18	12
Percentage	2.5%	0%	0%	5%	32.5%	35%	15%	10%

Among 120 students 3 (2.5%) girls and 0%boys didn't check answer sheet, only 6 boys checked answer sheet rarely, 39(32.5%) girls and 42(35%) boys students checked answer sheet once and 18 girls (15%)and 12boys (10%)checked answer sheet twice. The researcher found that low number of student didn't check answer sheet but maximum number of student checked their answer in answer sheet.

Solution by Teacher

Teacher is a facilitator and concepts' learning is the main target. Poor students only want to learn solution of the problem and they want to see teachers solution that why they can copy and practice it. Researcher asked a question as "Does teacher need to solve all the mathematical problems given in book?" According to this research, five students among forty wanted all solution of all problems given in book by teacher. Eight students wanted only difficult problems' solution by teacher and twenty seven wanted answer from every different questions.

"No, only those which are not solved by us" – Anjan Shrestha

"No, if teacher solve all the mathematical problems then students are fully depend upon teacher" – Elina Shrestha

Guessing Exam Scores

Students hope more marks in mathematics but it is not always true, many students fail in mathematics. Students guess their obtained marks after their examination. In this research, some guess accurately, some near about and some have varied with many numbers.

"Yes my guess marks often match with my obtained marks" – Nilu Ale

Six boys and three girls had opined that their guess mark did not match with obtained marks which all were from public school. Remaining all 111(92.5%) students had positive answer. But among 120 students, only 30 (25%) students accurately guessed the mark and other had 5-6 marks difference.

Generally students guess more marks because they only calculate according to their answers in solution but answer sheets are checked process wise. Students do not realize their fault until the answer sheets are checked in front of them

Class work and home work

Doing class work is essential task and makes easy to understand what teacher guides and home work build up confidence. How do students take homework and class work? Do they feel bored while doing home works and class works? Here is a legend that doing home work is extra load for students. In this research, every student had a concept that they must do mathematics homework and should actively participate in class work. Each student did home work but 30 (25%) students feel bored while doing mathematics home work. 66 students were obedient to do home work and 18 were very excited while doing mathematics homework.

All of these120 students participated in class work but 45 wanted to escape from the teacher while doing class work. Three students never asked any unknown answer with mathematics teacher.

Puzzles and Quizzes

Students have positive attitude towards mathematical puzzles and quizzes. Most of the students enjoy with mathematical puzzles and they are happy and excited they got correct answers. Certain puzzles and quizzes are inserted in school level curriculum in

Nepal but very few mathematics teachers give chance to students to participate in such activities. There is not any mathematical puzzles and quizzes program in school level.

Researcher found very positive response towards students related to mathematical puzzles. Students were excited and happy. Every student responded as enjoyable, great, exciting, interesting, creative, happy etc words related to mathematical puzzles and quizzes. No one answered as negative feeling.

"I feel very much excited while attending mathematical puzzles and quizzes" – *Shrijana Rajkarnikar*

"I feel curious and interesting while attending mathematical puzzles and quizzes" – *Anish Sharma*

The researcher found that mathematics puzzles and quizzes were very interesting most of students excited too much while attending mathematical puzzles and quizzes and feel curious and interested to attain in mathematical puzzles and quizzes.

Mathematics and its Nature

Different students have different ways to express the nature of mathematics. Here, researcher is trying to find out image of mathematics *i.e.* also nature of mathematics among secondary level students of Nepal. There were six options related to mathematics nature which are mathematics is enjoyable, relaxing, creative, wonderful, boring, headache to students.

Enjoyable was ticked by twenty students, relaxing by eighteen students, creative by twenty three students, wonderful by three students, boring by two students and headache by seven students. Only nine (9) had negative attitude towards mathematics among forty students

Table:6 Nature of Mathematics

	Enjoyable		Relaxing		Creative		Wonderful		Boring		Headache tostudents	
	Boy	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy	Girl
Number of Students	24	36	30	24	51	18	3	6	3	3	15	6
Percentage	20	30	25	20	45.5	15	2.5	5	2.5	2.5	12.5	5

The question elated to nature was "Is mathematics enjoyable and relaxing subject? Most of the responses were positive towards it.

Some students had mixed response that mathematics is enjoyable, creative and useful but it is not relaxing subject.

In the context of Nepal mathematics is boring subject not enjoyable and relaxing subject. The researcher found that out of120 students 24 boys that is 20%and 36 girls that is 30%feels mathematics is enjoyable subject, 30 boys that is 25% and 24 girls that is 20% students feels mathematics is relaxing subject, similarly out of 120 students 51 boys that is 45.5%and 18 girls that is 15% feels mathematics is creative subject. 2.5% boys and 5% girls feels mathematics is wonderful subject,2.5%boys and 2.5% girls feels mathematics is boring subject and 12.5% boys and 5% girls feels mathematics is headache subject.

From above the researcher conclude that mathematics is enjoyable relaxing and creative subject.

Mathematics Classroom Activity

Students are very attentive in mathematics classes because they think teacher's instruction must be followed by them. Otherwise they cannot understand it properly and it

is chain learning. If they don't understand today's lesson then they won't learn tomorrow's lesson. They were only 15 students among 120, who did not want to take active participation in mathematics classroom, they thought they were poor in mathematics, their friends and teachers hated them when they asked about confusion. Rest 105 students enjoy mathematics class.

"Yes I always enjoy while participating in mathematics classroom activity."-Prabesh K.C.

"Yes I enjoy more while doing difficult and new problems; I get a kind of satisfaction after I get correct answer."-Anand Shah

Students' enjoyment depends upon teacher's activity, teaching method, time of teaching an nature of lesson. Students enjoy mathematics class while teacher teaches with teacher teaches with teaching materials, full of subject matter's concept and proper explanation of formulas.

There were 105 students out of 120 enjoy while participating in mathematics classroom activity but only 15 students didn't want to take active participation in mathematics classroom activity.

Anxiety

Any physical, emotional or psychological problems, aroused due to mathematics or its learning can be considered as mathematics anxiety. What all of the students are expressing is math anxiety, a feeling of intense frustration or helplessness about one's ability to do mathematics.

Image of Mathematics Teachers

Students hate teacher according to his or her activities, not by subject but they think mathematics teacher are clever and good than others. Are students angry with mathematics teacher? Only 27 students are angry with mathematics teacher, 60 students aren't angry with mathematics teacher and 33 are angry according to situation. There is a myth that mathematics teachers are strict and tight.

Disliked Subject

In Case of myth about mathematics is difficult and anxiety that no student has such case in this research but some have little bit negative emotion about mathematics. Any way it is not like what we find as a myth. Which subject you never want to study? No student replied mathematics as an answer of this question. Most of the students don't like to see social studies and science. 24 students (20%) didn't want to study science and 21 (17.5%) didn't like social studies. Environment and population studies and Accountancy had so many small points to remember and 18 students didn't like each of them: Private school's 12 students hated Nepali and 6 students from public school didn't want to learn English subject. 21 students didn't have any subject that they hate.

Table: 7 Dislike Subjects

Dislike Subjects	Science	Social Studies	EPH	Accountancy	Nepali	English	Not any Subject
Number of Students	24	21	18	18	12	6	21

Are you negatively emotional with mathematics? In total they were not negatively emotional towards mathematics but they felt difficult and disliked mathematics when they

did not get correct solution, very hard to solve and needed so much time to complete all exercise. Each student gave answer 'no' on it but 54 students (45%) added but with some clause that they hated mathematics some times.

"I don't want to see mathematic long time when I get very few marks in examination after hard work" – Reena Lama

The researcher found that some students didn't want to mathematics long time because they got very few marks in examination after hard work. They worked very hard but got very few marks in examination.

What makes Borether in Mathematics?

What part of mathematics makes you bother? Many students like mathematical puzzles then what they in it? Students hate so many formulas, using calculators, rough papers, very formalities on solving process, wrong answers after long solution, takes more time and need very much confidences etc are their bothering points in mathematics.

"Unknown formulas make me bother when I practice the mathematical problems." – Anjan Shrestha

There are a lot of formulas in mathematics some are known formulas and some are unknown formulas. Known formulas didn't make bore to practice mathematics but unknown formulas made them bore to practice mathematics.

Geometrical proofs made difficult to some students and maximum 63 students (52.5%) had problem remembering formulas. Remembering only formulas was not them; they needed to apply in correct place with correct calculation. Some problems had tricky answer.

Examination Phobia

Sure, examination makes students frightened but some students afraid very much more than needed. There is very little number of students who were only afraid with only mathematics examination. There are 36 students who afraid in every subject's examination but more 15students afraid only in mathematics among 120 students.

"I afraid every time from mathematical examination" – Nishant Lama

Students have a thinking that mathematics needs more practice for examination preparation then they get afraid when they can't give more time on it.

I am afraid sometimes when I have not prepared well" – Prabesh K.C.

The researcher found that most students afraid in mathematics examination not prepared well.

Belief

Image of mathematics was going to research by two pillars attitudes and beliefs. Here, belief means comparatively study on common myth towards mathematics and students opinion. Three sub-topics were analyzed to clarify this topic as nature of mathematics, learning of mathematics and values of mathematics.

Nature of Mathematics

Mathematics was realized on both logic and creativity, and it was pursued both for a variety of practical purposes and for its essential interest. For some people, and not only professional mathematicians, the essence of mathematics lies in its beauty and its intellectual challenge. For others, including many scientists and engineers, the chief value of mathematics is how it is applied to their own work. Because mathematics plays such a central role in modern culture, some basic understanding of the nature of mathematics is requisite for scientific literacy. To achieve this, students need to perceive mathematics as

part of the scientific endeavor, comprehend the nature of mathematical thinking, and become familiar with key mathematical ideas and skills. This topic focuses on mathematics as part of the personality than on mathematics as a process, or way of thinking and gender effect in learning mathematics.

Gender Difference

Mathematics can learn by either boys or girls. This research on image of mathematics had also this objective to find out whether there is gender difference towards learning mathematics or not? Who can learn mathematics better, boys or girls? The 120 respondents had different views, 18 said it is male domain, 9 said female domain, 75 said indifferent due to gender and 18 did not respond. All female domain respondents were female.

This research can conclude that mathematics learning is not affected by gender but it can be affected by socio-economic condition, religion and family status of the students. Our society has different looking towards girls and it may affect to their mathematics learning activity because girls have to do more work as a household ladies so that they can not allocate enough time to study mathematics. But there is not any gender difference towards mathematics learning.

Mathematics and Personality

Personality is over all development of a people. Instead of a concept that mathematics good students have a good personality. 30 (25%) students thought it has not any role and relation for personality development of pupil. Rest 90 students thought that mathematics good students have good concepts in other subjects and they can do better. Is mathematics only for clever students? 84 students (70%) answered as mathematics is not only for clever students. Some responded as it is not only for clever students but it

makes students clever. Remaining 36 students thought that only clever students learn mathematics.

Characteristics Features of Mathematics

A research on image of mathematics was going to find out some characteristics features on it by giving to choose some features according as annex I on belief towards it. There were twenty six options related to it and students had freedom to choose any number of options. Among these options maximum fifteen options and minimum five options were choose by each student. The result of the research among forty students had been shown as below.

Table: 8 Characteristics Feature of Mathematics

Character	Number of Students			Total %	Character	Number of Students			Total %
	Boy	Girl	Total	%		Boy	Girl	Total	%
Logical	33	36	69	57.5	Symbolic	6	9	15	12.5
Abstract	6	0	6	5	Rigid	0	3	3	2.5
Challenging	18	48	57	47.5	Technique Based	24	24	48	40
Confidence	36	18	54	45	Changing	0	2	2	2.5
Respected	6	9	15	12.5	Reasoning	15	9	24	20
Process	36	27	63	52.5	Always true	6	6	12	10
Practical	18	18	36	30	Flexible	3	3	6	5
Powerful	18	15	33	27.5	Generalization	9	3	12	10
Stressful	9	15	24	2	Specification	3	0	3	2.5
Language	0	3	3	2.5	Dynamic	3	3	6	5
Structured	6	9	15	12.5	Problem Solving	30	30	60	50
Memory Based	30	33	63	52.5	Innovative	3	3	6	5
All about number and rules	18	18	36	30	Artistic	3	0	3	2.5

Above data show that maximum number of student *i.e.* 57.5% of students thought mathematics as a logical subject and secondly they (52.5%) thought it is process wise and memory based subject. Students did not realize mathematics is artistic, Specification, rigid, language, dynamic, flexible,

Learning Mathematics

Mathematics learning changes students' mathematical behavior. Image of mathematics study students' mathematical behaviors, relation between math-mind and practice with mathematics achievement. What is the role of students' and teachers' to learn mathematics effectively? Researcher tried to find out the answers of these questions.

Mathematics as a Difficult Subject

Mathematics has different nature and students should have some extra capabilities and skills than other subject to learn. Some students took mathematics as the easiest subject and some as very hardest subject. In contrary of mathematics is difficult subject, only 27.5% or 33 students had mathematics difficult. Half students did not think mathematics is difficult to learn but 27 students had difficulty to learn mathematics according to situation, context and presentation of teacher.

Table: 9 Mathematics difficulties Analysis

Items	Easy		Difficult		Depends on Situation	
Gender	Boy	Girl	Boy	Girl	Boy	Girl
Number of Students	24	36	21	12	12	15
percentage	50%		27.5%		22.5%	

Chart: 5 Mathematical Difficulty Analyses

Mathematics is logical subject and needs more time, more intelligence and effort to learn, Is mathematics difficult to learn?

"If we ware unknown about rules and formulas, than it is quite difficult subject." - Anish Sharma Mathematics is difficult to learn because they can't remember it by learning; they have to practice a lot. Few students always feel relaxing by doing difficult mathematics problems and mathematics puzzles. They were six students who hate mathematics and never want to study mathematics in future in higher study.

Out of 120 students 24 boys and 36 girls that is 50%0f total students feel mathematics is easy subject.21 boys and 12 girls that is 27.5% of total feel mathematics is difficult subject and 12 boys and 15 girls that is 22.5% of total students feels depends upon the situation of mathematics learning.

Mathematical-Mind and Learning Mathematics

Instead of one myth that child born with mathematical mind, 95% students disagreed on it. Does children get mathematics mind by birth? What is the relation between mathematical-mind and practice? Only six students accepted first question and 114 (95%) students showed interrelation between mathematical-mind and practice. Among these 114 students, 60 students exactly rejected that children got mathematics mind by birth. Some claimed that only thinking mathematical-mind and without doing sufficient practice one can not learn mathematics but regular practice is necessary to learn this subject.

"Mathematics marks directly proportional to practices." – Anand Shah

In summary, Mathematical-mind and practice are interrelated, without practice mathematical-mind cannot be created; students can gain mathematical-mind by their own effort.

Role of Teachers and Students

Learning mathematics is a group effort and its seen components are students and teachers. In case of teacher's role, teacher should teach mathematics by taking care of each student or focusing everyone with true vision to make each student perfect by providing a good learning environment. Teacher should give mathematical entertainment to the students for better achievement. Teacher should give more examples and explain clearly for better achievement. Teacher should understand student's interests and feelings then should behave well in front of students or treat each student psychologically. How the teacher should teach mathematics for better achievement? The researcher found different words on it but in total all wanted positive, friendly and caring role of the mathematics teacher.

"By giving simple ideas and interesting methods of solving problems and also by encouraging them by saying mathematics is not hard" – Anjan Shrestha

"The teacher should teach mathematics in the way that students shouldn't feel it's not only about numbers and rules but also have real application in life" – Anand Shah

"Teacher suggest them by saying mathematics is also like another subject and also give friendly environment to student with understanding idea and method." – Elina Shrestha

" I think teacher should teach mathematics by using different style which can attract all the students towards the subject matters." – Anish Sharms

What is the role of students in making mathematics learning effectives? Students should hard work, Concentrate towards mathematics learning, Confidence and well disciplined. Students should study well, practice hard, do not hesitate to ask difficult questions and understand formulas well to make mathematics learning effectives.

Students should have logical mind and don't make negative emotional attitude towards the teachers. As summary, each respondents want active, sincere and positive role of students in effective mathematics teaching learning process.

"The only role of student is studying hard, being sincere, simple and doing their best at every step;" – Sanjaya Tamang

"To make mathematics learning effective, students should concentrate in class and clear all confusions with asking cross question." – Suruchi Dhungana

To make mathematics learning effective teacher should use student centered teaching learning activities. He/she should used easy methods in teaching learning activities to understand mathematics problem easily.

Values of Mathematics

Each and every thing has its own values whether it is less or more. Here, value of mathematics also show, public image towards mathematics. How can we apply mathematical concepts in our daily uses? Mathematics teacher are honored in comparison with other teachers. Here, relation of mathematics with other subject and chance of getting job by mathematics student are analyzed with some collective data from students.

Mathematics and Job Chance

Importance of mathematics shows the probability of getting job by mathematics students. How much mathematics is helpful in getting job chance? Students had positive answer towards it and only four (10%) students rejected this. Among other thirty six students twenty (50%) students had very positive thinking that no mathematics students are unemployed. There was a thinking that mathematics know persons have sure job, either tuition class or teacher in university to private schools. Mathematics is interrelated with other subject, and every one needs mathematical knowledge.

Respect of Mathematics Teacher

Teaching is a respected job but here is a myth that unqualified people are employed in teaching. How much honored mathematics teachers in our society? Two types of answers were given by students *i.e.* respected or not respected. 75 (62.5 %) students had first type of response towards this question and remaining 45 students had mix response. Among these 45 students, 15 thought teachers have not proper respect in our society and other 30 calculated mathematics teachers' dignity is less than other respected professions.

Mathematics and Its Uses

Everywhere we have numerical use of mathematical concept. Whether we go to shop or restaurant, paying travel fare of public bus or putting petrol in oil station, calculating statistical data in census of taking a work in contract every where we should use mathematical concepts in our daily life. How much important mathematics is in our daily life? No student replied it negatively. Some had a claim that mathematics is only study of number and formulas but this research data showed that it is false.

"We have to do a lots of calculations in different purpose so mathematics is very important in secondary level as well as higher level" – Reena Lama

Are mathematical concepts useful to other subject? Sure, mathematics is useful and interrelated subject with others. All of the students showed a kind of relation with mathematics and other subject.

"Yes, mathematical concepts are useful to study other subjects like science, accountancy, computer etc." – Raju Tamang

The researcher found that mathematics concepts are useful to study other subject like in science computer accountancy etc. similarly mathematical concepts are used in every steps of human life.

Arithmetic Part of Mathematics

Does only arithmetic part useful in our daily life? Arithmetic deals with numbers. Many people think mathematics is only about calculating numbers. However, it is not true and only 18 students gave importance of only arithmetic part of mathematics. Other 102 students had shown other parts like algebra, geometry, statistics and trigonometry parts were also important and useful in our daily life.

Testing and analyze the data

To test gender difference of image of mathematics among secondary level students Chi-square test was used by making 3×2 contingency table at 0.05 level of significance.

	Easy	Difficult	Depends on Situation	Total	Cal χ^2	Tab. at 0.025
Boys	24 28.5	21 15.68	12 12.83	57	5.67	7.21
Girls	36 31.5	12 17.33	15 14.18	63		
Total	60	33	27	120		

In d. f 2 and level of significant 0.025 the tabulated value is 7.21 which is greater than calculated value 5.67. So the Null hypothesis is not rejected.

From the above test there is no significance difference in the image of mathematics between boys and girls students.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study was concerned with the students' opinion related to image towards mathematics. This is a qualitative research and image has a vague meaning. A difficult fact was faced by researcher that some opinion were affected by researcher's view towards mathematics. However, it was tried to minimize this kind of affect in opinion collection and analysis process. Image of mathematics is a mental picture related to mathematics.

Different kinds of views and thinking were found about image of mathematics that it is hard, difficult to learn, boring subject, time needy subject, useful every where and so on. Researcher made an opinionaire related to it with two main pillars *i.e.* attitudes and beliefs towards mathematics then collect students' opinion from different students by gender, class level and schools. Mainly two objectives were taken for this research. First is to find secondary level students' image towards mathematics and secondary to study image of mathematics due to gender.

For opinion collection, sixty students were taken from two public schools, four private schools and one entrance preparation institute. An opinionaire with thirty five questions was given and each question was analyzed and presented.

Students like mathematics and it is useful subject. However, it is difficult and practice needy subject but no one born with mathematical-mind. School level students don't think good to use calculators and formula table. Teacher's role is very important to learn mathematics. Mathematics has in enjoyment part as puzzles and quizzes but many few students can get such opportunity property.

Mathematics is sex free subject and students' personality is developed by mathematical knowledge. Mathematics is not only for cleaver students. Mathematics is difficult to learn but students can learn it easily when students correlate mathematics with practice. Mathematics is helpful to find job and very useful in our daily life. It has in important relation with other subject.

As a summary, student liked mathematics, they were confident towards it, can enjoy by mathematics and there was very less mathematical anxiety. It is very valuable and its nature is memory based, logical and process wise subject.

Findings

The below mentione3d findings are found from this research.

- Mathematics is 4th liking subject among all teaching/learning subjects in secondary level.12.5% students were frightened with mathematics teacher's entrance in class room and 5% students hesitate to ask questions in classroom.

- Comparatively students gave more time to study mathematics in their house. Average 2.22 hour per day time was allocated by these students and 22.5% students did not have any fixed time to study in their house.

- Only 12.5% students wanted all problems' solutions, 20% wanted only difficult problems' solutions and 67.5% wanted in every difficult problem's solutions from teacher. 5% boys' and 2.5% girls' guessing mathematics marks matched with their obtained marks and 25% students accurately guessed their marks before result published.

- Participating in mathematical puzzles and quizzes were very exciting and well for all students. The main bother factor in mathematics was remembering formula. 52.5% students had such bothering due to remembering formulas.

- 12.5% students were frightened from mathematics and next 30% were always afraid with any examination.

- Personality development and mathematics had a well relation according to 75% students.

- Mathematics was difficult for 27.5% students, 22.5% had difficulty only in certain lessons and 5% hated mathematics.

- Mathematics helped to get job according to 50% students and 10% mentioned no relation shown between mathematics and job chance. Rest 40% had no idea on it.

- There are not gender differences on image of mathematics among secondary level students.

Conclusion

From this study, researcher found that Mathematics is not favorite subject but many students choose optional mathematics because they thought it is very importance to learn for future. There is not more trouble with mathematics teacher's entrance in class room but many students hesitate to ask questions with mathematics teacher. Students don't like mathematics teacher most. Overall students game more time to study mathematics in their house comparatively than other subjects. Mathematics takes more attention to students either in their house or school. Using calculator in present tie is very essential among the students due to habit in school level but many students think that using calculators and formula table are not good for future study. Rough paper is needed in mathematics and more students use it. But some students always use rough paper which is not well habit and some never use it also not good habit. Answer sheets are given in every mathematics book in school level. Most of the students use it properly but very few students use it twice which is not good for their learning mathematics. Poor students are looking all solutions in book from teacher and good students want only guidance from teacher. Most of the students want solution of only different types of questions' from teacher. To guess obtain marks after mathematics examination, many students' guessing marks match with obtained marks. Students have positive attitude towards doing mathematics homework. Students feel homework make perfect and more practice are needed for excellent achievement. Mathematical puzzles and quizzes are entertainment and refreshment part of mathematics. There is no special facility in schools for mathematics puzzles and quizzes but almost all students entertain with it Mathematics is enjoyable subject and it gives relax when able to solve difficult problems. Few students have negative attitudes and they feel mathematics is headache to them. Students towards

mathematics teacher have different types of attitudes. Students are angry with teacher according to his or her activity not by the reason of mathematics teacher. But one truth is found those mathematics teachers are stricter in comparison with other subject. No students hate mathematics but very few students don't want to study mathematics in future. Remembering formulas is one difficult task to students. Mathematics is neither male domain nor female domain subject but due to gender and Nepalese tradition female students have some more problems to study mathematics. Daughters don't get such facilities and they have to give more time in their household work. Personality of pupil and mathematics has very positive relation. Mathematics is not only for clever students but mathematics makes students clever. More students thought mathematics is logical, process oriented, memory based on problem solving subject but some students also focused that mathematics is only about number and rule, technique based and confidence building subject. Children are not born with mathematical-mind; mathematical knowledge comes from regular practice and confidential study. Mathematics students can get job easily. It is related to each field and mathematics students easily assimilate in every field. Teaching profession is respected in our society but mathematics teachers have high respect than other subject teachers.

Mathematics is useful in every field either in shopping or in construction or in pharmacy. Arithmetic part is not only useful but also other parts like algebra, geometry, statistics etc are needed accordingly.

Recommendations

Researcher it self is a difficult task. So many difficulties and lacking were faced on this research period. There was not proper study related to image of mathematic in Nepal and very difficult to make a research outline. Researcher found many lacking on this research and recommend other to do more research on it. Question making and its validity checking is one challenging task then second is very hard to get actual feeling from students. Some students take it is just a giving some answer as a formality. From this research, researcher recommends to study on the following area.

- Image of mathematics among different level of students.

- Image of mathematics among street-business.

- Attitudes towards mathematics on informal education students.

- A study on mathematical myth and reality.

- A comparative study on gender difference and mathematical achievement

- Role of students and teacher for well mathematical achievement.

- A case study about mathematics anxiety.

- Nature of mathematics and students achievement.

- A study of uses and values of mathematics in daily life.

- Image of mathematics comparison of its uses.

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Appendix – 1

Opinionaire Form

Image of Mathematics Among Secondary Students.

2009

Name of Researcher: Bhim Prasad koirala   Phone No.-

- -

Name of Students …………………….. School Name …………….. Passed Class

………………………………….. Temp. Address & Phone No. ……………………….

Sex …….. Age ……… Relation ………… Parent's Profession ………………S.L.C.

from Private [   ] Public [   ] Others [   ]   Passed class obtained marks

……………..…….. % Opt. subjects ………………………. Math Score

………………….

There is no fixed answer, your true feeling and experiences are to be given.

- -

Attitude

(a)   Liking

(i)   What are your favorite subjects? Write them in order.

(ii)   Do you afraid when your mathematics teacher enters in the class room?

(iii)   Which subject teacher do you like most? Why?

(iv)   What is your optional subject? Why do you choose this subject?

(v)   How much time do you spend to study mathematics in your house?

……………………………………………………………………

(b)   Confidence

(i)   Do you like to solve mathematical problems without using calculators and formula tables?

Yes ☐   No ☐

(ii)   Do you always use rough papers to solve mathematical problems?

Yes ☐   No ☐

(iii)   How often you check answer sheets given in books after solving mathematical problems?

Yes ☐   No ☐

(iv)   Does teacher need to solve all the mathematical problems given in book?

Yes ☐   No ☐

(v)   Does your guess marks after mathematics exam match with your obtain marks?

Yes ☐   No ☐

(c)   Enjoyment

(i)   Do you feel bored while doing mathematics class work and homework?

Yes ☐   No ☐

(ii)   What do you feel while attending mathematical puzzles and quizzes?

……………………………………………………………………

……………………………………………………………………

(iii)   Is mathematics enjoyable and relaxing subject?

……………………………………………………………………

(iv)   Do you enjoy while participating in mathematics classroom activity?

……………………………………………………………………

(v)   Give tick mark

Mathematics is

☐ Wonderful   ☐ Boring   ☐ Enjoyable

☐ Creative   ☐ Headache to students

(d)   Anxiety

(i)   Do you angry with mathematics teacher?

……………………………………………………………………

(ii)   Which subject you never want to study?

……………………………………………………………………

(iii)   What makes you bother when you practice the mathematical problems?

……………………………………………………………………

(iv)   How often you afraid from mathematics examination?

……………………………………………………………………………

(v)   Are you negative emotional with mathematics?

……………………………………………………………………

Belief

(a)   Nature of mathematics

(i)   Who can learn mathematics better?

Male☐   female☐   indifferent☐

(ii)   Does mathematics show student's personality? How?

……………………………………………………………………

……………………………………………………………………

(iii)   Is mathematics only for clever students?

……………………………………………………………………

(iv)   Is mathematics helpful to fulfill daily individual needs? How?

……………………………………………………………………

……………………………………………………………………

(v)   Mathematics is : (tick those you think true)

☐Logical	☐Stressful	☐Language
☐Abstract	☐Structure	☐Memory Based
☐Challenging	☐Symbolic	☐Rigid
☐Confidence Building	☐Technique Based	
☐Changing	☐Respected	☐Reasoning
☐Always true	☐Flexible	☐Process
☐Generalization	☐Specification	☐Practical
☐Dynamic	☐Problem Solving	☐Innovative
☐Powerful	☐All about number and rules	☐Artistic

More : ……………………………………………………………

(b)   Learning mathematics

(i)   Is mathematics difficult to learn? Why?

………………………………………………………………

(ii)   Does children get mathematics mind by birth?

…………………………………………………………………………

(iii)   What is the relation between math-mind and practice?

…………………………………………………………………………

…………………………………………………………………………

(iv)   How the teacher should teach mathematics for better achievement?

…………………………………………………………………………

…………………………………………………………………………

(v)   What is the role of students in making mathematics learning effective?

…………………………………………………………………………

(c)   Values of Mathematics

(i)   How much mathematics is helpful in getting job chance?

…………………………………………………………………………

(ii)   How much honored mathematics teachers are in our society?

…………………………………………………………………………

…………………………………………………………………………

(iii)   How much important mathematics is in your daily life?

…………………………………………………………………………

(iv)   Are mathematical concepts useful to study other subjects?

…………………………………………………………………………

(v)   Does only arithmetic part useful in our daily life?

…………………………………………………………………………

Any comment or suggestions:

…………………………………………………………………………

Thank you for your help.

Appendix – II

Opinionare Respondents' Details

S.N.	Name of Students	School	Sex	Class
1	Sanjaya Shrestha	Private	Male	10
2	Bindu Lama	Private	female	10
3	Alan K.C.	Private	Male	10
4	Pinkey Dheke	Private	female	10
5	Diptinata Das	Private	female	10
6	Aarati mahato	Private	female	10
7	Reena lama	Private	female	10
8	Sajan thapa	Private	Male	10
9	Anish Sharma	Private	Male	10
10	Sanjaya tamang	Private	Male	10
11	Srijana ranjeetkar	Private	female	9
12	Anjan shrestha	Private	Male	9
13	Nilu ale	Private	female	9
14	Suruchi dhungana	Private	female	9
15	Samundra rajkarnikar	Private	female	9
16	Suresh thapa	Private	Male	9
17	Subash khakurel	Private	Male	9
18	Nisanta lama	Private	Male	9
19	Prabesh shrestha	Private	Male	9
20	Gyalzin shrepa	Private	Male	9
21	Sujuta gurung	Public	female	10

22	Elina shrestha	Public	female	10
23	Sabina k c	public	female	10
24	Rasila rai	Public	female	10
25	Anju sunuwar	Public	female	10
26	Ananda shah	Public	Male	10
27	Madhu kunwar	Public	Male	10
28	Samrat thapa	Public	Male	10
29	Hari joshi	Public	Male	10
30	Milan k c	Public	Male	10
31	Pramila nagarkoti	Public	female	9
32	Jamuna shrestha	Public	female	9
33	Anu risal	Public	female	9
34	Sangeeta koirala	Public	female	9
35	Shova thapa	Public	female	9
36	Prabesh k c	Public	Male	9
37	Ranju tamang	Public	female	9
38	Kumar khadka	Public	Male	9
39	Krishna regmi	Public	Male	9
40	Nabraj basnet	Public	Male	9
41	Sunil thapa	Private	Male	10
42	Pratikshya bhattarai	Private	female	10
43	Gopal khakurel	Private	Male	10

44	Nikita bhattarai	Private	female	10
45	Bhimsen dhital	Private	Male	10
46	Saroj khatri	Private	Male	10
47	Prakash adhikari	Private	Male	10
48	Sabin bhattarai	Private	Male	10
49	Sabina bhattarai	Private	female	10
50	Bandana dhital	Private	female	10
51	Sreejana shrestha	Private	female	10
52	Rabina bhattarai	Private	female	10
53	Aayush bharati	Private	Male	10
54	Apekshya khanal	Private	female	10
55	Nabin bhattarai	Private	Male	10
56	Bhumika bharati	Private	female	10
57	Laxmi pd bhattarai	Private	Male	10
58	Namaraj dhital	Private	Male	10
59	Maniram luitel	Private	Male	10
60	Pratima bhattarai	Private	female	10
61	Anita khanal	Public	female	9

62	Santosi khakurel	Public	female	9
63	Anjana tamang	Public	female	9
64	Basanti tamang	Public	female	9
65	Sudha bhattarai	Public	female	9
66	Kajol shrestha	Public	female	9
67	Bikram dhital	Public	Male	9
68	Sabin baskota	Public	Male	9
69	Ajaya subedi	Public	Male	9
70	Rabin bhetwal	Public	Male	9
71	Prakash rokka	Public	Male	9
72	Rabi thapa	Public	Male	9
73	Gokarna lamichhane	Public	Male	9
74	Krishna pariyar	Public	Male	9
75	Sreejana pariyar	Public	female	9
76	Sita sedain	Public	female	9
77	Suraj pariyar	Public	Male	9
78	Soni dhakal	Public	female	9
79	Sanjita khanal	Public	female	9

80	Bhawana karki	Public	female	9
81	Saraswoti khadka	Private	female	10
82	Samjana rai	Private	female	10
83	Suraj kadel	Private	Male	10
84	Anish lama	Private	Male	10
85	Deependra sedain	Private	Male	10
86	Bishnu khakurel	Private	Male	10
87	Sanjeev tamang	Private	Male	10
88	Bibek lama	Private	Male	10
89	Bibek luitel	Private	Male	10
90	Bibek bhattarai	Private	Male	10
91	Prabin thapa	Private	Male	10
92	Bisal dhital	Private	Male	10
93	Basanta adhikari	Private	Male	10
94	Bibek tamang	Private	Male	10
95	Saroj bhattari	Private	Male	10
96	Sunil bhattarai	Private	Male	10
97	Asmita luitel	Private	female	10

98	Salikram gartaula	Private	Male	10
99	Anjan sedain	Private	Male	10
100	Rabin lama	Private	Male	10
101	Aswin khakurel	Public	Male	9
102	Rina lama	Public	female	9
103	Prabina khadka	Public	female	9
104	Kabita baskota	Public	female	9
105	Urmila lama	Public	female	9
106	Alina akauliya	Public	female	9
107	Mina akauliya	Public	female	9
108	Melina koirala	Public	female	9
109	Yojana subedi	Public	female	9
110	Anisha karki	Public	female	9
111	Rupa shrestha	Public	female	9
112	Bipina mijar	Public	female	9
113	Sarita darji	Public	female	9
114	Ranju regmi	Public	female	9
115	Punam shrestha	Public	female	9

116	Kalpana paudel	Public	female	9
117	Bimala tamang	Public	female	9
118	Bibiya luitel	Public	female	9
119	Akrita khanal	Public	female	9
120	Samjana rai	Public	female	9

Total Students: 120

Boys: 60

Girls: 60

From Private School: 60

From Public Schools: 60

From Class IX: 60

From Class X: 60

Appendix – III

List of the Schools and institutions that data were collected.

1.   Sunflower academy, Dhrmasthali, Kathmandu.

2.   Nabinjyoti secondary school Ramkot , Kathmandu.

3.   Peoples Academy,Bafal,Kathmandu.

4.   Blooming lotus higher secondary school, Thankot, Kathmandu

5.   Sitapaila higher secondary school,Sitapaila, Kathmandu.

6.   Sitaram higher secondary school, bhimdhunga, Kathmandu.

7.   Pravat ma.vi. thankot, Kathmandu.

8.   Chandibhairav secondary school, Piplamod,Kathmandu.

9.   Success tuition centre,Kalanki,Kathmandu.

Appendix -IV

To find the expected frequency of observed frequency researcher used formula

$f_e = \dfrac{Row\ total \times colum\ total}{Grand\ total}$ Shown in table below

	Easy	Difficult	Depends on situation
Boys	$\dfrac{60 \times 57}{120} = 28.5$	$\dfrac{33 \times 57}{120} = 15.68$	$\dfrac{27 \times 57}{120} = 12.83$
Girls	$\dfrac{60 \times 63}{120} = 31.5$	$\dfrac{33 \times 63}{120} = 17.33$	$\dfrac{27 \times 63}{120} = 14.18$

And Computation of χ^2 shown in table below

Computation of χ^2

f_0	f_e	f_0-f_e	$(f_0-f_e)^2$	$\dfrac{(f0 - fe)2}{f_e}$
24	28.5	-3.5	12.25	0.43
21	15.68	6.68	44.63	2.85
12	12.83	-0.83	0.69	0.06
36	31.5	-4.5	20.25	0.64
12	17.33	-5.33	28.41	1.64
15	14.18	0.82	0.67	0.05
				$\sum \dfrac{(f_0 - f_e)^2}{f_e} = 5.67$

$\therefore \chi^2 = 5.67$

Calculated value =5.67

Degree of freedom = (r-1) (c-1)= (3-1) (2-1)= 2