

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

Each person is born in a family, gets different educational experiences from family life, school life, and college life of student. S/he shares different experiences in the society through out her/his life. If a member of the general community is posed a question: what is mathematics? We may get different answers according to the respondent's own beliefs, experiences and practices both inside and outside the class room. The common answer may invariably focus on number and operation. In connection to this, Zevenbergen, Dole and Wright (2004) state that mathematics is study of patterns and relationships, way of thinking, seeing and organizing the world, a language, a tool, a form of art, and a power (pp. 7-10). It means mathematics is more than just number operation.

"Mathematics [math] is a living subject which seeks to understand patterns that permeate both the world around us and the mind within us" (National Research Council [NRC], 1989, p. 84). It means patterns followed by a person him/her self or sharing experiences in the society play important role in mathematics.

Schoenfeld (1992) states that mastering, in some coherent order, the set of facts and procedures that comprise the body of mathematics (p. 342). It means mathematics is a process of drilling and practicing of facts,

rules and procedures in the same manner as a teacher or somebody transfer to the students.

The uniqueness of mathematics and the reluctance of people to get in depth knowledge of mathematics seem subjected to the way they perceive and believe what mathematics is all about (Poudel, 2005, 1).i.e. nobody are exactly unique in nature whose perceptions, attitudes and beliefs in mathematics guide for further mathematical knowledge.

Doing mathematics means following set procedures step-by-step to arrive at answers, knowing mathematics means "knowing how to do it," and mathematics is a largely arbitrary collection of facts and rules (Ball, 1990, pp. 449-466) i.e. memorizing certain rules, and facts, and applying them systematically to solve a problem constitutes mathematics.

Mathematics is a dynamic field that is best learned through an active process of construction in which students are empowered to explore, conjecture, and reason logically (Frykholm, 1995) i.e. active participation of students is essential for empowering them to construct and explore new knowledge in mathematics.

Various conceptions of nature of mathematics have been identified as being documented in empirical studies. distinguished among:

1. The problem solving view which see mathematics as a dynamic, continually. Expanding field of human creation and invention with its results open to revision,

2. The Platonist view which views mathematics as a static but unified body of knowledge, a realm of interconnecting structures and truths that are discovered not created, and
3. The instrumentalist view which envisions mathematics as an accumulation of unsubjected facts, rules, and skills to be applied by the trained artisan in pursuit of some desired end.

So, discovering knowledge and accumulation of the facts, rules or procedures for continuous drill, practice through revision constitutes nature of mathematics.

According to Lerman (1983):

There are two alternative conceptions of the nature of mathematics called absolutist and fallibilist. From an absolutist perspective, all of mathematics is based on universal, absolute foundations and is the paradigm of knowledge, certain, absolute, value-free and abstract, with its connections to the real world perhaps of a “platonic nature”. From a fallibilist perspective, mathematics develops through conjectures, proofs, and refutations, and uncertainty is accepted as inherent in the discipline (pp. 59-66).

After the establishment of School Leaving Certificate [SLC] board in 1934 AD, the first curriculum was introduced in Nepal for secondary level in which mathematics was divided into compulsory and optional part, each consisting 100 of 100 marks out of 800 full marks (Pandit, 2050, p. 165). The secondary curriculum of Nepal has made a provision of six core subjects and two optional paper subjects. The six secondary

core subjects are Nepali, English, Mathematics, Science, Social studies, Health, Population and environment [HPE] with two optional papers 5 with full-marks 100 and pass-marks 32 while the optional mathematics (paper 1) has also got weight 5 with full-marks 100 and pass-marks 32 (High Level National Education Commission [HLNEC],1999, p. 10).

Now mathematics is compulsory subject categorized into: A. optional 1 paper (any one) and B. optional 2 paper (any one). Mathematics has got weight through grade one to ten and optional mathematics is optional subject for the students who choose it for last two years of secondary education. Historically, in Nepalese context, mathematics a cause of failure of students in school education (UNESCO, 1998) is charged as difficult and complex subject.

According to population census 2058 B.S (2001 A. D.) population only the 54.2% population were literate and about 42% citizens were under the line of poverty. Only 13.9% people were lived in urban area, more than 70% people had taken, as traditional agriculture was chief employment. Due to the lack of employment, highly dependable on traditional household agricultural practice and poverty most of the Nepalese students run off school before SLC. If they keep on to SLC, most of them selection non-mathematical subjects as optional in secondary level. Different results of the SLC examination show that over all enrollments of students in optional mathematic is very low and very low particularly in public schools. On the other hand, most of the Board toper and distinction holder students in SLC are those who take the mathematics as optional subjects at secondary level. Obviously, optional

math for student is not only needed for upgradinSLC but also to establish equity, equality and transparency in the filter test subjected jobs or profession.

Mathematics is taught as a compulsory subject for each level of school education system of Nepal and an extra optional subject can decide for last two years of secondary education. In our perspective, mathematics is considered as a complex subject and it has become a reason of failure of student in school education. Many students are disturbed by the level of understanding and success in their learning too. Data as well as simple observation show that the rate of selection of mathematics as optional subject is very little; most of the students are coming off from the mathematics as an optional subject. Now days, compulsory mathematics is becoming a burden to most of the students of school level as well as other level too. The majority of the Nepalese students are unfamiliar about the chance carried by optional mathematics.

Little enrollment of students in optional mathematics, high enrollment of students in other optional subject, Mathematics taken as difficult and boring subject, High failure rate in mathematics in school educations mathematics taken as male domain subject etc are the present condition of Nepal towards mathematics as well as optional mathematics. On this background, it is necessary to study the causing factor to selection mathematics or other subjects as optional. Why student acquire math? And why they separate from mathematics? Accordingly, current study proposed to study the factors influencing the selectionion of mathematics as optional at secondary level.

## **1.2 Statement of the Problem**

the majority of the Nepalese students are unidentified about the opportunity formed by optional Mathematics in judgment to non mathematics subject while ingoing the grade IX after passing district level examination of grade eight and they decide two optional subjects. Therefore, I believe selectionion of optional subject in grade IX is essential in the student life. The enrollment of students on optional mathematics is very small than that of other optional subjects. Therefore, the research approved to find the answer of the following questions

- i. Does the family background influence on the selection of optional mathematics at grade nine?
- ii. Do the neighbouring factors influence on the selection of mathematics as an optional subject at grade nine?
- iii. Does the student's self drive influence on the selection of mathematics as an optional subject at grade nine?

## **1.3 Significant of the Study**

Education is the stamina for the growth of the nation. Education presents the maximum potential for reducing poverty through rising production. True learning is only possible when the student get freedom in selecting subjects that is possible only through the consciousness in the significance of optional subject. The enrollment of student in optional mathematic is very small; the majority of the students would like to depart extreme from mathematics subject. Agriculture based financial

system, intense poverty, poor literacy, joblessness, teachers' supremacy of optional subjects are obstacle in implementing student' educational right in Nepalese context. We have lot of data gap on these issues. However, we can barely find out the outcome among these issues in secondary level. In such condition, a booming research on "factors influencing the selectionion of mathematics as an optional subject in grade IX of public schools of kaski District is very important. Researcher expect the finding of the proposed research able to:

- i. Get the existing factors that are subjected to decide mathematics as optional subject.
- ii. Show the existing facts on enrollment of public school students in optional mathematics
- iii. Facilitate the comparative study on math and non-math subjected to the enrollment and selectionion of optional subjects.
- iv. A reference in the quantitative research in future in subjected topics in Nepal.

#### **1.4 Objectives of the Study**

The objectives of this study are as follows:

- i. To recognize the reasons influencing on the selection of optional mathematics in secondary level public schools.
- ii. To find enrollment ratio in mathematics and non-mathematics students in secondary level of public schools of Kaski District.

## 1.5 Statistical Hypothesis

The hypothesis of the study was:

$H_0 : p_1 = p_2 = p_3$  (Null hypothesis)

$H_1 : p_1 \neq p_2 \neq p_3$  (Alternative hypothesis)

Where,  $p_1, p_2, p_3$  are the corresponding true proportion of factors influencing on the selection of optional mathematics at grade nine students of kaski district.

## 1.6 Delimitation of the Study

The following points are accepted to limit the study.

1. This study is limited to pokhara valley of Kaski district only.
2. Only 3 school were selectioned by applying purposive sampling.
3. This study is limited to 60 students of public school only.
4. This study is limited to 3 subject teachers and haeadmasers.

## 1.7 Definition of the Terms

**Enrollment:** enrollment means the aregistration of students in grade nine according to the optional subjects.

) **Factors:** the term factor is defined as the one of several things that cause or influence something, e.g. educational factors, social factor, economic factor etc.



) **Family background:** the overall position education, job\occupation and economic position are termed as family background.

) **Grade:** class in the school levels of recent Nepalese Schools.

) **Mathematics/Math:** Optional mathematics is considered as mathematics.

) **Neighbouring Factors:** social influence, School environment, peer group influences are considered as the neighbouring factors.

) **Non-Math:** other optional subject except mathematics is considered as non-math.

) **Optional mathematics Students:** the student of grade nine who take mathematics as optional subject of Nepal recently learning in rural area school in the day of enumeration.

) **Optional subjects:** the subject under optional one and optional second paper as prescribed by the recent secondary curriculum.

a. Optional first paper:

1. Language

2. Humanities, social science

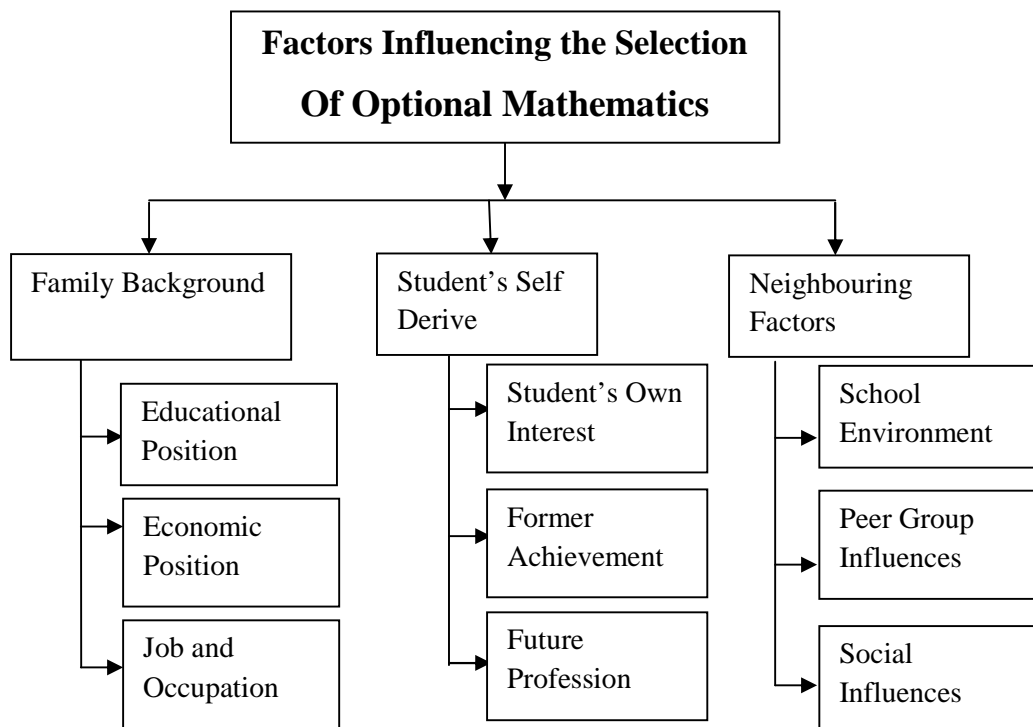
3. Optional mathematics

b. Optional second paper: Interdisciplinary subject prescribed by curriculum of the secondary level.

- ) **Other optional subject students:** students who study other optional subject except optional mathematics.
- ) **Public School:** the school that governed by the Nepalese government.
- ) **Student's self derive:** student's own interest, future profession, former achievements are considered as student's self derive.
- ) **Subject Teacher:** the term subject teacher is defined in the sense of a teacher who teaches optional mathematics at grade IX.

## 1.8 Conceptual Understanding of the Study

From above literatures, conceptual understanding of this study is shown as:



## **CHAPTER II**

### **REVIEW OF SUBJECTED LITERATURE**

A review of subjected literature is the source of the further study of research task. It helps to research the research programs and gives the better ideas of a surveying in the research hypothesis. It helps to study the research program and supply the improved ideas of the investigating in the entire research. Some researches are studied but exactly same researches were not found. Some Studies about the factors affecting on achievement of students on mathematic, attitude of the girls students toward optional mathematics, attitude of mathematics teacher towards optional mathematics and impact of socio economic factor on mathematics achievement were found. Some of them are given hereunder.

“Children’s education and achievement are subjected to parental education, income, profession, and children’s own attitudes and beliefs towards education. Parents’ education and income has direct positive influence on scholastic achievement of students” (Mathur and Hardrill, 1972).

Ghimire T. R. (1997) studied on the topic factors affecting teaching and learning mathematics at secondary level” with the objective to the study factor affecting in learning of school mathematic in term of school environment, family background, motivational factors physical facilities, interest of the learners, instructional materials. The tools for the study

were administered to the sample to 90 students and the data was analyzed by using t-test. He concluded that environment of the school in rural and urban areas affects equally but the boys are more affected than girls. Likewise environment affect more to the subject of rural areas and girls were affected more than boys. He was also finding out that motivation, students' interest, instructional methodology and material also affected on the teaching and learning mathematics.

OP'J Eynde & Decorte (2001) did a research on "Junior Higher student mathematic subjected Belief system: their internal structure and external relations". The data consisted of the belief score of 355 student of Flemish Junior School in answer: what is the mathematics are subjected beliefs of Flemish Junior High student and how do they subjected to gender, achievement level and track level. The study showed that boys were found to perform worse than girls and to hold negative beliefs about mathematics. Girls certainly seem to do better than boys in Flemish Schools. The result also indicates that high achieving students have more positive beliefs about the relevance of their competence in mathematics than low achieving students.

Subedi (2005) did a study on "factors affecting failures in mathematics in SLC examination" with the objectives; to measure the effect of school and out of school contextual factors in mathematics achievement to determine the correlation between affecting factors and mathematics achievement. So, students were selectioned through the purposive sampling of eight schools in Sarlahi District. Questioners were applied to collect the data of this study. Mathematics achievement of

failure students are strongly positive correlated with the school environment, effective classroom teaching and time variable which is significant. The teacher's behavior, peer's behavior, interest of learner and motivation with occupational goal are low positive correlate with the achievement of mathematics. School environment is an important causing agent on the failure's mathematics achievement.

Paudel (2005) did a study on "correlation study between beliefs and mathematics achievement of the student of grade IX. 118 students in grade nine were selected from the Gauri Shankar H.S.S. and Step by Step Secondary School at Pokhara in Kaski district. Questionnaire was applied as tools for data collection. The report showed that there is no significance difference between the public and private school student belief. The role of the teacher is to transmitting the mathematical knowledge students were less confidence in learning mathematics, no paper use of mathematics in the social context.

Sex role theory shows that being biologically different boys or girls does not affect in mathematics achievement. According to this theory the different between boys and girls is created by our society and culture. They conduct the role of man according as biological differences. Society has believes that girls cannot have good mathematics achievement so it is better to take other non math subject as optional. Due to the lack of confidence, girls are weak in mathematics. Interest of reading mathematics in future blows away. So they are not motivated towards mathematics subjected job. As a result they do not dare to take optional mathematics.

Joshi (2010) did a research on "Attitudes of Girls Students towards Optional Mathematics at Secondary Level". His main objectives were to find out the attitudes of secondary level girls towards optional mathematics and compare the attitudes of urban and rural girls towards optional mathematics. A set of Opinionnaire and interview was applied tools for the data collection.  $\chi^2$  test was applied to find out the attitudes of secondary level girls students towards optional mathematics and t –test was applied to compare the attitudes urban and rural girls students. The sample size was taken 60 girls students of Kailai district from 5 urban and 5 rural schools. He found that there was a positive attitude towards optional mathematics and there is no significance difference between attitudes of urban and rural girls towards optional mathematics.

Tuncay & Omur (2009) has done a study entitled “Identifying Factors Affecting the Mathematics Achievement of Students for Better Instructional Design” and concluded that instructional strategies and methods, teacher competency in math education, and motivation or concentration were the three most influential factors that should be considered in the design decisions. A Likert scale survey was conducted in this study for the data collection. Descriptive analysis, ANOVA and Post Hoc Multiple Comparison LSD test were used to answer the research questions. All statistical analyses were conducted with a significant level of 0.05.

Koirala (2009) has done a study entitled “Major units causing higher failure rate in mathematics in the district level examination of class VIII” and concluded that the different units, prescribed in class eight

mathematics curriculums, are not equally contributing for the achievement of the students and are not even equally responsible for the failure of the students. Thus from the perspective of the students the study concluded that the curriculum comprised of some difficult units by which the students' mathematical learning and performance is hindered and badly affected. He used stratified random sampling procedure to select schools in the sample. The discrepancy of the students' ratios lying between the groups on the basis of their total scores and the unit wise scores has been tested by applying the  $\chi^2$  (chi-square) - test.

Farooq & Shahzadi (2006) has done study entitled "Effect of Teachers' Professional Education on Students' Achievement in Mathematics" and concluded that untrained teachers had problems with their teaching methods and often made faulty starts, which persisted throughout their lessons. They appeared more confident in their subject knowledge but lacked the professional knowledge and skills to enhance their teaching. On the other hand, trained teachers exhibited some of the qualities of teacher professionalism emphasized.

Paudel (2006) has done a study entitled "A comparative study on mathematics achievement of secondary level students taught by trained and untrained teachers" in public schools of Kathmandu district and concluded that there is significance difference in achievement of students taught by trained and untrained teachers. By using stratified random sampling, he had selected 12 teachers (i.e. 6 trained and 6 untrained) and 168 students taught by them. He had developed an achievement test paper and introduced to sampled students to collect data. The collected data

were analysed by using mean, standard deviation and t- test at 0.05 level of significance.

CERID (1998) carried out a research entitled, “Secondary Education a need of diversification” and concluded that teachers qualification, training, professional role and responsibilities and comment are more important for good quality education.



# **CHAPTER III**

## **METHODOLOGY**

### **3.1 Chapter Overview**

This chapter presents the procedure carried out to achieve the objectives of the study. In this chapter, researchers discuss the various aspects of the study linked to research methodology. Researchers begin with design of the study followed by population of the study, sample of the study, sample size, sampling method, instruments of the study, data collection methods and data analysis techniques.

### **3.2 Design of the Study**

The design of the study was survey design dealing with both primary and secondary data. The primary data were collected by structured questionnaire technique from sampled students of grade nine while secondary data were collected in paper sheet from the administrative records of the sampled schools. This is the quantitative and as well as descriptive in nature.

### **3.3 Population of the Study**

Students who had studied at grade IX of public schools of Kaski district of Nepal in academic year 2067/68 is the population of this study.

### **3.4 Sample of the Study**

There are 130 secondary schools in Pokhara valley. Out of them 21 are public secondary schools in Pokhara valley, Kaski district. Among the public schools researcher took 3 public schools of Pokhara valley by using cluster sampling. All the students who selection optional mathematics at grade IX was taken as sample and equal number of students who had selectioned other optional subjects except optional mathematics was included on sample from each sample school by using random sampling. The optional mathematics subject teachers and head teachers were taken as the respondent of sampled schools (see appendix-I) to carry out the interview.

### **3.5 Instruments**

Researcher employed four types of instruments in this study; they were questionnaire, opinionnaire, interview and the administrative records.

#### **a. Questionnaire and Opinionnaire**

In order to meet the research objectives of this study, Questionnaire (Appendix –A) was applied to measure the students' attitude towards the selection of optional mathematics as their deal subject. In the start of the questionnaire it was developed as the information subjected to the students background, school background and the information subjected to optional subject. Researcher was developed the two sets of opinionnaire

for the optional mathematics students (Appendix – B) and other optional subject students (Appendix – C) separately.

Dhakal (2006) applied students attitude scale containing two domain and 40 statements taking reference of Fenneman Sherman’s (1978) attitude scale. Taking reference of Dhakal (2006) researcher developed the oppinionnaire with three domain and 24 statements after the pilot test. The oppinionnaire consists of three dimensions (family background, Student's self derive and Neighbouring Factors) to represent the selection of optional mathematics. The oppinionnaire was developed in Likert scale point technique. For the scoring of the statements was done as follows:

#### **Likert Scale of Scoring**

S.N.	Rating	Marks for Positive statement	Marks for Negative statement
1.	Strongly Agree	5	1
2.	Agree	4	2
3.	Neutral	3	3
4.	Disagree	2	4
5.	Strongly Disagree	1	5

#### **b. Interview Schedule**

The subject teacher and head teacher of sampled schools were interviewed. The interview schedule had managed with the support of

thesis supervisor. The interview was conducted to 3-subject teacher and head teacher of sampled schools, which was subjected to difficulties of optional mathematics, School environment, Teacher behavior, & teacher training, management and profession analysis.

### **3.6 Reliability & Validity**

The opinionnaire was accepted from the applied scales of Dhakal (2006). However, necessary to revalidate for the current circumstance, for establishing validity and reliability of 24 statements of each opinionnaire set. Researcher carried out pilot survey in 20(10 opt.maths and 10 opt. economics) students of grade IX of Shree Tribhuwan Higher Secondary School, Dhungepatan. From the pilot study those statements towards which all students has responded on the same scale were discarded and remaining statement were included on the scale. Split-half method was applied to test the reliability of the opinionnaire. The Split half coefficient was calculated. Its value Guttman split-half coefficient was found 0.927 of opinionnaire set-I and 0.873 of set-II. The validity of the instrument was established by its approval from subject expert and supervisor with some alternate and addition of the statements.

### **3.7 Data Collection Procedures**

Researcher visited the schools, discussed with the head teacher & subject teacher of each schools, made them clear to the objectives of the study and took authorization for filling up the Student Questionnaire Form together with opinionnaire set to the students of grade IX. Researcher went to the classroom with the subject teacher & introduced

himself. Distributed the Student Questionnaire Form to the students, read the Student Questionnaire Form carefully and clarify each statements, & terminology. Lastly, the researcher asked for them to return back next day after filling up the questionnaire fully. Researcher collected the filled questionnaire forms after that day. Researcher closed the questionnaire set (Appendix A) together with opinionnaire set I (Appendix B) for the all optional mathematics students and questionnaire set (Appendix A) together with opinionnaire set II (Appendix C) to the other optional subject students. The secondary data (students enrollment according to optional subject in different academic years) was composed by administration of the sampled school. The interview was conducted to the each 3 subject teacher who taught optional mathematics and head teacher. The core points that told by the teacher & head teacher in the period of interview was on paper.

### **3.8 Data Analysis and Interpretation**

$\chi^2$ - test was applied for analysis of the data and testing the significance of each statement at 0.05 level of significance. This shows that if the  $\chi^2$ - value of statement more than that of tabulated value (9.488) then the factor subjected to that statement had positive effect to the selection of optional subject. The percentage table was developed to show the factors that effect on the selection of optional Subject. To show enrollment ratio of the student, the student enrollment table was developed. The descriptive analysis was done for qualitative data from the questionnaire and interview through successively.

## CHAPTER IV

### ANALYSIS AND INTERPRETATION OF DATA

This is a small-scale survey study subjected to the factors influencing on the selection of optional mathematics. The main source of the data of this study is students who are studying in grade IX and the teacher who have been teaching optional mathematics at secondary level. The data for this study were collected from students, teachers and head teacher with the help of different tools.

The analysis of the study was carried out with the heading of conceptual understanding prepared from the subjected literature review. It was assume those variables such as categorized as family background, students self derive & neighbouring factors. The data were obtain from the optional mathematics students by using opinionnaire sets-I (Appendix – B) and other optional subject's students by using opinionnaire set-II (Appendix – C). Student's questionnaire form include for both students (Appendix – A). The interview was conduct to the subject teacher and head teacher of sampled schools that are mention in previous chapter. The analysis and interpretation of the data/information on the following headings:

- ) Factors influencing on the selection of optional mathematics at grade IX.
- ) Factors influencing on the selection of other optional subjects at grade IX.

) Students' enrollment ratio between optional mathematics and other optional subjects.

#### **4.1 Factors Influencing the Selection of Optional Mathematics at Grade IX**

There are different factors that influence on the selection of optional mathematics at grade IX. With the help of different literature review, it was assumed that there are 3 domains with each of them have 3 variables i.e. total of 9 variables which influenced on the selection of optional mathematics. There were 24 statements subjected to the selection of mathematics as an optional subject. They were categorized into 3 domains on which statement 1-8 was subjected to the domain family background, statement 9-16 were subjected with student's self derive and similarly statement 17-24 were subjected to neighbouring factors on both set I (Appendix–B) & set II (Appendix– C). The percentage of students' attitude towards each statement was presented in the table (Appendix– D/E). Chi square value of each of the 24 statement (Set I) and 24 statements (Set II) at 0.05 level of significance were calculated (Appendix – F/G). The analysis and interpretation of factors influencing on the selection of optional mathematics is describe as follows.

#### **4.2 Influence of Family Background on the Selection of Optional Mathematic at Grade IX**

In this study, the term family background includes the educational position, economic Position and job/occupation of family. It was assumed

that family background play the essential role to choose optional mathematics at grade IX.

**Table: 1 Influence of Family Background to Choose Optional Mathematics**

S.N	Statements	$\chi^2$ value	Remark
1.	Parents' education helps to recommend my optional subject.	11	S
2.	My guardian encourages me to recommend optional mathematics.	12.33	S
3.	My family invest enough time to discuss about my study	12.33	S
4.	Family occupation is subjected to mathematics	12.66	S
5.	Economic position of people is challenge to choose optional mathematics	14.66	S

[S=Significance. The table value of  $\chi^2$  at 0.05 levels of significance and 4 degree of freedom is 9.488]

The outcome of the test shown that all of the factors enlisted in family background are significant. This implies that the family background (Educational position of family, economic position of family & job/ occupation) directly control the selection of optional mathematics at grade IX. Thus, family background motivated the student to



recommend optional mathematics. This is similar to Udoh (1983) 'with the good background, students still need to develop themselves in subject areas they are keenly interested in and particularly that he has potentiality for'.

**Table: 2 Percentage of Respondent's Reaction to Oppinionnaire  
Items Subjected with Family Background**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	My parents do not know the essence of mathematics.	18	40.5	25	16.5	0
2.	Economic position of people is challenge to choose opt. maths.	23.5	25.5	19.5	18	13,5
3.	Tuition is necessary for getting good marks in opt. mathematics.	30.5	23	8	30.5	8

From the table, it is showing that parents' education, economic position & occupation greatly influence the selection of optional mathematics by the students. In addition, the table revealed that the most of the students think their parents do not know why mathematics is important. More than 50% of students agree that tuition is necessary. This shows that only classroom teaching is not enough for optional

mathematics. They need some extra guidance. This is not motivating factor to choose optional mathematics.

The qualitative information was collected by the students questionnaire form (Appendix –A) and interview to the subject teacher and head teacher. The students are forced to take optional mathematics of their family members/guardians is involved in same discipline. The response of the interview to the teacher and head teacher was focussed on the peoples attentiveness towards the importance of mathematics be. Finally, the subject teacher suggested, “mathematics should bond to the daily life trouble of the people straightforwardly”. In the result of the questionnaire, whose parents/guardians are educated they suggested to choose optional mathematics to their children.

In both qualitative and quantities analysis family background really influences the selection of optional mathematics. This is in accordance with Empoke (1996) opinion that parents and guardians have determining influence on children and always serve as a basis for making judgment on whether a subject should be chosen or not.

### **4.3 Influence of Student's Self Derive on the Selection of Optional Mathematics at Grade IX**

Conceptually, the term students self derived include students own interest, former achievement & future profession. It was assumed that the student's self derive is important key on the selection of the optional subject. Most of the Nepalese students are deprived on their selection of optional subject at higher level of education. But in the secondary level

there is direct influence of the students own interest on their selection of optional subject

**Table: 3 Influence of Student's Self Derive to Choose Optional Mathematics.**

S.N	Statements	<sup>2</sup> value	Remark
1.	Mathematics is my favorite subject.	27.8	S
2.	I can do fine in optional Mathematics.	19	S
3.	I select optional mathematics Due to the good marks of grade VIII.	12.33	S
4.	Any person can do well in optional mathematics.	9.66	S

The above statements show the positive pressure of the student's self derive on the selection of optional mathematics. All of these statements were significant in 5 percent level of significant indicates the factors subjected to students self derive play the essential role on the selection of optional mathematics at grade IX.

**Table: 4 Percentage of Respondent's Reaction to Oppinionnaire  
Items subjected with Student's Self Drive**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	I can do well in optional Mathematics.	32.5	44	13	10.5	0
2.	I select optional mathematics due to the good marks of grade VIII.	36	32.5	13	17	2
3.	I took optional mathematics because I know opportunity that created by mathematics.	18	23.5	20.5	21.5	16.5

Above table shows, only 19 % students were rejected that their selection of optional subject was function of former achievement. Thus, students who were studying optional mathematics by product of the good marks at grade eight. Moreover, more than 65% of the optional mathematics students were deal to their future that is matched with the findings of the Research Division of Cambridge Assessment (2007) which found that students choose certain subjects because they would be useful in their future profession.

In qualitative aspect, subject teacher did not supply the suggestion and information to the student about their future profession & opportunities that produce by the optional mathematics on future as the students want. Head teacher also accepted that there was no plan launched to endorse the selection of optional mathematics by their schools. Some of the school management had taken entrance on the selection of optional mathematics. Students were deprived to choose optional mathematics as some school made rule themselves. These actions show that the former achievement, students' own interest and future profession are causing agent to wish optional mathematics at secondary level.

#### **4.4 Influence of Neighbouring Factors on the Selection of Optional Mathematics**

It was assumed that the students selection of optional mathematics to the result of school environment, peer group influence & the social influence. Here the terms school environment peer group influence & the social influence were serve as neighbouring factors. School environment was mainly relating with the students attitude towards the subject teacher & the schools activities subjected to optional mathematics. Here we have to find out that teacher behavior motivated the students' selection of optional mathematics. The secondary level students are mainly deal with their peer group. Peer group & group work also encouraged the studying optional mathematics. Human behavior is the by-product of the society so their selection is obviously subjected to their social environment. Here

social influence was defined in the sense of mathematics teachers' position on society & how society takes a mathematics student?

**Table: 5 Influence of Neighbouring Factors to Choose Opt. maths.**

SN	Statements	<sup>2</sup> value	Remark
1.	Our teacher does not clarify why mathematics is important.	12.33	S
2.	School has conducted the program encouraging optional mathematics students.	24	S
3.	I select optional mathematics because my friends are suggesting me.	10.33	S
4.	Position of maths teacher is high in our society.	20.16	S

From the above table, all of these statements show that school environment, peer group influence and social influences play the significance role for the selection of optional mathematics at secondary level.

**Table: 6 Percentage of Respondent's Reaction to Oppinionnaire  
Items Subjected with Neighbouring Factors**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	Our school has conducted program encouraging the optional maths Students.	2	21.5	20.5	23	33
2.	I took optional mathematics because my friends are recommending me.	11.5	21.5	15.5	24	27.5
3.	Teacher has more expectations from optional mathematics students.	50	25	10	15	0

This shows that most of public schools do not encourage choosing optional mathematics to their students. About 33% students accept that they took optional mathematics due to their peer group. This result is in line with Udoh (1983) who observed that the peer exerts influence on their members in taking decision. Qualitatively, in the answer of the questionnaire (Appendix – A) nominal number of student responded that neighbouring factor was taken as the causing agent to the selection of optional mathematics. To depth, some of students responded that teacher behavior was responsible to selection of optional mathematics. In the interview to the teacher, they think that their own performance play supposed role to selection of the optional mathematics or other optional subject, Researcher was discussed about how can make school

environment is positive to the selection optional mathematics? Most teachers responded that we always support the students to choose optional math. But they said they are incapable to commence program subjected to uphold optional mathematics teacher student due to economic & physical difficulties.

#### **4.5 Factors Influencing the Student's Selection of Other Optional Subjects at Grade IX**

Most of the Nepalese students choose non-mathematical subject as optional subjects. Different result of S.L.C. shows overall the enrollment of students in optional mathematics in low and very low especially in public rural schools. On the other hand, Board toppers and the distinction holders in S.L.C. are majority of from the students taking optional mathematics. Thus, the researcher has been done to find out the causing agent why a few students select optional mathematics. The researcher has defined some variable from the review of literature, which could relate to the students' selection of optional mathematics as conceptual understanding of study. The analysis and the interpretations of the collected data/information are present as follows.

#### **4.6 Influence of the Family Background on the Selection of other Optional Subjects**

Conceptually the family educational position, economic position and job/occupation were termed as family background. Family background plays the essential role in education of a child. The separate



attitude scale was prepared of the students who were not taking optional mathematics. The information about their attitude toward not selection optional mathematics at grade IX was determined by family background, which is shown by following table.

**Table: 7 Influence of Family background to Choose Other Optional Subjects.**

S.N.	Statements	<sup>2</sup> value	Remark
1.	My parents don't encourage me to choose optional mathematics	12	S
2.	Our occupation is not subjected with mathematics	11.66	S
3.	Due to poor economic condition person unable to selection optional mathematics.	15.66	S

Most of the students had positive outlook towards that parents education helps to their job selection. Here we show educational position, job and occupation, economic position have significant role to select optional subjects. which got much similarity with the result Udoh (1983) 'with the good background, students still need to develop themselves in same subject areas'.

**Table: 8 Percentage of Respondent's Reaction to Oppinionnaire  
Items Subjected with Family Background.**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	My parents know the essence of optional math.	6.5	22	25.5	14.5	31.5
2.	Our occupation is not relating with mathematics.	16.5	37	20	17	9.5
3.	Tuition is necessary for getting good position on mathematics	28	24	20.5	9.5	18

From the table we show that most of the non-optional mathematics students feel economic position does not play the essential role to the taking optional mathematics where as more than 50% of students felt tuition was necessary for good performance on mathematics.

By qualitative way that from student questionnaire form, students responded, that family background was also a motivator to select optional subject. Most of these answered that educational position of family is chief family factor for captivating optional mathematics teacher said that students' family background is an imperative to selection of educational profession to a person. They also said that the students who have educative family background is conscious to prefer optional subject in

comparison to that of non-educative family background. Most of head teacher and teacher agreed that the economic position of family also give confidence on choosing an optional mathematics at secondary level.

#### **4.7 Influence of the Student's Self Derive on the Selection of Other Optional Subjects**

Normally, the majority of Nepalese students have attracted on mathematics at primary level but they undergo that mathematics is difficult. The term students self-drive was defined as students own idea, former achievement & future profession. It was suppose that Student's interest, former achievement & future profession are directly manipulate decide of optional subjects.

**Table: 9 Influence of Student's Self Derive to Choose Other Optional Subjects**

S.N.	Statements	<sup>2</sup> value	Remark
1.	I never feel enjoy to solve mathematical problem	19.83	S
2.	Due to low score of grade VII, I don't choose optional mathematics	10.66	S
3.	There is no practical implementation of mathematics in our daily life.	11	S
4.	Only selectioning opt. math is not the solution of getting job in future	13.66	S

The students in 5 percent level of significant accepted all the statements. Therefore, students' self derive play the indispensable role to selection on their optional subject.

**Table: 10 Percentage of Respondent's Reaction to Oppinionnaire  
Items Subjected with Student's Self Derive**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	I never feel enjoy to solve mathematical problem.	20	28	33	17	2
2.	Opt. maths is domain of talent students.	8	37	20	25	10
3.	Only selectioning opt. math is not the solution of getting job in future.	20.5	27.5	34.5	18	5.5

From this table, about 80% of non-optional mathematics students did not experience enjoy on working out the mathematical problem. Most of them took mathematics as area of talent subject. About 76% non-mathematics students become conscious that there is no any protected outlook on optional mathematics.

In the same way, on the questionnaire most of non-optional mathematics reacted that self interest was vital to selection optional

subject. And nearly everyone of student does not select optional mathematics due to their unfortunate accomplishment on mathematics.

In conclusion, why the student selected non-mathematics as their optional subject was the major deal of the interview with teacher. In interview with subject teacher, selection of other optional subject except optional mathematics, nearly all of teacher exposed the fact that the students' earlier achievement and considerate of mathematics as difficult subject. Most teacher & head teacher responded there was no any agenda to build up the extra career of students due to the deficient in policy of education as well as trend.

#### **4.8 Influence of Neighbouring Factors Selection of Other Optional Subjects**

The word neighbouring factors consist of peer pressure, community influences & school atmosphere. It was presume that neighbouring factors have encouraging force to wish non-mathematics optional subjects. Due to the school situation, students do not obtain optional mathematics. There was two factors peer influence & social influences which were approaching issue to the students selection of non-mathematical optional subject.

**Table: 11 Influence of Neighbouring Factors to Choose Other Optional Subjects**

S.N.	statements	<sup>2</sup> value	Remark
1.	School does not support choosing optional mathematics.	15.66	S
2.	Mathematics is only for memorization.	13	S
3.	Position of mathematics teacher is not good in our society.	14.66	S

The result of this table shows that the all of the statement were accepted in five percent level of significance. So that the unconstructive approach towards mathematics encouraging to selection other optional subjects.

**Table: 12 Percentage of Respondent's Reaction to Oppinionnaire Items Subjected with Neighbouring Factors.**

S.N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	School does not encourage choosing optional mathematics.	25.5	21.5	26.5	18	8.5
2.	Due to practice, anyone can solve the mathematical problem.	4.5	22	30.5	26	17

Here more than 47% of students have unconstructive feelings towards school atmosphere for positive support of the students' selection of optional subjects. There were a small number of percent of students who were opting non-mathematics as optional due to the negative function of peer group and the general public.

In the student questionnaire form, some students reacted that peer group control was a foundation of pleasing non-optional mathematics. Nevertheless, most of them did not have pessimistic thoughts towards optional mathematics links. School administration claimed that they provide equal opportunity and treat all students equally with no any prejudice. Nevertheless, investigator established that the lack of back-up.

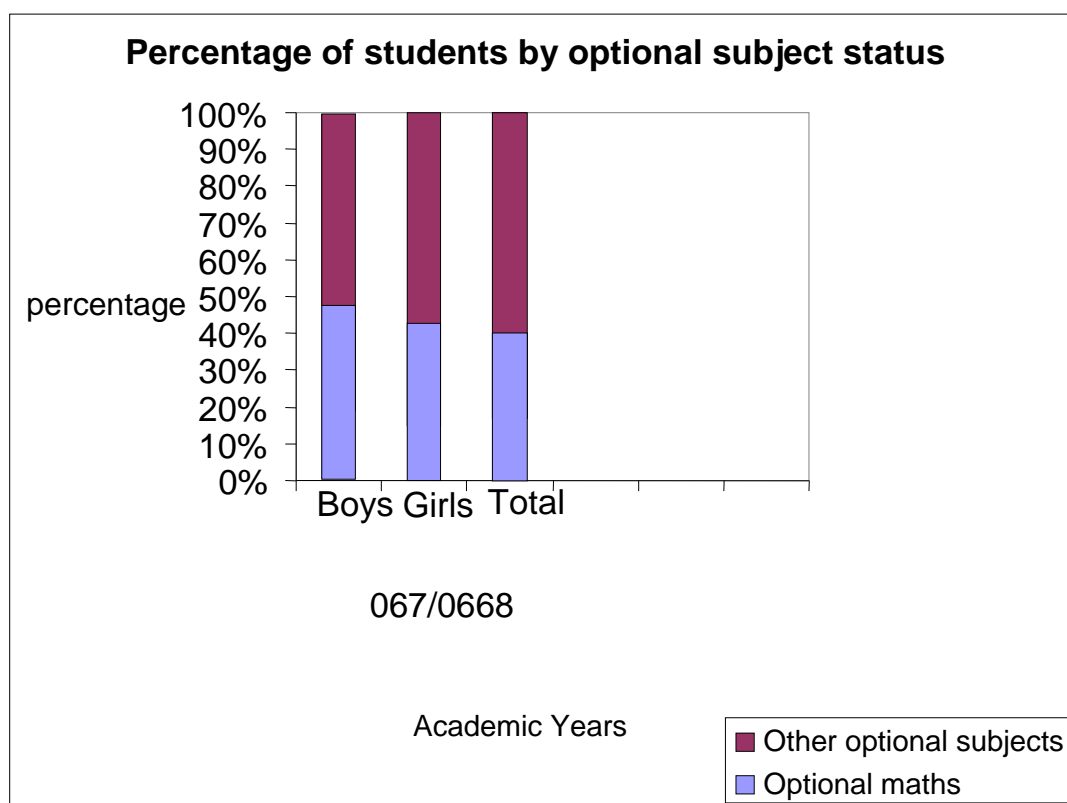
Therefore, as of the investigation of the variable made-up to manipulate students in not selecting optional mathematics emerged significant. Consequently, it is wrap up that the variables consist of family background, students self derive and neighbouring factors are accountable to the students' selection of optional subject at grade IX.

#### **4.9 Students Enrollment Ratio on Optional Mathematics and Other Optional Subjects**

Various outcome of the SLC examination illustrate that over all enrollment of students in optional mathematic is very small and very small especially in public schools. According to educational statistics (2059 – 2063 B.S.) out of the total number of students only 3.52% are enrolled in optional mathematics and remaining students are in other subjects out of them 73.03% in compulsory mathematics and 95.28% in

optional first additional mathematics are found to be succeeded only (Educational Statistics; 2005).

There are 130 secondary schools in Pokhara valley, Kaski District. Out of them 21 are public secondary school in Pokhara valley of Kaski District. The researcher selected 3 public schools by using random probability sampling. There were 91 students, among them only 30 students chosen mathematics as an optional subject in academic year 2067/2068. In academic year 067/68, more than 65% students selected non-mathematical optional subjects in grade IX .Among them less than 15% girls students opted optional mathematics. This shows that there were vast space between the number of students in optional mathematics and non-optional mathematics. The students' enrollment ratio of sampled schools is shown by following percentile bar graph:





# CHAPTER V

## SUMMARY, FINDING, CONCLUSION AND RECOMENTDATION OF THE STUDY

This last chapter deals with the summary, findings, conclusions & recommendations. Following the analysis and the interpretation of the collected data/ information, an effort has been completed to sum up and short list the finding, conclusion and recommendation for the additional study on the same & subjected topics. This chapter deals with the following sections in details.

### 5.1 Summary

The reason of the study was to find out the factors influencing on the selection of optional mathematics at grade IX of public school of pokhara valley. The objective of this study was:

- a) To find the factors influencing on the selection of optional mathematics at grade IX students.
- b) To find out the students enrollment ratio in optional subjects.

This study was small-scale survey type. The design has use both quantitative & qualitative. The population of the study was the students who are studying in secondary level in public schools of p0khara valley of kaski district. The student questionnaire form was the main tool where student's background & attitude scale was integrated. 60students(30 taken form optional mathematics & 30 taken from other optional subject),

head teacher & 3 subject teacher of 3 public secondary schools of Kaski district was taken as sample of the study. The researcher developed the student's questionnaire form & interview schedule to teacher& head teacher with the aid of earlier studies & the thesis supervisor.

The student questionnaire form consist of two parts on which one part was subjected to respondent background(family, school, optional subject) and next part is attitude scale on the selection of optional subject. The Likert 5 point scale was applied to know the attitude of students towards selection of optional mathematics. Various statistical tools such as percentage and  $\chi^2$  – test were applied to analyze the data by attitude scale. Where the data obtained by interview & the questionnaire subjected to the students background (family, school, optional subject) were analyze by qualitative/descriptive way.

After the analysis & interpretation of the obtained data/information the researcher established that the selection of the optional subject at grade IX were strongly associated with educational position of the family, former achievement and students own interest. The variables family job/occupation, economic position peer group influences, school environment, social influences & inter profession also played essential role to select optional mathematics at grade IX.

## **5.2 Finding**

The findings of the study on the basis of analysis of the collected data and information as follows:

1. Students' selection of optional mathematics is a role of educational background of family, job/occupation, economic position of family, students own interest, former achievement, peer group & social influences and school environment. On which students own interest, school environment, future profession, and former achievement played the essential role on their selection.
2. Majority of student's hasnot selected optional mathematics because of their bad performance in former grade and negative mind-set towards mathematics.
3. Future profession of student plays a essential role in selection of optional math. Most of the Nepalese students are not aware to their future profession.
4. The majority of the parents of students are not deal to the importance of mathematics. Nepalese people feel mathematics is not link with their job and occupation.
5. It is found that there is no program launched by school to favor on thematics. Teachers' role is not satisfactory in the science of proper guidance & counseling.
6. Students having strong interest towards mathematics select are optional mathematics, where as those think mathematics as of talent student, complex subject did not select optional mathematics.
7. There is a vast difference between enrollment on optional mathematics & other optional subjects' students. Most of pupils did

not choose mathematics as optional subject. Only 15% students were study optional mathematics and remaining other student studied other optional subjects except optional

8. Jected to teacher education were program launched on the favor of optional mathematics. Most of teacher didn't encourage choosing optional mathematics to thmathematics
9. There were no subeir students even school environment plays essential role on selection of optional mathematics.

### **5.3 Conclusion**

From the findings it is concluded that the students selection of optional subject is a by product of family background, students self desire & Neighbouring factors deal with peer influences, social influences , school environment such as school administration, teacher behavior in classroom effects on selection of optional mathematics,. It concludes that the school environment is very essential for increasing the student to choose optional mathematics so it should be improved.

Future profession such as apprentices created by the optional subject had strongly positive affects on selection of the students about their future hobbies, profession is very essential for increasing the students favor to optional mathematics so it should be provided by teacher guardians, head teacher & school administrator.

Positive attitude of society towards mathematics obviously increase students to choose optional mathematics so program subjected to join

mathematics with the daily life to society is very essential former achievement of student play the essential role of the selection of student on mathematics at primary & secondary level in very important. So trained & energetic mathematics teacher should engage to teaching profession on these levels and physical facilities should be provided.

Peer influence like cooperative behaviors on mathematics class, competitive motivates students' selection of optional mathematics so teacher parents & school administrator should manage them properly.

Family background such as attitude of family, job & occupation, economic position of family play an important role on the selection of optional subject so they should make favorable to mathematics for that require program should be launched nationally.

Generally, students do not want to become teacher. It is not a common belief among students to prefer some other professions than teaching. Hence teacher professional practice should rise up as other profession. It would be favorable to choose mathematics as optional subject at elementary level to university level.

#### **5.4 Recommendations for Further Study**

The conclusion of this study cannot be oversimplified to all schools (Public & private) schools to all are as (Rural & urban) due to the delimitation restricted in this study. Subsequent to conducting this research, the research found a few findings; the researcher would like to

put forward some recommendations and educational proposition for the supplementary study to authorize the present study's conclusion.

1. The majority of the Nepalese students are feeble and pathetic in mathematics somewhat that of other subjects hence they do not catch optional mathematics. Some helpful mathematics plan for students at school level is desired.
2. This study was completed in Kaski district as a case. For the overview of the result of the study, parallel study ought to be done in wider range & huge model.
3. Study can be done in higher secondary and college levels.

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# APPENDIX-A

## Student-questionnaire form

**Direction to fill up the questionnaire**

Sujan Dhewaju, M.Ed. student; 2008 Batch; specialization in mathematics education from Prithivi Narayan campus, Tribhuvan University Faculty of Education, Pokhara, Nepal is conducting research on "Factors influencing the selection of optional Mathematics at grade IX ( A case of public secondary schools of Kaski District)". This survey is a part of this M.Ed. field research in order to submit to the Department of Mathematics Education as a Partial Fulfillment for the Master's Degree in Education (Specialization in Mathematics Education). Respondents are requested to tick [V] in the box; write their answer in the dotted blanks. Since the researcher plans to report only aggregate findings in his dissertation, individual responses will remain confidential according to the statistical act 2015.

### 1. Information about Respondent

1.1	Name: .....
1.2	Sex: <input type="checkbox"/> 1. Male    2. Female
1.3	Optional subject (paper 1 <sup>st</sup> ) .....

### 2. Information about School

2.1	Name: .....
2.2	Locality:    1. Rural    2. Urban
2.3	Number of students in class IX: Boys: ..... Girls: ..... Total: .....
2.4	Number of optional maths students in class IX: Boys: .... Girls: .... Total: .....
2.5	Number of non-optional maths students in class IX: Boys: .... Girls: .... Total: .....
2.6	Address: .....

### 3. Information about Family

SN	Name of guardian	Sex	Cast	Relation	Qualification	Job/ Occupation	Yearly income Of family
1.							
2.							
3.							
4.							
5.							

**4. Information about optional subject:**

4.1) which is your optional subject?

- a) Optional Mathematics                      b) Other .....

4.2) which one of these factors encourages you to choose your optional subject?

- a) Family Background                      b) Own interest    c) Social environment  
d) Result of grade 8                      e) To get good marks in SLC  
f) Job opportunities in future              g) Other.....

4.3) who motivate to choose your optional subject?

- a) Parents    b) Teacher  
c) School Administration                      d) Friend    e) Other.....

4.4) In your view, which one of the following family factor play crucial role to choose optional subject?

- a) Occupation\job                      b) Economic status                      c) Educational status

## APPENDIX-B

### Students' Attitude on selection of Optional Mathematics

#### (Optional Mathematics Students, Set I)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Parents' education helps to offer my optional subject.					
2	My guardian encourages me to select optional mathematics.					
3	My parents don't know the essence of mathematics.					
4	My family spend sometime to discuss about my study.					
5	My family takes lots of benefit from mathematics.					
6	Family occupation is related to mathematics.					
7	Economic condition of people is challenge to select optional mathematics.					
8	Tuition/coaching is necessary for getting good marks in opt. mathematics.					
9	Mathematics is my favorite subject so I opt optional mathematics.					
10	I can do fine in Mathematics.					
11	I select mathematics due to the good marks of grade VIII.					
12	Optional mathematics helps to obtain good marks in SLC.					
13	Any person can do well in optional mathematics.					
14	In each and every field, the use of mathematics is very important.					

15	I would like to be a mathematics teacher.					
16	I took optional mathematics because I recognize opportunity that created by mathematics.					
17	Our teacher didn't clarify why mathematics is important.					
18	Our school has conducted the program encouraging optional mathematics students.					
19	School has not upbringing background to study mathematics.					
20	I took optional mathematics because my friends are suggesting me.					
21	Due to practice, all of people do fine in optional mathematics.					
22	I will capable to apply what I find out in mathematics.					
23	Position of mathematics teacher is high in our society.					
24	Teacher has more expectations on optional mathematics.					

## APPENDIX-C

### Students' Attitude on selection of Other Optional Subjects (non math)

#### (Other Optional Subjects Students, Set II)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Parents' education helps to offer my optional subject.					
2	My parents don't encourage me to select optional mathematics.					
3	My parents know the essence of optional math.					
4	My family invests fixed time to discuss about my study.					
5	Family doesn't take any advantage by mathematics.					
6	Our occupation is not linked with mathematics.					
7	Due to poor economic condition person incapable to select optional mathematics.					
8	Tuition/coaching is necessary for getting good point on mathematics					
9	I never feel enjoy to solve mathematical problem.					
10	I can never get success in mathematics.					
11	Due to low marks of grade VIII, I don't want optional mathematics					
12	Optional mathematics students obtain good marks in SLC.					
13	Optional mathematics is area of talent students.					
14	There is no practical achievement of mathematics in our daily life.					

15	I don't like to be a mathematics teacher.					
16	Only selecting opt. math is not the solution of getting employment in future.					
17	Our teacher doesn't explain why mathematics is essential.					
18	School doesn't encourage selecting optional mathematics.					
19	School has not environment to learn mathematics.					
20	I don't desire opt. math because my optional math friends irritated me.					
21	Due to practice, anyone can tackle the mathematical problem.					
22	Mathematics is only for memorization.					
23	Position of mathematics teacher is not high in our society.					
24	Teacher has extra expectations from the optional mathematics students.					

## APPENDIX – D

### Students' Attitude on selection of Optional Mathematics (non math)

#### (Other Optional Mathematics Students, Set I)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Parents' education helps to offer my optional subject.	22.5	24	35	11.5	7
2	My parents don't encourage me to select optional mathematics.	12	20	35.5	31.5	0
3	My parents know the essence of optional math.	6.5	22	25.5	14.5	31.5
4	My family invests fixed time to discuss about my study.	24.5	18.5	5	6.5	32.5
5	Family doesn't take any advantage by mathematics.	18.5	37	18	22.5	4
6	Our occupation is not linked with mathematics.	16.5	37	20	17	9.5
7	Due to poor economic condition person incapable to select optional mathematics.	10.5	18.5	16	28	27
8	Tuition/coaching is necessary for getting good point on mathematics	28	24	20.5	9.5	18
9	I never feel enjoy to solve mathematical problem.	20	28	33	17	2
10	I can never get success in mathematics.	9.5	34	31.5	14.5	10.5
11	Due to low marks of grade VIII, I don't want optional mathematics	12	24.5	27.5	25	11
12	Optional mathematics students obtain good marks in SLC.	11	41	24.5	16	7.5
13	Optional mathematics is area of talent students.	8	37	20	25	10
14	There is no practical achievement of mathematics in our daily life.	16	30.5	25	21.5	7
15	I don't like to be a mathematics	13	33	20.5	25	8



	teacher.					
16	Only selecting opt. math is not the solution of getting employment in future.	14.5	27.5	34.5	18	5.5
17	Our teacher doesn't explain why mathematics is essential.	16	25.5	18	24.5	16
18	School doesn't encourage selecting optional mathematics.	25.5	21.5	26.5	18	8.5
19	School has not environment to learn mathematics.	10.5	21	13	40.5	15
20	I don't desire opt. math because my optional math friends irritated me.	4.5	22	10.5	29	35
21	Due to practice, anyone can tackle the mathematical problem.	4,5	22	30.5	26	17
22	Mathematics is only for memorization.	0	16.5	39.5	28.5	16.5
23	Position of mathematics teacher is not high in our society.	4.5	8.5	33.5	38	15.5
24	Teacher has extra expectations from the optional mathematics students.	13	37	18	16.5	15.5

## APPENDIX – E

### Students' Attitude on selection of Other Optional Subjects

#### (Optional Subjects Students, Set II)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Parents' education helps to offer my optional subject.	24.5	33.5	28.5	13.5	0
2	My guardian encourages me to select optional mathematics.	27.5	30.5	24.5	7	10.5
3	My parents don't know the essence of mathematics.	18	40.5	25	16.5	0
4	My family spend sometime to discuss about my study.	28.5	37.5	21.5	8.5	4
5	My family takes lots of benefit from mathematics.	4	15.5	43	22.5	12
6	Family occupation is related to mathematics.	9.5	20.5	16.5	40.5	13
7	Economic condition of people is challenge to select optional mathematics.	23.5	25.5	19.5	18	13,5
8	Tuition/coaching is necessary for getting good marks in opt. mathematics.	30.5	23	8	30.5	8
9	Mathematics is my favorite subject so I opt optional mathematics.	32	52	8	8	0
10	I can do fine in Mathematics.	32.5	44	13	10.5	0
11	I select mathematics due to the good marks of grade VIII.	36	32.5	13	17	2
12	Optional mathematics helps to obtain good marks in SLC.	30.5	25	34.5	10	0
13	Any person can do well in optional mathematics.	38	32	13.5	16.5	0
14	In each and every field, the use of mathematics is very important.	32.5	19.5	28	16	4
15	I would like to be a mathematics teacher.	11.5	38.5	35	12	3
16	I took optional mathematics because I recognize opportunity that created by	18	23.5	20.5	21.5	16.5

	mathematics.					
17	Our teacher didn't clarify why mathematics is important.	44.5	25	12	15.5	3
18	Our school has conducted the program encouraging optional mathematics students.	2	21.5	20.5	23	33
19	School has not upbringing background to study mathematics.	30.5	29.5	21.5	13.5	5
20	I took optional mathematics because my friends are suggesting me.	11.5	21.5	15.5	24	27.5
21	Due to practice, all of people do fine in optional mathematics.	10	33	20.5	21	15.5
22	I will capable to apply what I find out in mathematics.	25.5	12	42.5	16	4
23	Position of mathematics teacher is high in our society.	38	40.5	12.5	9	0
24	Teacher has more expectations on optional mathematics.	50	25	10	15	0

## APPENDIX – F

$t^2$  - test for each statement (1-24)

(Optional Mathematics Students, Set I)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	$t^2$ - value
1	Parents' education helps to offer my optional subject.	8	9	9	4	0	11
2	My guardian encourages me to offer optional mathematics.	9	8	8	2	3	12.33
3	My parents don't know the essence of mathematics.	6	12	8	4	0	13.33
4	My family invest some time to discuss about my study.	10	10	7	2	1	12.33
5	My family take enough benefit from mathematics	2	5	12	8	3	9.67
6	Family occupation is related to mathematics	4	5	5	12	4	12.66
7	Economic status of people is challenge to choose optional mathematics	8	8	4	6	4	14.66
8	Tuition is necessary for getting good marks in opt. mathematics.	10	6	3	8	3	14.33
9	Mathematics is my favorite subject	11	15	3	2	0	27.8
10	I can do well in Mathematics	11	12	5	2	0	19
11	I choose mathematics Due to the good marks of grade VIII.	12	8	6	3	1	12.33
12	Optional mathematics helps to get good marks in SLC.	10	7	10	3	0	13

13	Anyone can do well in optional mathematics.	10	6	8	6	0	9.6
14	In each and every field, the use of mathematics is very important.	10	5	9	4	2	14.66
15	I want to be a mathematics teacher.	4	11	10	3	2	11.66
16	I choose mathematics because I know opportunity that created by mathematics	6	6	7	6	5	14
17	Our teacher doesn't explain why mathematics is important	13	7	4	4	2	12.33
18	Our School has conducted the program encouraging optional mathematics students	1	6	6	7	10	24
19	School has good environment to students mathematics	10	8	7	3	2	15.33
20	I choose optional mathematics because my friends are offering me.	4	7	3	8	8	24
21	Due to practice, all of people do well in optional mathematics	3	10	6	6	5	15.33
22	I will able to use what I learn in mathematics	7	4	13	5	1	13.16
23	Position of mathematics teacher is good in our society.	12	12	4	3	0	10.33
24	Teacher has more expectations on optional mathematics	16	6	5	3	0	20.16



## APPENDIX – G

$t^2$  - test for each statement for set II.

(Other Optional Subjects Students, Set II)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	$t^2$ - value
1	Parents' education helps to offer my optional subject.	8	6	10	4	2	17
2	My parents don't encourage me to choose optional mathematics	4	6	10	10	0	12
3	My parents know the essence of optional math.	2	6	8	4	10	11.66
4	My family invests fixed time to discuss about my study.	8	5	2	4	11	13.83
5	Family doesn't take any benefit my mathematics.	5	11	6	6	2	19
6	Our occupation is not related with mathematics.	5	11	7	4	3	11.66
7	Due to poor economic condition person unable to select optional mathematics.	4	5	4	19	8	15.66
8	Tuition is necessary for getting good position on mathematics.	8	7	7	2	6	9.66
9	I never feel enjoy to solve mathematical problem.	8	7	10	4	1	19.83
10	I can never get success in mathematics.	2	10	10	4	4	9.66
11	Due to low score of grade VII, I don't choose optional mathematics.	4	7	8	8	3	10.66

12	Optional mathematics students get good marks in SLC.	4	12	7	5	2	14.66
13	Optional mathematics is domain of talent students.	3	11	6	7	3	14
14	There is no practical implementation of mathematics in our daily life.	5	9	8	6	2	11
15	I don't like to be a mathematics teacher.	4	10	6	8	2	13.66
16	Only selecting opt. math is not the solution of getting job in future.	5	8	10	6	1	13.66
17	Our teacher doesn't explain why mathematics is important.	5	7	6	7	5	14.33
18	School doesn't encourage choosing optional mathematics.	8	6	8	6	2	15.66
19	School has not environment to study mathematics.	3	6	5	11	5	17.66
20	I don't choose opt. math because my optional math friends irritated me.	2	6	4	8	10	11.67
21	Due to practice, anyone can solve the mathematical problem easily.	2	6	10	7	5	10
22	Mathematics is only for memorization.	0	5	12	8	5	13
23	Position of mathematics teacher is not good in our society.	2	2	10	12	4	14.66



24	Teacher has more expectations from the optional mathematics students.	4	10	6	6	4	11
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## APPENDIX – H

### Statistical Formula Used for Data Analysis

1. For  $\chi^2$ - test,

$$\chi^2 \text{ Value} = \frac{\sum f_{o_{ij}} - \sum f_{e_{ij}}^2}{f_{e_{ij}}}$$

Where

$f_{e_{ij}}$  = expected frequency

$$= \frac{i^{\text{th}} \text{ row total} \times j^{\text{th}} \text{ column total}}{\text{Grand Total}}$$

$f_{o_{ij}}$  = observed frequency

Degree of freedom (d.f.) = 5 – 1 = 4

Level of Significance ( $\Gamma$ ) = 0.05

2. For percentage (%)

$$= \frac{\text{No. of respondent for particular option}}{\text{Total no. of respondent}} \times 100$$



## APPENDIX – I

### Statistical Formula Used for Data Analysis

S.N.	Name of School	Number of Students		Total
		Opt. Mathematics	Other Opt. Subjects	
1.	Shree Balmrandir Secondary School, Nadipur	28	27	55
2.	Gyanbhumi Secondary School, Nadipur	9	13	22
3.	Shree Sitaladevi Community School, Sitaladevi	3	11	14