

**FACTORS INFLUENCING IN THE SELECTION OF OPTIONAL
MATHEMATICS**

A THESIS SUBMITTED

BY

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Declaration

I hereby declare that to the best of my knowledge this thesis entitled "Factors Influencing in the selection of Optional Mathematics" is original work. No part of it was earlier submitted for any degree to any university, college or educational institutions. Whatever subject matter I have presented in this thesis belongs to my own work. I have not copied any material from I have not copied any material from the theory and research reports completed in the past except some cited statements.

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CERTIFICATE

This is to certify that Januka Devi Paudel, student enrolled in the university in academic year 2060/2061 with T.U. Registration No. 23020-87 and examination Roll No. 480009 (062), has completed this thesis under my supervision during the prescribed period abiding the rules and regulations of T.U. The research paper entitled "Factor Influencing the Selection of Optional Mathematics" embodies the result of her investigation conducted during 2019 under the department of Mathematics, Prithvi Narayan Campus, Pokhara. I recommend and forward this thesis to be submitted for evaluation as the partial requirement to award the degree of master of education.

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Factor Influencing in the Selection of Optional Mathematics has been approved in partial fulfillment of requirements for the degree of master of mathematics education.

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ABSTRACT

Mathematics is an important subject which is taught at every level of our country and has significant place in curriculum. This thesis identifies the factors which manipulate the selection of Mathematics by grade IX students as an optional subject in community secondary schools of Pokhara metropolitan city. What factors influence those students selecting Mathematics at grade IX in community school? And what is the present enrollment ratio of optional subject at grade IX in community school? These questions were key of this study.

A case of 40 students from grade IX of community secondary schools of Pokhara metropolitan city among them 20 were optional mathematics student and rest 20 were other optional subjects. The questionnaire form were given among 40 students and asked to fill it.

According to the result of the study there were large involvement of students in on Opt. Mathematics in community school. From student's enrollment ratio, it is concluded that 60.73% students choose optional mathematics and remaining choose economics as optional subjects. High percentages of girls choose optional mathematics rather than percentage of boys. From this study, it is concluded that student's selection of optional subjects deal, with family background, teacher factor and student's self derive. From the χ^2 test, economic condition of people was main reason for selecting optional mathematics. Whereas school does not encourage choosing optional mathematics main reason for selecting other subject as optional subjects.

From the χ^2 test statements which were significant for the selecting optional mathematics Parent's education helps to offer my Optional subject, My guardian encourages me to select Optional math, My parents don't know the essence of Mathematics, Family occupation is related to Mathematics, Economic condition of people is challenge to select, I choose Mathematics due to good marks of grade VIII, Anyone can do well in Optional Mathematics, In each and every field, the use of Mathematics is very important, I want to be a Mathematics teacher.

Non-significance for selecting optional mathematics are My family spend sometimes to discuss about my study, My family take lots of benefit from Mathematics, Mathematics is my favorite subject, I can do well in Mathematics, Optional Mathematics help to obtain good mark in SEE, I choose math because I know opportunity that created by Mathematics, Our teacher does explain why math is important, Our school has conducted the program encouraging Optional math. students, I choose Optional Mathematics because my teacher are offering me, Due to practice, all of people do well in Optional math., I will able to use what I learn in math, Position of math teacher is good in our society, Teacher has more expectations on Optional math.

From the χ^2 test statements which were significance for the selecting other subject as optional subject as My parents know the essence of Optional math, Our occupation is not related with math, Tuition is necessary for getting good position on math, Due to low score of grade VIII, I don't choose Optional math, Only selecting Optional math is not solution of getting job in future, School does not encourage choosing Optional math, Due to practice, anyone can tackle the math problem easily, Math is only for memorization, Teacher has extra expectations from the Optional math students.

Non-significance for selecting other subjects as Parent's education helps to offer my Optional subject, My parents don't encourages me to choose Optional math, My family spent fixed time to discuss about my study, Family does not take any benefit by Mathematics, Due to poor economic condition person unable to select Optional math, I never feel enjoy to solve math problem, I can never get success in math, Opt. math students get good marks in SEE, Optional Mathematics is domain of talent student, There is no practical implementation of math in our daily life, I don't like to be a math teacher, Our teacher does not explain why Mathematics is important, School has not environment to study math, I don't choose Optional math because my Optional math friends irritated me, Position of math teacher is not good in our society.

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Chapter I

Introduction

Background of the Study

In the modern world, Mathematics is taken as an important component of education. Mathematics is the backbone of our civilization. It is not the exaggeration to say that history of Mathematics is the mankind. Mathematics has led to the development of various subjects, vocations and technology. It is the science which is still playing an important role in various ways of life. We can relate Mathematics to history, logic science, daily life, social science, art, music and literature as well as different aspects. This fact is well recognized also in Nepal. Therefore Mathematics is introduced as a Compulsory subject at all levels of school education. 30% is allotted to Mathematics at the primary level (Primary Education Curriculum 2009), 20% at Lower Secondary Level (Lower Secondary Education, Curriculum 2000) and 12% at secondary level (Secondary Education Curriculum 2006). Each person born in a family gets different educational experiences from family life, school life and college life of student. 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.

Mathematics has no generally accepted definition. Aristotle defined Mathematics as "The science of quantity" and this definition prevailed until the 18th century. Galileo Galilei (1564-1642) said "The universe cannot be read until we have learned the language and become familiar with the characters in which it is written". It is written in Mathematics language and the letters are triangle, circles and geometrical figure without which it is humanly impossible to comprehend a single world.

Modern education began in Nepal with the establishment of the first school in 1853. However, this school was only for the members of the ruling families and their courtiers, schooling for the general people began only after 1951 when a popular

movement ended the autocratic Rana family regime and initiated a democratic system.

Schoerfeld (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 project of driving and practicing at facts, rules and procedures in the same manner as a teacher or somebody transform to the students.

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 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. The six secondary core subjects are Nepali, English, Mathematics, Science, Social Studies, Health, Population and Environment (HPE) with two Optional papers with full marks 100 and pass mark 32 while the Optional Mathematics (first paper) has also got weight five period per week with full marks 100 and pass mark 32 (High Level National Education Commission, 1999 p. 10).

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 students in school education. 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. Nowadays, Compulsory Mathematics is becoming a burden to most of the student of school level as well as other level too. Mathematics taken as difficult and boring subject, high failure rate in Mathematics in school education Mathematics taken as male domain subject etc are the present condition at Nepal towards Mathematics as well as Optional Mathematics. This analysis is not fully over simplified to conclude that all schools (community school) to all are as urban due to limitation restricted in this study. This study is only for

Grade IX at Secondary Level but it can also be alone in higher secondary and college level. The study was conducted in only Pokahra Metropolitan City so it should be conducted in wider range and huge model.

The present condition of Nepal towards optional mathematics are taken as difficult and boring subject, high failure rate and talent domain subject. On this background it is necessary to study the causing factor to select Mathematics and other subjects as Optional. Why student acquire Mathematic? And why they are separated from Mathematics? Accordingly, current study proposed to the study of the factors influencing the selection of Mathematics as Optional at secondary level.

Statement of the Problem

After passing district level examination of grade eight, the majority of Nepalese students are unidentified about the opportunity termed by Optional Mathematics in judgement to non Mathematics subject while going to the grade IX. Selection of Optional subject in grade IX is essential in the student's life. Enrollment of students in Optional Mathematics is much smaller than that of other Optional subject. Therefore, research wants to find the answer of the following research question.

- a. What are the family background influence on the selection of Optional Mathematics at grade IX?
- b. How is the teacher influence on the selection of Mathematics as an Optional subject at grade IX?
- c. How is the students themselves influence on the selection of Mathematics as an Optional subject at grade IX?

Objectives of the Study

This study is based on the following objectives. It aims

- a. To find the reason influencing on selection of Optional Mathematics in secondary level of community school.
- b. To find out enrollment ratio in Mathematics and non- Mathematics students in secondary level of community schools of Pokhara metropolitan city.

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 family background, teacher factor, students self derive influencing on the selection of Optional Mathematics at grade IX students of Pokhara Metropolitan City.

Significance of the Study

Education is one of the factors of reducing poverty and rising production. It is the main step for the growth of nation.

True learning is possible when student get freedom in selecting subject which is possible only through consciousness in significance of Optional subject. In context of Nepal, agricultural based financing system, intense poverty, poor literacy and others are obstacle of Optional subject in implementation. However, in such condition, factor influencing the selection of Optional Mathematics grade IX student of Pokhara Metropolitan City is very important. The researcher expects to

- a. show existing factors on environment of community school students in Optional Mathematics.
- b. get existing factors that are subjected to decide Mathematics as Optional subject.
- c. show comparative study on Mathematics and non Mathematics subjects to environment and selection of Optional subject.

Delimitations of the Study

The following points are accepted to limit the study.

1. The study is limited to Pokhara Metropolitan City only.
2. Only two community schools were selected for propovsive sampling (Bal Mandir Secondary School and Nabin Secondary School).
3. This study is limited to 40 students (20 students from each school).

Definition of Terms

- **Mathematics:** Optional Mathematics is considered as Mathematics.
- **Non- Mathematics:** Other Optional subjects except Mathematics is considered as non- Mathematics.
- **Factor :** The term factor is defined as the one of several things that cause or influence same thing. Eg: educational factors, social factor, economic factors etc.
- **Optional Mathematics student:** The student of grade IX who take Mathematics as Optional subject of Nepal recently learning in urban area school in the day of enumeration.
- **Family background:** The position, education, job/occupation and economic position are termed as family background.
- **Optional subjects:** The subject under Optional first paper and Optional second paper as prescribed by the recent secondary curriculum.
 - a. **Optional first paper**
 - ❖ Optional Mathematics
 - ❖ Humanities, Social Science
 - ❖ Language
 - b. **Optional second paper**

Interdisciplinary subject prescribed by curriculum of secondary level.
- **Community school:** The school governed by the Nepalese government.
- **Other Optional subject students:** Students who study other Optional subject and reject Optional Mathematics.
- **Student's self derive:** Student's own motivation they choose Optional Mathematics for future profession.
- **Subject teacher:** The teacher who teaches Optional Mathematics at grade IX.

Chapter II

Review of Subjected Literature

A literature review is the search and evolution of the available research works. It documents the state of art with respect to the task that is used for research for better surveying. In the research, review is very improve. It helps to improved idea for better investigation during the research. It also helps research to develop through understanding and insight into previous researcher work that relates to the present study. Research in any sector of skin wants a suitable study with the works in which there are many researches done to identify what has been established, known or studied and what has not been tried to be found yet. Many books, reports and related students have been reviewed in order to explain the present problem of the study.

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 secondary level" with the objective to the study factor affecting in learning of school mathematics in term of school enrollment family background, motivational factors physical facilities, interest of learners, instructional materials. The tools for the study was administrated to the sample to go students and the data was analyzed by using t-test. He concluded that environment of 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 the motivation, student's interest, instructional methodology and materinals also affected an teaching and learning mathematics.

Neupane (2006) conducted a research on "Effect of socio-economic status on Mathematics achievement" For this the study researcher developed the achievement test paper, parent's questionnaire form and 84 sample students of 5 government school's of Lamjung district. From this research he concluded that the score obtained by students in Mathematics was found significantly correlated with parent's

education occupation, family size and structure of family size and structure of family were found negatively correlated with Mathematics achievement.

"Identifying factors affecting the Mathematics Achievement of students for better instructional design" done by Tuncay and Omur (2009) conducted a study on instructional strategies and methods, teacher competency in Mathematics education, and motivation or concentration were the three most influential factors that should be considered to design decision.

Pokharel, M (2001) had studied entitled "Mathematics achievement in SLC examination between public and private school student at Kaski district. "The main conclusion of this study was to mean achievement scores and correlation of private school student in Compulsory and Optional Mathematics was greater than community school student in Kaski district in SLC examination. He concluded that the Mathematics achievement of private school is better than that of community school.

Richard (1983) had made a study entitled "Factors related to student's school achievement. He concluded the important factors related to students school achievement in Mathematics and classroom behavior (time spend in learning, student attention, method of teaching) teacher's background (trained, experience, ability), background (trained, experience, ability) of private and community school student's characteristics (prestige, knowledge, student's attitude, daily attendance)

"Attitudes of civil students towards Optional Mathematics at secondary level" done by Joshi (2010) aimed to find out the attitude of secondary level students towards Optional Mathematics and compare the attitudes of urban and rural girls towards Optional Mathematics. A set of opinionaire and interview was applied tools for the date. Collection χ^2 test was applied to find out the attitudes of secondary level girls students towards Optional Mathematics and t-test was applied to find out the attitudes of the urban and rural girls student's. The sample size was taken 60 girls

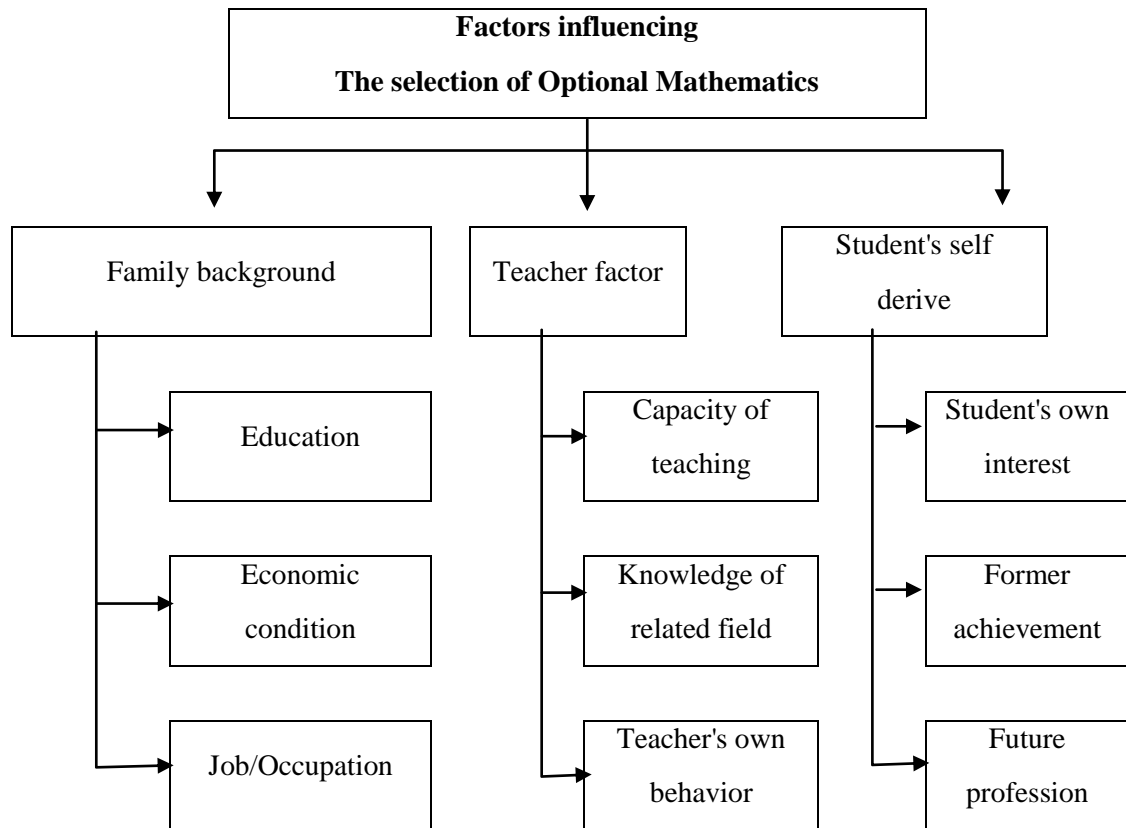
students at Kailali district from 5 urban and 5 rural schools. He found that there was a positive attitude towards Optional Mathematics and there is no significant differences between attitude of urban and rural girls towards Optional Mathematics.

Sapkota (2005) studied as "A comparative study of the Mathematics achievement on SLC result of Kathmandu and Kavre districts of Nepal. The major findings of the study in several variables are presented as follows:

- There is significant difference between the achievement in Mathematics students of Kathmandu and Kavre districts.
- There is significant difference between the achievement of boys and girls in Mathematics of Kathmandu districts.
- There is significant difference between achievement of students from rural and urban area of Kathmandu district.

Farooq and Shanzad (2006) has done a study entitled "Effect of teacher's professional education of students achievement in Mathematics" and concluded that untrained teachers had problem with their teaching methods and often made facility 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 other hand, trained teachers exhibited some of the qualities of teacher professionalism emphasized.

Conceptual Understanding of the study from above literatures the conceptual understanding of this study is shown as



From the above table, it is found that there are many sort of factors which affect in mathematics learning. Mainly it is categorized into 3 factors is family background, teacher factor and student self derive. Family background include economic position educational position and job/occupation of family. Teacher factor include capacity of teaching, knowledge of regarding field and teacher's own behavior. Student self derive factor include student own interest, former achievement and future profession.

Chapter III

Methodology

Chapter View

The chapter explained the plane method of study which helped to achieve the objective of the study. This chapter begins with its design of the study, population of the study, the study area/field sample and sampling strategy, data collection tools and techniques, data collections procedure and data analysis procedure.

Design of the Study

Designing of the study is a plan and strategy at investigation concerned so as to obtain answer to research question. Both primary and secondary data were taken during survey. Primary data were collected by structured questionnaire technique from sampled student of class nine whereas secondary data were collected by paper sheet from administrative record as sampled schools. The design of research as survey study with this research follows the post positivism aradigm. It follows the quantitative research design such as survey research design, as in descriptive nature.

Population of the Study

The population of the study consisted of secondary level students who had studied at grade IX of community schools of Pokhara metropolitan city of Nepal in the academic year 2075.

Sample of the Study

There are 68 community secondary schools in Pokhara metropolitan city, Kaski district (data based on Pokhara Metropolitan City's office). Among these community schools the researcher took 2 community school of Pokhara metropolitan by using purposive sampling. All the students who select Optional Mathematics at grade IX were taken as sample and same no of students who selected other Optional subjects except Optional Mathematics were included on sample from each school by using

random sampling. The respondents of sampled school were taken by head teacher and subject teacher of Optional Mathematics.

Instruments

The study intended to find the factors influencing as selection of Optional Mathematics of grade IX student of Pokhara metropolitan city. There are 3 types of instrument in this study.

- Questionnaire
- Opinionative
- Administrative record

a. Questionnaire and opinionative

To measure the students' attitude towards the selection of Optional Mathematics Appendix A was applied as questionnaire. The information of subjected to Optional subject schools background and student's background was introduced in questionnaire, two sets of opinionnaire were developed by the researcher for the Optional Mathematics student (Appendix B) and other Optional subject students (Appendix C) separately.

Dhakal (2006) applied students attitude scale containing two domain and 40 students talking reference of Tenneman Sherman's (1978) attitude scale. Taking reference of Dhakal (2006) the researcher developed the opinionnaire with these domain and 24 statements after the pilot test. The opinionnaire consists of three dimension (family background, teacher factor, student's self derive) to represent the selection of Optional Mathematics. The opinionnaire was developed in likert scale point technique for the scoring of statements was done as follows.

S.N.	Rating	Marks for positive statement	Mark 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 way of having face to face conversation in specific subject matter between more than one people is known as interview. It is done to get the real and actual data from research area. The head teacher of sample school was interviewed with the help of thesis supervisor's interview schedule. The interview was conducted to two subject teacher and head teacher of sampled school, which was subjected to difficulties of Optional Mathematics, school environment teacher behavior and teacher training management and profession analysis.

Data Collection Procedures

The objective of this study was discussed to the head teacher and subject teacher and make them clear. After clearing objective, they took, authorization for filling up the student questionnaire form together with opinionnaire set to the students of grade IX. The researcher went to classroom with head teacher and subject teacher and distributed the student questionnaire form to the student which clarify each statement, Student's were asked to return provided form next day after filling up fully. Next day the researcher collected the filled form from that classroom. After collection, researcher closed the questionnaire set (Appendix A) together with opinionnaire set I (Appendix B) for all Optional Mathematics students and questionnaire set (Appendix A) to other Optional subject teacher. This above arrangement is done for primary data. For secondary data student enrollment according to Optional subject in different academic years was composed by

administration of the sampled school. Each head teacher from two sampled school were taken interview.

Data Analysis and Interpretation

At 0.05 level of significance, test was applied for analysis of the data. This shows that of χ^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 facts that effects on selection of Optional subject of the student enrollment table was developed for enrollment ratio of student. Through questionnaire descriptive analysis was done.

Chapter IV

Analysis and Interpretation of Data

Analysis and interpretation of data deals with the collection of information. The researcher visited the school head teacher, teacher and students. The students who are studying in grade IX is the main source of data of this study as well as teacher who teaches Optional Mathematics of secondary level. The researcher had taken the responses of the respondent during face to face interview were carefully noted they were able to express freely whatever they have in their mind to analyze the data.

Before analysis of the study was carried out with heading of conceptual understanding prepared from the subjected literature review. Variables such as family background, teacher factor and student's self derive are categorized. The data were obtained from the student's of grade IX who study Optional Mathematics by using opinionnaire set I (Appendix B) and other Optional subject's students by using opinionnaire (Set II (Appendix C) in (Appendix A) student's questionnaire form include for both students for head teacher and subject teacher's interview was conducted. From the following headings, analysis and interpretation of data was done.

- Factors influencing the selection of Optional Mathematics at grade IX.
- Factors influencing the selection of other Optional subjects at grade IX.
- Student's enrollment ratio between Optional Mathematics and other Optional subjects.

Factor Influencing the Selection of Option Mathematics at Grade IX

The influence on selection of Optional Mathematics. There are various factors from different literature review. It was assumed that there are 3 domains with each of them has 3 variables. i.e. total of a variable which influenced as selection of Optional Mathematics. There are total 24 statements subjected to the selection of Mathematics as an Optional subject. They were categorized into 3 domains on which statements 1-8 were subjected to the domain family background, statements 9-16

were subjected with students self derive and similarly statements 17-24 were subjected to teacher's factors both set I (Appendix B) and set II (Appendix C) the percentage of student's attitude towards each student was presented in the table (Appendix D/E). The chi square value of each at the 24 state men (set I) and 24 statement (set II) at 5% level of significance were calculated appendix F/A) the analysis and interpretation of factors influence on selecting Opt. Maths, are describe as follow.

Influence of Family Background on the Selection of Optional Mathematics at Grade IX

It was assumed that family background plays the essential role in select of Optional Mathematics at grade IX. Economic position educational position and job/occupation of family include as a term of family background.

Table 1 : Influence of family background to choose Optional Mathematic

S.N.	Statement	χ^2 Value	Remark
1.	Parents' education helps to recommend my Optional subject	9	s
2.	My guardian encourages to recommend Optional Mathematics	7	s
3.	My family invest enough time to discuss about my study	40.5	non-s
4.	Family occupation is subjected to Mathematics	6.5	s
5.	Economic position of people is challenged to choose Optional Mathematics	2.5	s
6.	My family take enough benefits from Mathematics	12	non-s
7.	My parents do not know the essence of Mathematics	6	s
8.	Tuition is necessary for getting good marks in Optional Mathematics	3	s

The table value of χ^2 at 0.05 levels of significance and 4 degree of freedom is 9.488)

From above test, it doesn't signify that family invests enough time to discuss about their children's study. It doesn't signify that family take enough benefit from math. From above nine statements economic position of people is challenge to choose Optional Mathematics is the best statement.

Table 2 : Percentage of respondent's reaction to opinionnaire
Items subjected with family background

S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	My parents do not know the essence of Mathematics	10%	10%	15%	30%	35%
2.	Economic Position of people is challenged to choose Optional Mathematics	10%	20%	30%	25%	15%
3.	Tuition is necessary for getting good marks in Optional Mathematics	35%	15%	15%	15%	20%
4.	Parents' education helps to recommend my Optional subject	40%	5%	25%	25%	5%
5.	My guardian encourages to recommend Optional Mathematics	25%	35%	15%	25%	0%
6.	My family invest enough time to discuss about my study	75%	20%	0%	0%	5%
7.	Family occupation is subjected to Mathematics	40%	5%	25%	10%	20%
8.	My family take enough benefits from Mathematics	30%	5%	15%	45%	5%

From the table, having highly percentage on the statement that parents do not know the essence of Mathematics influenced on selection of Optional Mathematics. Also high number of students need family invest enough time to discuss about my study, the selection of optional mathematics.

Influence of Teacher Factors on the Selection of Optional Mathematics

For the selection of Optional Mathematics, it is assumed that factor of teacher is most importance. Here factor of teacher are the most important. Here factors of teachers terms are capacity of teaching, knowledge of regarding field and teacher's own behavior. Teaching capacity by the subject teacher also influence students towards Optional Mathematics. If subject teacher had good capacity of teaching i.e. all student clearly know what teacher teaches them without any doubt then more student took Optional Mathematics otherwise they choose other subject as Optional subject. Similarly, knowledge of teacher towards related field i.e. Optional Mathematics influence student to choose Optional Mathematics. If teacher can solve every problem related to Optional Mathematics than most of the students wants to study the subject. Otherwise they moved towards other subject friendly environment created by the teacher in a classroom.

Table 3 : Influence of teacher factors to choose Optional Mathematics

S.N.	Statement	χ^2 Value	Remark
1.	Our teacher does clarify why Mathematics is important	18.5	non-s
2.	School has good env. to Mathematics student	5.5	s
3.	I select Optional Mathematics because my teachers are suggesting me	9.5	non-s
4.	Position of Mathematics teacher is high in our society	25.5	non-s
5.	In each and every field, the use of Mathematics is very important	6.5	s
6.	Our school has conducted program encouraging the Optional Mathematics students	15.5	non-s
7.	I took Optional Mathematics because my teachers are recommending me	14.5	non-s
8.	Teacher has more expectations from Optional Mathematics students	28.5	non-s

From above statement, the best statement is that the school has good env. to Mathematics student for selection of Optional Mathematics. Each and every field, the uses of Mathematics is very important also affect the selection. Other five statement doesn't significance for selection of optional mathematics.

Table 4 : Percentage of respondent's reaction to opinionnaire**Items subjected with teacher factors**

S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	Our school has conducted program encouraging the Optional Mathematics students	5%	15%	45%	25%	10%
2.	I took Optional Mathematics because my teachers are recommending me	20%	30%	40%	5%	5%
3.	Teacher has more expectations from Optional Mathematics students	15%	65%	20%	0%	0%
4.	Our teacher does clarify why Mathematics is important	55%	20%	20%	5%	0%
5.	School has good env. to Mathematics student	5%	0%	50%	25%	20%
6.	I select Optional Mathematics because my teachers are suggesting me	0%	15%	40%	40%	5%
7.	Position of Mathematics teacher is high in our society	50%	45%	5%	0%	0%
8.	In each and every field, the use of Mathematics is very important	25%	20%	20%	35%	0%

Above table shows that schools are not so excited to encourage to consider program related to Optional Mathematics. More than 60% students are interested to take Optional Mathematics due to the recommendation and high expectation from the teacher. The teacher influences student by providing scope and knowledge of utilization of Mathematics in related field. Hence, the teacher's facts also play significant role in selecting Optional Mathematics as Optional subject.

Influence of Student's Self Derive on Selection of Optional Mathematics at Grade IX

Self derive is considered as an important key on the selection of the Optional subjects. Student's own interest, former achievement and future profession are the terms of students self derive. At higher level of education, most of the students in Nepal are deprived on their selection of Optional subject but in secondary level there is direct influence of the student's own interest on their selection of Optional subject.

Table 5 : Influence of students self derive to select Optional Mathematics

S.N.	Statement	χ^2 Value	Remark
1.	Mathematics is my favorite subject	13	non-s
2.	I can do well in Optional Mathematics	18.5	non-s
3.	I select Optional Mathematics due to good marks of grade VIII	9.5	s
4.	Any person can do well in Optional Mathematics	3.5	s
5.	Opt. Maths helps to get good mark in SEE	26	non-s
6.	I want to be a Mathematics teacher	3.5	s
7.	I select Optional Mathematics due to the good marks of grade VIII	6.5	s
8.	I took Optional Mathematics because I know opportunity that created by Mathematics	22	non-s

Above six statements show the influence of student's self derive to select Optional Mathematics. All these students in 5 percent level of significance indicates that

student self derive is highly dominated to select Optional Mathematics. Only statement 4 and 6 shows positive result towards selection of Optional Mathematics as Optional subjects. Selection of optional mathematics due to good marks in grade VIII also influence of students self derive to selection optional mathematics.

Table 6 : Percentage of the respondent's reaction to opinionnaire
Items subjected with student's self derive

S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	I can do well in Optional Mathematics	50%	35%	5%	10%	0%
2.	I select Optional Mathematics due to the good marks of grade VIII	20%	30%	40%	5%	5%
3.	I took Optional Mathematics because I know opportunity that created by Mathematics	10%	40%	50%	0%	0%
4.	Mathematics is my favorite subject	45%	30%	20%	0%	5%
5.	I select Optional Mathematics due to good marks of grade VIII	20%	30%	35%	5%	10%
6.	Any person can do well in Optional Mathematics	20%	5%	15%	30%	30%
7.	Opt. Maths helps to get good mark in SEE	30%	60%	0%	10%	0%
8.	I want to be a Mathematics teacher	30%	10%	15%	30%	15%

From above table more than 50% students agree to believe that they can do very well in Optional Mathematics so that they select Mathematics as an Optional subject. In next statement they were not affected that due to good marks in grade VIII they select Mathematics as Optional subject. Some of the students were influenced towards Optional Mathematics due to job opportunity in future related to Mathematics.

Factors Influencing the Student's Self Derive on Selection of Other Optional Subject at Grade IX

In a classroom, it is not necessary that all students choose only Optional Mathematics. Some of the students also have right to choose other subject as an Optional subjects. Most of the students in community school choose other subject as Optional subject. On the other hand, board toppers and the distinction holders in SEE are majority from the students taking Optional Mathematics. Thus, the researcher has found out the causing agent why a few students select Optional Mathematics. The analysis and interpretation of the collected data are present as below.

Influence of family background on selection of other Optional subjects

Family background is also one of the essential factors for selection of other subject as the Optional subject in grade IX. Various factors such as economic, environment science and job/occupation influence students. Taking Optional Mathematics at grade IX was determined by family background which is shown by following table.

Table 7 : Influence of family background to select other Optional subset

S.N.	Statement	χ^2 Value	Remark
1.	My parents don't encourage me to choose Optional Mathematics	8.5	s
2.	Our occupation is not subjected with Mathematics	2.5	s
3.	Due to poor economic condition a person is unable to select Optional Mathematics	13.5	non-s
4.	Parents education help to offer my option	9	s
5.	My parents invest fixed time to discuss about my study	61.5	non-s
6.	Family doesn't take benefit from my Mathematics.	10.5	non-s
7.	My parents know the essence of Optional Mathematics	6.5	s
8.	Our occupation is not relating with Mathematics	6.5	s
9.	Tuition is necessary for getting good position in Mathematics	4	s

The reason of selection of other subject as an optional subject rather than Optional Mathematics is due to our occupation which is not subjected with Mathematics. The rest of the statements are not adjusted as factors for selecting other subject on the optional subjects. My parents know the essence of optional mathematics, our occupation is not relating with mathematics and tuition is necessary for getting good position in mathematics are also consider to select other subjects as optional subjects.

Table 8 : Percentage of the Respondent's Reaction to opinionnaire**Items subjected with student's self derive**

S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	My parents know the essence of Optional Mathematics	10%	20%	45%	20%	5%
2.	Our occupation is not relating with Mathematics	10%	15%	30%	25%	20%
3.	Tuition is necessary for getting good position in Mathematics	30%	15%	5%	20%	30%
4.	My parents don't encourage me to choose Optional Mathematics	0%	20%	30%	40%	10%
5.	Our occupation is not subjected with Mathematics	0%	15%	30%	25%	30%
6.	Due to poor economic condition a person is unable to select Optional Mathematics	0%	10%	5%	40%	45%
7.	Parents education help to offer my option	5%	30%	50%	10%	5%
8.	My parents invest fixed time to discuss about my study	90%	5%	5%	0%	0%
9.	Family doesn't take benefit from my Mathematics.	0%	15%	20%	20%	45%

From the above table students do not affect that their parents know the essence of Optional Mathematics became high percentage stay in neutral position. Students don't agree that their occupation is not relating with Mathematics. The main reason of the students choosing non-Mathematics is because parents invest fixed time to discuss about study.

Influence of the Teacher's Factors Selection of Other Optional Subjects

Teacher factors consist of peer pressure, class room influence and school atmosphere. It was assumed that the behavior of the teachers forward the student's, knowledge of related field and capacity of teaching factors have got encouraging force to wish non-Mathematics as an optional subject.

Table 9 : Influence of teacher factors to select other Optional subject

S.N.	Statement	χ^2 Value	Remark
1.	School does not support selecting Optional Mathematics	2.5	s
2.	Mathematics is only memorization	5.5	s
3.	Position of Mathematics teacher is not good in our society	21	non-s
4.	Our teacher doesn't explain why Mathematics is important	18.5	non-s
5.	Teacher has extra expectation from the Optional Mathematics students.	19	non-s
6.	School does not encourage selecting Optional Mathematics	3.5	s
7.	Due to practice, anyone can solve the Mathematical problem	6.5	s
8.	I don't choose Optional because my Optional Mathematics friends irritated me.	24.5	non-s

From above result only 2 students are accepted at 5% level of significance. The teacher has extra expectation from the Optional Mathematics students. The school

does not support selecting Optional Mathematics and Mathematics is only memorization are the factors of selecting other subject as Optional subjects. School doesn't encourage selecting optional mathematics and due to practice any one can solve the mathematical problem are also the factors of selecting other subject as optional subjects.

Table 10 : Percentage of the Respondent's reaction to opinionative

Items subjected with student's self derive

S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	School does not encourage selecting Optional Mathematics	20%	25%	15%	30%	10%
2.	Due to practice, anyone can solve the Mathematical problem	5%	20%	40%	15%	20%
3.	I don't choose Optional because my Optional Mathematics friends irritated me.	0%	0%	15%	60%	25%
4.	School does not support selecting Optional Mathematics	20%	20%	15%	35%	10%
5.	Mathematics is only memorization	5%	10%	25%	25%	35%
6.	Position of Mathematics teacher is not good in our society	5%	0%	5%	45%	45%
7.	Our teacher doesn't explain why Mathematics is important	0%	0%	15%	40%	45%
8.	Teacher has extra expectation from the Optional Mathematics students.	25%	40%	25%	5%	5%

Here more number of students choose non-Mathematics subject because echer has extra expectation from optional mathematics student and also school doesn't support selecting optional mathematics.

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

Most of the students feel that Mathematics is very difficult subject, so they are not interested to select Optional Mathematics. Hence, students move towards non-Mathematics subject. Self derive is one of the factors to select Optional subject. The term self derive is defined as student's own idea, former achievement and future profession. It was suppose that student's are interested from former achievements and future professions also directly manipulate in decision of optional subject.

Table 11 : Influence of student's derive to select other Optional subjects

S.N.	Statement	χ^2 Value	Remark
1.	I never enjoy to solve Mathematical problem	15.5	son-s
2.	Due to low score of grade VIII, I don't select Optional Mathematics	4.5	s
3.	There is no practical implementation of Mathematics in our daily life	23	son-s
4.	Only selecting Optional Mathematics is not the solution of getting job in future	6	s
5.	I can never get success in Maths.	11	son-s
6.	Opt. Maths students get good mark in SEE	11.5	son-s
7.	Optional Mathematics is domain of talent students	11.5	son-s
8.	I don't like to be a Mathematics teacher	9.5	son-s

At 5% level of significance due to 100 score of grade VIII, student don't select Opt. Mathematics and also only selecting Optional Mathematics is not solution of getting job in future affects the selection of non-Mathematics.

Table 12 : Percentage of the Respondent's Reaction to opinionnaire

Items subjected with student's self derive

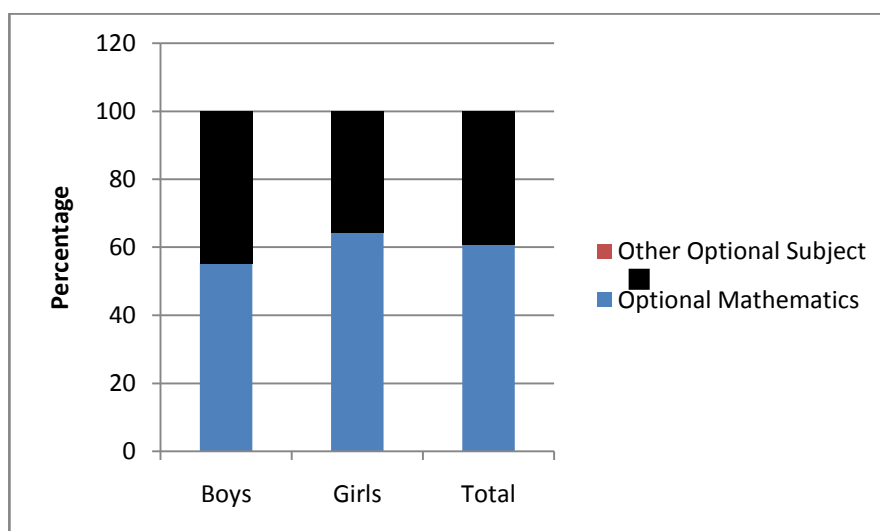
S.N.	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	I never enjoy to solve Mathematical problem	5%	0%	50%	25%	20%
2.	Optional Mathematics is domain of talent students	5%	40%	25%	0%	30%
3.	Only selecting Optional Mathematics is not the solution of getting job in future	30%	35%	15%	5%	15%
4.	I don't like to be a Mathematics teacher	15%	40%	15%	0%	30%
5.	Due to low score of grade VIII, I don't select Optional Mathematics	5%	35%	20%	5%	35%
6.	There is no practical implementation of Mathematics in our daily life	5%	0%	45%	55%	0%
7.	I can never get success in Maths.	5%	5%	35%	15%	40%
8.	Opt. Maths students get good mark in SEE	0%	40%	25%	5%	30%

From the above table more students agreed that they selected non Mathematics as an Optional subject because most of the students feel that only selecting Optional Mathematics is not the solution of getting job in future. They also agree that Optional Mathematics is domain of talent students. But they don't agree that they enjoy to some Mathematical problems.

Students Enrollment Ration in Optional Mathematics and Other Optional Subjects

There are 68 community secondary schools in Pokhara Metropolitan City. Two community schools were selected for this research and done random probability sampling. Bal Mandir Secondary School and Nabin Secondary School were chosen for sampling. There were 219 total number of student (both schools). Among them 134 were girls and 85 number of boys. Among them 64.18% girls chose Optional Mathematics and remaining 35.82% choose economic as a Optional subject whereas 55.3% boys choose Optional Mathematics and remaining 44.71% chose Economics as an optional subject. Total number of percentage of a student who chose Optional Mathematics was 60.73% and total number of percentage of a student who chose Optional Economic is 39.27%. This shows that there is vast space between the number of students in Optional Mathematics and non-Optional Mathematics. The student's enrollment ratio of sampled school is shown by following percentile bar graph.

Percentage of students by Optional subject status.



Academic Year 2075

Chapter V

Summary, Findings and Conclusion

Summary, findings, conclusion and recommendations are dealt in this chapter. Analysis and interpretation of collected data/information are focus and an effort has been completed to sum up and short the findings, conclusion and recommendation for the additional study on same and subjected topic.

Summary

Finding factors influencing on the selection of Optional Mathematics at grade IX of community school of Pokhara Metropolitan City was the reason of this study. The objectives of this study were.

- a. To find out the factor influencing on the selection of Optional Mathematics at grade IX students.
- b. To find out the students enrollment ratio in Optional subject

There was a small survey done in two community schools (Bal Mandir Secondary School and Nabin Secondary School) located in Pokhara Metropolitan City, Kaski district. The survey was done with the students of grade IX. The student questionnaire form was given to students randomly who were studying Optional maths and Economics as an Optional subject. 40 students (20 taken from Optional Mathematics and 20 taken from Economics), head teachers of two community schools of Pokhara Metropolitan City were included in the survey.

Interview schedule to head teacher and student's questionnaire form were developed for the survey.

There were two parts in student questionnaire in which one part was subjected to the respondent background (family, school, Optional subject teacher) whereas next part consisted on the selection of Optional subjects. Likert 5 point scale was applied to know the attitude of students towards selection of Optional Mathematics.

Chi-square test and percentage were applied as statistical tools to analyse the data by attitude scale in qualitative/descriptive way. The analysis was done with the help of data obtained by interview and questionnaire subjected to students background.

After completing the analysis and interpretation of obtained data/information the researcher established that the selection of the Optional subject at grade IX was strongly related to former achievement and students own interest. The family factors also played essential role to select Optional Mathematics at grade IX.

Findings

On the basis of analysis of the collected data and information following point were carried out for finding.

- a. Educational background of the family, job/occupation, economic position, students own interest, former achievement and teacher's behavior create the role of student's selection of Optional Mathematics.
- b. From the survey of two schools, it shows that the selection of Optional Mathematics in Bal Mandir was greater than that of Nabin Secondary School.
- c. Due to less aware of future profession students were affected during selection of Optional Mathematics as an Optional subject.
- d. Some of the students thought that Mathematics was only for talent student so it was complex subject. Those students didn't choose Optional Mathematics but those who were strongly interested towards Mathematics, select Optional Mathematics as Optional subject.

- e. The students had unconstructive facts towards school atmosphere for positive support of student's selection of Optional subject where school didn't encourage them.
- f. Most of the teachers didn't encourage their students for the selection of Optional Mathematics. As a result students chose other subjects as Optional subjects.
- g. From the student's enrollment ratio that 60.73% students chose Optional Mathematics and remaining chose Economics as an optional subject.

Conclusion

From the above findings, it is concluded that the students' selection of Optional subject deals with the family background, teacher factor and student's self derive. It concludes that the school environment is very essential for increasing the student to choose Optional Mathematics. School administrator, teacher, positive behavior should favor the student to choose Optional Mathematics by increasing their motivation, creating measurement, future profession related to Optional Mathematics which have strongly positive effects. Positive attitude of teacher towards Mathematics obviously increase students to choose Optional math. So program subjected to join Mathematics with daily life. So trained and energetic Mathematics teachers should be engaged in teaching profession on these levels and physical facilities should be provided.

School administrator, teachers as well as parents should manage good motivation environment around them so that student can enjoy the Mathematics class and develop interest on study.

Nowadays teaching professions are disliked by students, they do not want to be a teacher in future. Hence, teacher professional practice should rise up as other profession. It would be favorable to choose Mathematics as Optional subject in eleven class to university level.

Recommendations for Further Study

This analysis is not fully oversimplified to conclude that all schools (public) to all are as urban due to limitation restricted in this study. So the researcher puts forward some recommendations and education propositions for the supplementary study to authorize the present study is conclusion.

- a. This study is only for Grade IX at secondary level but it can also be done in higher secondary and college level.
- b. The study was conducted in only Pokhara Metropolitan City of Kaski district but it should be conducted in wider range and huge model.
- c. The students feel that Mathematics subjects is one of the hardest subjects in their curriculum. So, they do not catch Optional Mathematics. Some helpful Mathematics plan for students at school level is desired.

Bibliography

- Adeyemi B.M. (2009). **Factors influencing the choice of geography as an Optional Subject** : A Case of secondary school in Botswana.
- Alan Schoenferd. MCTM's Handbook of Research on Mathematics Teaching & Learning
- An Aristotelian Realist Philosophy of Mathematics PP 31-47.
- Article by Herbert J. Walberg (1981) **A Psychological theory of educational productivity.**
- Dhakal. H (2006). A study of the factors affecting the girls students attitudes towards selecting Optional Mathematics at secondary level. Unpublished Master's thesis. Tribhuvan University, Nepal.
- Faroog and Shahzad (2006). **Effect of teacher's professional education of students achievement in Mathematics** Bulletin of education & Research June 2006, Vol 28 No. 1, PP 47-55.
- Ghimire T.R. (1977). **A study on Factor affecting teaching/learning Mathematics at secondary level.** An unpublished Master's Thesis, Department of Mathematics Education, T.U.
- <https://en.wikipedia.org/wiki/Mathematics>.
- Joshi (2010). **Attitudes of Girls students towards Optional Mathematics at secondary level**
- Ministry of Education (2009), **School Level Educational Statistics of Nepal**, Sanathimi, Bhaktapur : Author.
- Ministry of Education (MOE) (2062). **Education Act**, (8th Rev.), 2028, Kathmandu : Bouddik Darpan.
- Neupane, A.K. (2006). Research on **Effect of Socio-economic status on Mathematics achievement.** An unpublished Master's Thesis, Department of Mathematics Education, T.U.
- Pandit, R.P. (1980). **Attitude of secondary schools students and three parents towards Mathematics and other subject of instruction.** An unpublished Master's Thesis, Department of Mathematics Education, T.U.

- Pokharel, M. (2001). **Mathematics achievement in school leaving certificate examination between public and private students** at Kaski district. Master thesis, Faculty of Education, TU, Kirtipur.
- Poudel, R.P. (2005). **Correlational Study between beliefs and mathematics achievement of students of grade IX**. An unpublished Master's Thesis, Department of Mathematics Education, T.U.
- Richard (1983), **Factor related to student's achievement**.
- Sapkota (2005). **A comparative study of the Mathematics achievement on SLC result of Kathmandu and Kavre District of Nepal** An unpublished Master's Thesis, Department of Mathematics Education, T.U.
- Schoenfeld, Alon H. (1992). **Learning to think mathematically problem solving, Metacognition & Sense making in Mathematics**. Hand book of Research on Mathematics teaching and learning, pp. 334-370.
- Sharma S.L. (2007), **Correlation of belief score and achievement score of Mathematics in grade IX of Nepalese schools**. Unpublished Master's Thesis. Kathmandu University, Nepal. [www. itdl.org/journal/dec-09/article0.3html](http://www.itdl.org/journal/dec-09/article0.3html)
- Tuncay and Omur (2009). **Identifying factors affecting the Mathematics achievement of students for better instructional design**
- William, M.K & Trochim (2006). **Social research methodology**, from <http://www.google.com.np>

Appendix (A)

Student questionnaire form

Direction to fill up the questionnaire

Januka Devi Paudel, M.Ed. student 2003-2005 Batch, specialization in Mathematics education from Prithvi 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 community secondary school of Pokhara Metropolitan City). 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. Respondents are requested to tick [√] in the box. Write their answer in the dotted blanks. Since the researcher plan to report only aggregate finding in her dissertation. Individual responses will remain confidential according to the statistical act 2019.

1. Information about Respondent

- 1.1 Name :
- 1.2 Sex: 1. Male 2. Female
- 1.3 Optional subject (Paper 1st)

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 Mathematics in class IX:
- Boys Girls Total
- 2.5 Number of non Optional Mathematics students in class IX :
- Boys Girls Total
- 2.6 Address :

3. Information about family

S. N.	Name of guardian	Sex	Cost	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 on these factors encourages you to choose your Optional subject?

- Family background
- own interest
- teacher
- result of grade 8
- to get good marks in SEE
- job opportunities in future

4.3 Who motivate to choose your Optional subject?

- a. parents b. teacher
c. friend d. school administration

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

- [illegible]

Appendix (B)

Student's attitude on selection of Optional Mathematics

(Optional Mathematics students, Set I)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	Parent's education helps to offer my Optional subject					
2.	My guardian encourages me to select Optional math					
3.	My family spend sometimes to discuss about my study					
4.	My parents don't know the essence of Mathematics					
5.	Family occupation is related to Mathematics					
6.	My family take lots of benefit from Mathematics					
7.	Economic condition of people is challenge to select					
8.	Tuition/coaching is necessary for getting good marks in Optional Mathematics					

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
9.	Mathematics is my favorite subject so I Optional Mathematics					
10.	I can do fine in Mathematics					
11.	I select Mathematics due to the good marks of grade VIII					
12.	Optional Mathematics help to obtain good mark in SEE					
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					

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
17.	Our teacher did clarify why Mathematics is important					
18.	Our school has conducted the program encouraging Optional Mathematics students					
19.	School has not up bringing background to study Mathematics					
20.	I took Optional Mathematics because my teacher 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 Mathematics					
23.	Position of Mathematics teacher is high in our society					
24.	Teacher has more expectations on Optional Mathematics					

Appendix (C)

Student's attitude on selection of Optional subjects (non Mathematics)

(Other Optional Mathematics students, Set II)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	Parent's education helps to offer my Optional subject					
2.	My parents don't encourages me to select Optional Mathematics					
3.	My family spent fixed time to discuss about my study					
4.	My parents know the essence of Mathematics					
5.	Family does not 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 marks on Mathematics					

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
9.	I never feel enjoy to solve Mathematics problem					
10.	I can never get success in Mathematics					
11.	Due to low marks of grade VIII, I don't want Optional math					
12.	Optional Mathematics student obtain good marks in SEE					
13.	Optional Mathematics is area of talent student					
14.	There is no practical achievements of Mathematical in our daily life					
15.	I don't like to be a Mathematics teacher					
16.	Only selecting Optional Mathematics is not solution of getting employment in future					
17.	Our teacher does not explain why Mathematics is essential					
18.	School does not					

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
	encourage selecting Optional Mathematics					
19.	School has not environment to learn Mathematics					
20.	I don't desire Optional Mathematics because my Optional Mathematics teacher irritated me					
21.	Due to practice, anyone can tackle the Mathematics 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)

Student's attitude on selection of Optional Mathematics

(Optional Mathematics students, Set I)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	Parent's education helps to offer my Optional subject	40	5	25	25	5
2.	My guardian encourages me to select Optional math	25	35	15	25	0
3.	My parents don't know the essence of Mathematics	5	15	35	30	15
4.	My family spend sometimes to discuss about my study	75	20	0	0	5
5.	My family takes lot of benefit from Mathematics	30	5	15	45	5
6.	Family occupation is related to Mathematics	40	5	25	10	20
7.	Economic condition of people is challenge to select Optional Mathematics	10	20	30	20	20
8.	Tuition/coaching is necessary for getting good marks in Optional Mathematics	35	15	15	15	20

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
9.	Mathematics is my favorite subject so I Optional Mathematics	45	30	20	0	5
10.	I can do fine in Mathematics	50	35	5	10	0
11.	I select Mathematics due to the good marks of grade VIII	20	30	35	5	10
12.	Optional Mathematics help to obtain good mark in SEE	30	60	0	10	0
13.	Any person can do well in Optional Mathematics	20	5	15	30	30
14.	In each and every field, the use of Mathematics is very important	25	20	20	35	0
15.	I would like to be a Mathematics teacher	30	10	15	30	15
16.	I took Optional Mathematics because I recognize opportunity that created by Mathematics	10	40	50	0	0
17.	Our teacher did clarify why Mathematics is important	55	20	20	5	0

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
18.	Our school has conducted the program encouraging Optional Mathematics students	5	0	50	25	20
19.	School has not up bringing background to study Mathematics	0	20	30	25	25
20.	I took Optional Mathematics because my teacher are suggesting me	0	15	40	40	5
21.	Due to practice, all of people do fine in Optional Mathematics	10	25	50	5	10
22.	I will capable to apply what I find out Mathematics	45	45	10	0	0
23.	Position of Mathematics teacher is high in our society	50	45	5	0	0
24.	Teacher has more expectations on Optional Mathematics	15	65	20	0	0

Appendix (E)

Student's attitude on selection of other Optional subjects

(Other Optional Mathematics students, Set II)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1.	Parent's education helps to offer my Optional subject	5	30	50	10	5
2.	My parents don't encourage me to select Optional Mathematics	0	20	30	40	10
3.	My parents know the essence of Mathematics	10	30	35	20	5
4.	My family spent fixed time to discuss about my study	90	5	5	0	0
5.	Family does not take any advantage by Mathematics	0	15	20	20	45
6.	Our occupation is not linked with Mathematics	0	15	30	25	30
7.	Due to poor economic condition person incapable to select Optional Mathematics	0	10	5	40	45
8.	Tuition/coaching is necessary for getting good point marks on	30	10	10	20	30

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
	Mathematics					
9.	I never feel enjoy to solve Mathematics problem	0	0	55	25	20
10.	I can never get success in Mathematics	5	5	35	15	40
11.	Due to low marks of grade VIII, I don't want Optional math	5	35	20	5	35
12.	Optional Mathematics student obtain good marks in SEE	0	40	25	5	30
13.	Optional Mathematics is area of talent students	0	25	45	20	10
14.	There is no practical achievements of Mathematical in our daily life	5	0	45	55	0
15.	I don't like to be a Mathematics teacher	15	40	15	0	30
16.	Only selecting Optional Mathematics is not solution of getting employment in future	25	35	20	5	15
17.	Our teacher does not explain why Mathematics is essential	0	0	15	40	45

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
18.	School does not encourage selecting Optional Mathematics	20	20	15	35	10
19.	School has not environment to learn Mathematics	0	5	10	50	35
20.	I don't desire Optional Mathematics because my Optional Mathematics teacher irritated me	0	0	15	60	25
21.	Due to practice, anyone can tackle the Mathematics problem	5	20	40	15	20
22.	Mathematics is only for memorization	5	10	25	25	35
23.	Position of Mathematics teacher is not high in our society	5	0	5	45	45
24.	Teacher has extra expectations from the Optional Mathematics students	25	40	25	5	5

Appendix (F)

χ^2 -Test for each statement (1-24)

(Optional Mathematics students, Set I)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
1.	Parent's education helps to offer my Optional subject	8	1	5	5	1	9
2.	My guardian encourages me to select Optional math	5	7	3	5	0	7
3.	My parents don't know the essence of Mathematics	1	3	7	6	3	6
4.	My family spend sometimes to discuss about my study	15	4	0	0	1	40.5
5.	My family take lots of benefit from Mathematics	6	1	3	9	1	12
6.	Family occupation is related to Mathematics	8	1	5	2	4	7.5
7.	Economic condition of people is challenge to select	2	4	6	4	4	2

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
8.	Tuition/coaching is necessary for getting good marks in Optional Mathematics	7	3	3	3	4	3
9.	Mathematics is my favorite subject	9	6	4	0	1	13.5
10.	I can do well in Mathematics	10	7	1	2	0	18.5
11.	I choose Mathematics due to good marks of grade VIII	4	6	7	1	2	6.5
12.	Optional Mathematics help to obtain good mark in SEE	6	12	0	2	0	26
13.	Anyone can do well in Optional Mathematics	4	1	3	6	6	4.5
14.	In each and every field, the use of Mathematics is very important	5	4	4	7	0	6.5
15.	I want to be a Mathematics teacher	6	2	3	6	3	3.5

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
16.	I choose math because I know opportunity that created by Mathematics	2	8	10	0	0	22
17.	Our teacher does explain why math is important	11	4	4	1	0	18.5
18.	Our school has conducted the program encouraging Optional math. students	1	0	10	5	4	15.5
19.	School has good environment to study math	0	4	6	5	5	5.5
20.	I choose Optional Mathematics because my teacher are offering me	0	3	8	8	1	14.5
21.	Due to practice, all of people do well in Optional math.	2	5	10	1	2	13.5
22.	I will able to use what I learn in math	9	9	2	0	0	20.5

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
23.	Position of math teacher is good in our society	10	9	1	0	0	25.5
24.	Teacher has more expectations on Optional math	3	13	4	0	0	28.5

Appendix (G)

χ^2 -Test for each statement (1-24)

(Other Optional Mathematics students, Set II)

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
1.	Parent's education helps to offer my Optional subject	1	6	10	2	1	15.5
2.	My parents don't encourages me to choose Optional math	0	4	6	8	2	10
3.	My parents know the essence of Optional math	2	6	7	4	1	6.5
4.	My family spent fixed time to discuss about my study	18	1	1	0	0	61.5
5.	Family does not take any benefit by Mathematics	0	3	4	4	9	10.5
6.	Our occupation is not related with math	0	3	6	5	6	6.5
7.	Due to poor economic condition person unable to select Optional math	0	2	1	8	9	17.5

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
8.	Tuition is necessary for getting good position on math	6	2	2	4	6	4
9.	I never feel enjoy to solve math problem	0	0	11	5	4	50.5
10.	I can never get success in math	1	1	7	3	8	11
11.	Due to low score of grade VIII, I don't choose Optional math	1	7	4	1	7	9
12.	Opt. math students get good marks in SEE	0	8	5	1	6	11.5
13.	Optional Mathematics is domain of talent student	0	5	9	4	2	11.5
14.	There is no practical implementation of math in our daily life	1	0	8	11	0	26.5
15.	I don't like to be a math teacher	3	8	3	0	6	9.5

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
16.	Only selecting Optional math is not solution of getting job in future	5	7	4	1	3	5
17.	Our teacher does not explain why Mathematics is important	0	0	3	8	9	18.5
18.	School does not encourage choosing Optional math	4	4	3	7	2	3.5
19.	School has not environment to study math	0	1	2	10	7	18.5
20.	I don't choose Optional math because my Optional math friends irritated me	0	0	3	12	5	24.5
21.	Due to practice, anyone can tackle the math problem easily	1	4	8	3	4	6.5
22.	Math is only for memorization	1	2	5	5	7	6

S. N.	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree	χ^2 value
23.	Position of math teacher is not good in our society	1	0	1	9	9	21
24.	Teacher has extra expectations from the Optional math students	5	8	5	1	1	9

Appendix (H)

Statistical formula used for Data Analysis

1. For χ^2 test

$$\chi^2 = \sum \left[\frac{(O - E)^2}{E} \right]$$

where,

O = observation frequency

E = expectation frequency = $\frac{\text{sum of observed frequency}}{\text{total no. of sample}}$

Degree of freedom (d.f) = $5 - 1 = 4$

Level of significance (α) = 0.05

2. For percentage (%)

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