

**CAUSES OF LOW ENROLLMENT OF GIRLS IN
OPTIONAL MATHEMATICS**

**A
THESIS
BY
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LETTER OF CERTIFICATE

This is to certify that Mr. Shiva Ram Neupane, a student of academic year 2065/066 with campus Roll No 947 Exam Roll No. 283874 thesis number 1008 and T.U. registration no. 9-2-21-438-2004 has completed his under my supervision during the period prescribed by the rules and regulation of Tribhuvan University Nepal. The thesis entitled "Causes of Low Enrollment of Girls in Optional Mathematics " has been prepared based on the result of his investigation and conducted during the period of 2013-2015 under the Department of Mathematics Education. University campus, Tribhuvan University Kirtipur Kathmandu. I recommend and forward that this thesis be submitted as partial requirements for the evaluation to award the Degree of Master of Education.

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LETTER OF APPROVAL

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Causes of Low Enrollment of Girls in Optional Mathematics

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DECLARATION

I hereby declare that the work reported in this thesis entitled **Causes of Low Enrollement of Girls In Optional Mathematics** submitted to the Central Department of Mathematics Education, University Campus, Tribhuvan University is my original work done in the form of partial fulfillment of the requirements for the degree of Masters of Mathematics Education under the supervision of Dr Eka Ratna Acharya of Department of Mathematics education.

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Date: 2071/12/17

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Shiva Ram Neupane

ABSTRACT

This study intended to find out the causes of girls student's low enrollment in optional mathematics at public secondary school in Sindhupalchok district. This study was survey type and used the data that are both qualitative and quantitative in nature. The student's opinionnaire form, interview question for subject teacher and head teacher and school administrative records were the main instruments. Likert 5 point scale was included in opinionnaire. Hundred twenty students (60 taken from optional mathematics and 60 taken from other optional subject), 10 Head teachers and 10 Subject teachers of 20 public schools of Sindhupalchok district were taken as sample of the study.

Various statistical tools such as percentage and χ^2 -test were used to analyze the data collected from attitude scale and administrative records. Family related factors (educational status, economic status and negligence of parents), student's (self) related factors (student's own interest, poor prior achievement and negative thinking towards mathematics) and neighbouring factors (school environment, teacher's behaviour and trends of society) were analyzed by descriptive way. After the analysis and interpretation of the obtained data information the researcher found that the low enrollment of girls students in optional mathematics at secondary level was strongly associated with educational status of family, poor prior achievement and student's own interest. Other variables family job/ occupation, economic status, peer group influence, school environment, social influence and teacher's behavior also played vital role to low enrollment of girls students in optional mathematics.

CONTENTS

<i>Letter of Approval</i>	<i>i</i>
<i>Letter of Certificate</i>	<i>ii</i>
<i>Declaration</i>	<i>iii</i>
<i>Acknowledgement</i>	<i>iv</i>
<i>Abstract</i>	<i>v</i>
<i>Table of Content</i>	<i>vi</i>
<i>List of Table</i>	<i>viii</i>
<i>List of Figures</i>	<i>ix</i>

CHAPTERS

I. INTRODUCTION	1-4
Background of the Study	1
Statement of the Problem	2
Objective of the Study	2
Significance of the Study	3
Delimitation of the Study	4
Definitions of the Related Terms	4
II. REVIEW OF RELATED LITERATURE	5 -11
III. METHODS AND PROCEDURES	12-16
Research Design	12
Population of the Study	12
Sample of the Study	12
Tools/Instrument for Data collection	14
Reliability and Validity of Tools	15
Data Collection Procedures	15
Procedure of Data Analysis and Interpretation	16

IV. ANALYSIS AND INTERPRETATION OF DATA	17-31
Current enrollment of girls student's in optional mathematics at secondary level	18
Causes of Enrollment of Students in Optional Mathematics and Other Optional Subject at Secondary Level	19
Influence of Family Related Factor on the Enrollment of Students in Optional Mathematics and Other Optional Subject at Secondary level	20
Influence of student's self related factors on the Enrollment of students in optional Mathematics and optional subject	23
Influences of Neighbouring factor on the enrollment of students in optional mathematics and other optional subject	27
V: FINDINGS, CONCLUSION AND RECOMENTDATION OF THE STUDY	32-36
Summary	32
Findings	33
Conclusion	34
Recommendation Suggestion for Further Study	35
REFERENCES	37
APPENDICES	

LIST OF TABLES

Table 1:	Sample of the study	13
Table 2:	Likert scale of scoring	14
Table 3:	Influence of Family Related Factors on Enrollment of Students in Optional mathematics.	20
Table 4:	Influence of Family Related Factors on the enrollment of girls Students in other Optional Subject	22
Table 5:	Influence of Students Related Factors on the enrollment of Students in Optional Mathematics	24
Table 6:	Influence of Students self Related Factors on the enrollment of Students in other Optional Subject.	26
Table 7:	Influence of Neighbouring Related Factors on the enrollment of Students in Optional Mathematics	28
Table 8:	Influence of Neighbouring Related Factors on the enrollment of Students in Optional Mathematics	30

LIST OF FIGURES

Figure 1: Conceptual Framework

Figure 2: Percentage of Students Enrollment Ratio in optional subject 18

Chapter I

INTRODUCTION

Background of the Study

Mathematics is taught as a compulsory subject each level of school education system of Nepal and an extra Optional Mathematics subject can choose at grade IX and X. In our context mathematics is taken as a compulsory subject which becomes a cause of failure of students in school education. Data and sample observation show that the rate of selection of Mathematics as optional subject is very low. Among them girls participation is very low. So most of girls students are being far from the optional mathematics. This study concerned with mathematics which is related to gender based learning that way the girls have low enrollement in optional mathematics and which factors are responsible for their enrollement and their low participation.

Optional mathematics is very closely related with our practical life, this implies that it is not only the subject for formal schooling but also related to every activity of human beings. So its area is not bounded but has been adding several new concepts with the evolution of human society now it is being the composition of different branches of mathematical concepts. So it is the most essential to inunt about its many deciplines and develop it ahead according to necessity of solving many problem faced by students in present situation. Hence,optional mathematics which always fastens its speed for further development. So in this study stress would lead o investigating to the cause of low enrollement of girls students towards optional mathematics.

In the content of Nepal girls participation is low in school and those who participated are not participating in Mathematics calssroom.Educational stastics

(2059-2063) out of total number of students only 3.52% are enrolled in optional mathematics and remaining in other optional subjects.

So, from different flash reports and from difference researchers we seen that low enrollement of girls students in optional mathematic is taken as complex and tedious subject high failure rate in mathematic in school educations Mathematics is taken as male domain subject, many student is feeling difficulty dissatisfaction and fear in this subject. Specially enrollement of girsl sutudents in optional mathematics at rural public school is very low etc. are the present problems of Nepal toward mathematics as well as optional mathematics. On this content it is necessary to study the causing factor to choose mathematics as optional study is to improve the girls participation in optional mathematics. Why girls students don't want to read optional mathematics? Why they detach from optional mathematics? What are the difficulties in learning mathematics for girls? why the girls want to be for from mathematics? Thus this study will find the causes of low enrollement of girls students in optional mathematics at secondary level specially in rural public school like Sindhupalchok.

Statement of the Problem

This study is related to the cause of low enrollement of girsl students in optional mathematics in secondary level of Sindhupalchok district. Therefore, I think selection of optional subject in grade IX is crucial in the student life. So the study aimed to find the answer of the following questions.

- What is the current enrollement of girls students in optional mathematics at secondary level in Sindhupalchok district?
- What are the causes of low enrollement of girls students in optional mathematics at secondary level in Sindhupalchok district?
- How these causes effect the enrollement of girls in optional mathematics?

Objective of the Study

The study was intend to accomplish the following objectives.

- To find out the current enrollement of girls student in optional mathematics in Sindhupalchok district.
- To analyzes the causes that brings low enrollement of girls student in optional mathematics.

Significance of the Study

Research on "Causes of low enrollement of girls in optional mathematics at secondary level " have some significances in this study. Because each and every research work has some significance. Therefore, the significances of this study are as follows.

- This study would help to find out the causes that are related to low enrollement of girls students in optional mathematics at secondary level.
- The study would find the trends of enrollement of girls students in optional mathematics.
- This study would help to bring existing factors that are related to choose mathematics as optional subjects for girls.
- This study would help to facilitate the comparative study on math and non-math related to the enrollement and selection of optional subject for girls.
- The reasult of the study would be helpful to the parents, teachers, students with aware of the responsible factors of the low enrollement of girls students in optional mathematics.
- The reasult of the study would be reference in the quantitative research in future on the same or related topics in Nepal.

Delimitation of the Study

Each study has not rigorous, perfect and free from limitation. The study have some sort of limitations. On the other hand they can't overcome the problems of every field. Thus this study also has some limitations which are pointed below.

- This study was limited to 20 public schools situated in Sindhupalchok district.
- This study was limited only to causes of low enrollement of girls students in optional mathematics at secondary level in Sindhupalchok district.
- This study was estimated to do the researcher himself by using school records of students enrollement.
- It is limited only grade IX students.

Definations of the Related Terms

Enrollement : It referes to the students registration in grade nine according to the optional subject.

Factors : The term factors is defined as one of the several things that cause or influence some thing, eg. educational, social, economic conditions etc.

Secondary level: School level grade IX and X as Government of Nepal

Neighbouring factors: School environment, teacher's behaviour and trend of society are considered as the neighbouring factors.

Public School : The school that supported by the Government of Nepal.

Rural School : The public school located in village areas of Sindhupalchok district.

Causes : The term causes is defined as the reasons that are affecting in the low enrollment of students in optional mathematics such as self related, family related, neighbouring factors, school environment, content matter etc.

Chapter II

REVIEW OF RELATED LITERATURE

Review of literature forward the research work in better perspective. The related materials provided the researcher meaning full and researchable materials is helpful to the researcher from the phase of problem consideration up to a making conclusion. The review of a making conclusion. The review of related materials saves from the duplication the established findings but established the new findings. In concluswion the review of related literature is not for recommendations of pervious researchers but for further researchers.

Ghimire (1997) did a research entitled "A study on factors affecting teaching leaarning mathematices at secondary level" with the objective to study the factor affecting in learning of mathematics in secondary level in term of social environement, family background, motivational factors, physical facilitiesw, intrest of the learners, instructional materials. The tools for the study were administered to the sample of 90 students and the data was analyzed by using t-test. He concluded the environment of the school in both rural and urban areas affects equally but the boys were more affected than girls. Likewise environmet affect more to the subject of rural areas and girls are affected more than boys. He also found out that motivations students interest, instructional methodology and materials also affectede on the teaching and learning mathematics.

Joshi (2010) did a research on "Attitudes of girls" students towards optional mathematics at secondary level this main objectives were to find out the attitudes of secondary level girls students towards optional mathematices and compare the attitude of urban and rural girls towards optional mathematics. A set of opnionnaire and interview were used tools for the data collection. X^2 test was applied to find out the

attitudes of secondary level girls students towards optional mathematics and t-test was used to compare the attitudes of urban and rural girls students. 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 significance difference between attitudes of urban and rural girls towards optional mathematics.

Sharma (2011) did a research on "Factors influencing the choice of optional mathematics at grade IX" with the main objectives to find the factors influencing on the choice of optional mathematics at grade IX students and to find out the students' ration in optional subjects. The study was small-scale. Survey type with the design both quantitative and qualitative. The student questionnaire form was the main instrument with students' background and attitude scale. Hundred and twenty students (60 taken from optional mathematics and 60 taken from other optional subject). 8 Head teacher and 8 optional mathematics subject teacher of 8 public secondary schools of Parbat district. Percentage and X^2 test were used to analyze data by attitude scale and the data gained by interview and questionnaire related to the students' background was analyzed by qualitative way.

This study concluded that the students' choice of optional subject is by product of family background, students' self-drive and neighbouring factors. Concern with peer influences, social influences, school environment such as school administration, teacher behaviour in classroom, effect on choice of optional mathematics. So it concluded that school environment is very essential for increasing the student to choose optional mathematics.

Jenkins (1976) did a research on 'causes of low enrolment of black students in upper level science courses'. With the main objective to identify and explore the

reasons of low enrollement of black students in upper level science course in terms of students intrests, difficulties,students view,students intentions and worthwhileness of sciences courses.the main tools for the study were science survey questionnaire and attendance department records.seven hundred and fourty nine enrolled in science course students both black and white of palatka south high school were the sample of the study.among them there were 631 white students and 155 black students enrolled in science courses

Researcher used correlation coefficient to analyzed the collected data.after the analysis of collected data this study found that it is primarily the capable studente with high sciens intrests who are willing to enroll in upper level science courses based on the data it is apparent that those black students who make grade in sciens liked coming to class and enjoyed doing the labs are the ones who had positive attitude and were more intrested in sciences.the data further supports the notion that these same students were likely to take additional courses in science.test the reverse was true for those black students who made poor grade in science.did not like coming to class,nor doing the lab,it conculed that the low enrollement of black students in upper level science are students intrests,difficulties,worthwhileness and students intentions.

Luitel (1997) has done a research in the title 'A study of attitudes of secondary school students towards mathematics and its relationship with their achievement in mathematics'.he used random sampling to select 150 students and the achievement test prepared by the school in final exam and applied t-test as well as correlation to analyze data thus collected.he also found that all coefficients of correlation between achievement and attitude of secondary school students (measures of attitudes towards mathematics) were significant.

Tiwari (2002) has reported the both farmer and non –farmer parents had positive attitude towards the school mathematics, farmer and non farmer parents had positive attitudes towards their male child and female child about the school mathematics. however, educated parents had positive towards daughter education rather than non –educated parents.

Subedi (2005) did a study on 'Factors affecting failure in mathematics in SLC examination' with the objective 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 selected through the purposive sampling of eight schools in sarlai district. Questions were used to collect the data of this study. Mathematics achievement of failure students were strongly positive correlated with the school environment effect classroom teaching time and verbal which is significant, the teacher's behaviour, peer's behaviour, interest of learner and motivation with occupational goal are low positive correlated with the achievement with the mathematics. School environment is an important causing agent on the failure of mathematics achievement.

Sapkota (2011) studies on 'cause of failure in mathematics at school' of a public school in lalitpur district with the objects to find the cause of failure in mathematics at secondary level and to identify the strategies taken by the school in improvement of mathematics achievement. This research design was qualitative as well as descriptive in nature. The respondent of the case study were students, correspondent parents, teachers and head teachers. From the case school six low achiever students including three boys and three girls were selected according to different family background and performance in mathematics examination. To collect the primary and secondary data school documents, observation note and interview

guideline were used. The result of this research was classroom practice and the curriculum was closely linked. Achievement of students is always affected by different variables such as schools learning environment, facilities at home, classroom environment, school politics, mathematics instruction, assessment of classroom and so on.

Janwali (2007) studied on the topic 'causes that affect mathematics achievement of girls students' and determine the correlation between affecting factors and mathematics achievement. The researcher adopted the survey method in this study. The sampling of this study was determined by convenience sampling from Rupandehi district. Researcher selected 25 sampling schools from different schools of this district situated in rural urban area. In this study one of questionnaire was adopted the three point likert scale for the convinces of the respondent were developed for the collection of needed information which was used for students. It concludes that the effective classroom teaching is very essential for increasing the mathematics achievement of girls students so it should be improved. The teacher behaviour and family background are also have positive effect so that the teacher and parents have equally responsible for the girls students learning activities in school and create good environment at home for learning and improve the mathematics achievement of girls students.

The above review reveals that there are some research concerning factors affecting on the achievement teaching and learning correlation between beliefs and achievements and girls students attitude teachers attitude on choosing optional mathematics low environment of students in upper level science course.

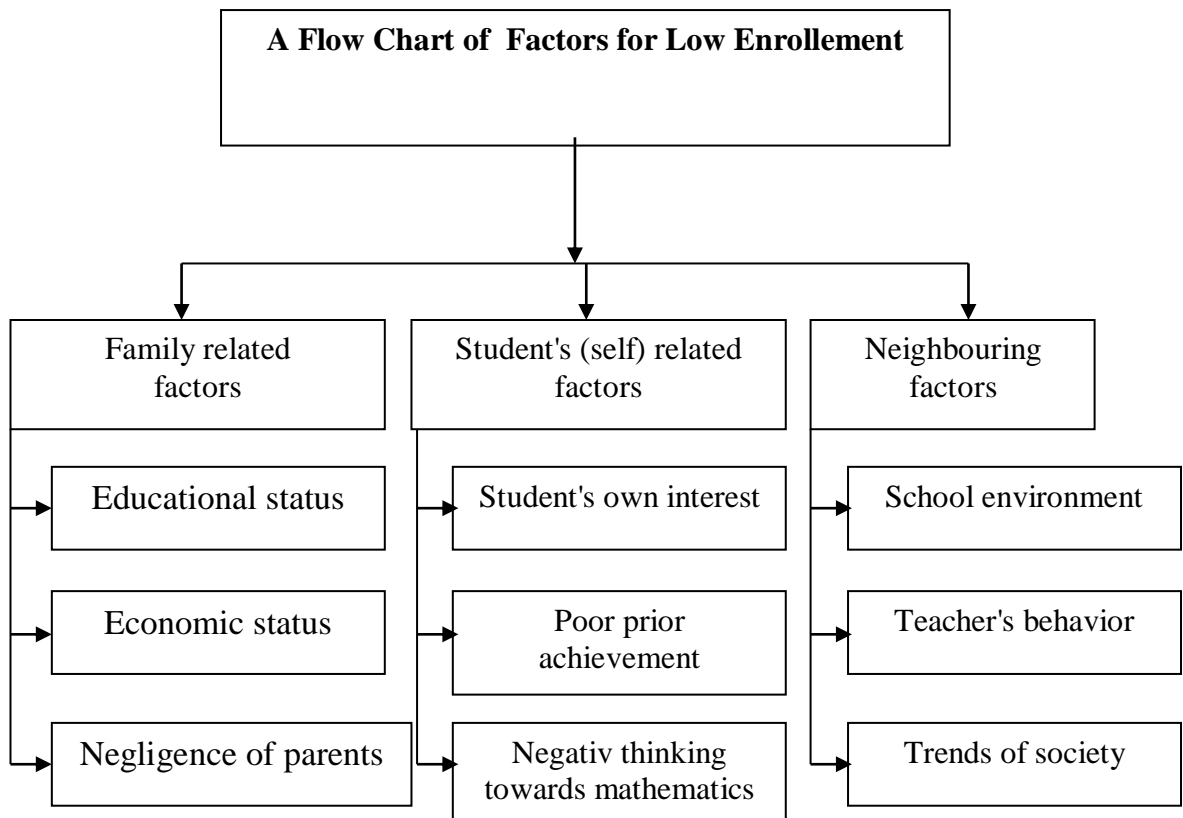
However there is no research in exact form has been carried out concerning to "Causes of low enrolment of girls students in optional mathematics at secondary

level in Sindhupalchok district". Therefore I choose this topic to fullfill the gap between above research.

Conceptual Understanding of the Study

This study primarily concerns with the question that causes influence the low enrollement of girls students in optional mathematics at secondary level. .Researcher made following conceptual framework in this context.The conceptual understanding of this study is shown as follows:

Fig-I: Flow chart for causes of low enrollement of girls students in optional mathematics at secondary level



Different researches show that low participation students is related with family related factors.Family related factors has various aspects but it is limited in the terms as educational status,economic status and negligence of parents .Generally,student doesn't choose optional mathematics by their own intrests,poor prior achievement and negative thinking towards mathematics. These terms are taken as students self related

factors. There are several factors related to students doesn't choose optional mathematics like; school environment, teacher's behaviour, trends of society, these factors are taken as neighbouring factors. Finally the research concludes that the girls students low enrollement in optional mathematics is the by product of family related, students self related and neighbouring factors. Concerns with peer influences, social influences, school environment such as school administration, teachers behaviours in classroom effects the low enrollement of girls students in optional mathematics. It is concluded that the school environment is very essential for low enrollement of girls students in optional mathematics. Negative attitude of society towards mathematics.

Chapter III

METHODS AND PROCEDURES

This chapter presents the procedure carried out to achieve the objectives of the study. In this chapter researcher discusses the various aspect of the study like populatons of the study, sample of the study, tools for data colection, data collection procedure and data analysis procedure.

Research Design

Research design is the way and path of the research that guides the researcher to reach the goal of the research. Its main importance is to help researcher to collect data interpret and analyze it. This design of this study was a survey design concentering with both primary and secondary data. This was the quantative and qualatative research as well as descriptive in nature.

Population of the Study

The population of study was considered of all rural public secondary schools of Sindhupalchok district in academic year 2014/2015. There are 156 public secondary schools. The researcher selected 20 rural public schools, 10 Head teachers and 10 optional mathematics teachers were selected for interview. 60 optional mathematics girls students and 60 non optional mathematics girls students were selected for oppinnaire. In 2071 there are 940 students in sample schools among them 880 were non optional mathematics.

Sample of the Study

There are 165 secondary schools in Sindhupalchok district. Among them 156 are public secondary schools. The researcher selected only 20 rural public secondary schools among rural public secondary schools by using random sampling. All the girls students who took mathematic as optional at grade IX took as sample and equal

number of girls students who took other optional subjects except mathematics but based their grade VIII exam in good position included on sample from each sample school by using random sampling. The optional mathematic subject teachers and head teachers were taken from each sample school as the respondent to conduct the interview.

Table 1: Sample of the study

S.N	Name of school	No. of optional mathematics girls Students	No of other optional subject girls students	Total
1	Rajeshwori H.S.S.Sipapokhare	3	3	6
2	Bhimeshwori H.S.S Bhimtar	2	2	4
3	Sipathindhara S.S. Bhotsipa	2	2	4
4	ChandeshworiH.S.S Bhotsipa	5	5	10
5	Setidevi S.S Bhimtar	3	3	6
6	Phataksila H.S.S Phataksila	3	3	6
7	Kalikachitena S.S. Phataksila	4	4	8
8	BhagbhairabH.S.S thokarpa	4	4	8
9	Mahindrekanti H.S.S. Kalika	3	3	6
10	Sindupuranagaun H.S.School	5	5	10
11	AisalukharkaH.S.S Bandegaun	2	2	4
12	Kamaladevi S.S. Bandegaun	4	4	8
13	Nawalpur S.S Nawalpur	3	3	6
14	Mahindra H.S.S Kunchok	3	3	6
15	Jalpadevi H.S.S bhaunepati	4	4	8
16	Saraswoti H.S.S Galthun	4	4	8
17	BhumesworiH.S.S.Kewel	2	2	4
18	ThamkaldhapH.S.S Thamkot	1	1	2
19	SetideviH.S.S. Thulosiruwari	1	1	2
20	GyanmandirH.S.S Melchaur	2	2	4
	Total No.of students	60	60	120

Tools/Instrument for Data Collection

Researcher used three types of instruments in this study; they are opinionnaire, interview and the administrative records.

Opinionnaire

Researcher developed two set of opinionnaire for the optional mathematics girls students and other optional girls student separately, in opinionnaire set- I, researcher included girls student attitude towards enrollment of optional mathematics and in opinionnaire set- II, researcher included girl students attitude towards not enrollment of girls students in optional mathematics.

Dhakal (2006) used students attitude scale containing two domain and 40 statements taking reference of fenneman sherman's (1978) attitude scale. Taking reference of dhakal (2006), the researcher developed the opinionnaire consisting three dimensions such as family related factor, Students self factor and neighbouring factor including 24 statements. every dimension consists of 8-8 statements which represents the low enrollement of optional mathematics. the opinionnaire was developed in likert scale point technique. for the scoring of the statements was done as follows;

Table 2: Likert scale of scoring

S N	Rating	Positive statement	Negative statements
1	Strongly agree	5	1
2	Agree	4	2
3	Neutral	3	3
4	Disagree	2	4
5	Strongly disagree	1	5

Interview Schedule

The interview was conducted with subject teacher and Head teacher of sampled schools. Interview schedule was managed with the support of thesis supervisor. The interview was conducted 10 subject teachers and 10 head teachers of sampled school which is related to difficulties in optional mathematics, teachers role in selecting optional subject, school provision in optional subject, teacher availability and qualification, girls students trends in selecting optional mathematics guidance and career counseling.

Administration Record

The administrative record such as girls student's enrollment on optional subject in different academic year, mark ledger result of girls students in optional maths and other related documents were collected from each sampled schools.

Reliability and Validity of Tools

The reliability and validity of tools were established by its approval from subject expert and supervisor with some alternate and addition of the statements.

Data Collection Procedures

The researcher visited the sample schools, consulted head teachers and subject teachers of each schools, clarified them about the objectives of the study and took permission for administrating of opinionnaire to the student of grade IX. Researcher distributed the student opinionnaire form to the girls student then explained and clarify if any confusion arouse in understanding the statements and terminology. Researcher distributed opinionnaire set- I for the optional mathematics girls students and opinionnaire set- II to other optional subject girls students. Finally the researcher requested them to rectum back next day after filling up the opinionnaire form completely. Researcher collected the filled opinionnaire forms

next day. The secondary data girls students enrollment according to optional subjects in different academic years and other collect form administration of the sampled school. The interview was conducted to each of 10 optional mathematics subject teachers and 10 head teachers of sampled schools. Researcher wrote the main points on the paper which told by the teacher and head teacher in the duration of interview.

Procedure of Data Analysis and Interpretation

The collected data through opinionnaire interview and schools administrative records were categorized and analyzed according to their themes first of all to show the current enrollment ratio of the girls student in optional mathematics the percentage bar graph of optional subject was developed and describe according to the students participation table. χ^2 test was used for analysis of data from opinionnaire and testing the significance of each student at 0.05 level of significance. Statements were accepted if the χ^2 value of each statement greater than tabulated value 9.488 at 0.05 level of significance with 4 degree of freedom.

The descriptive analysis was done for qualitative data from the interview. The researcher taking a wide angle lens to gather data and then by shifting, sorting, reviewing and reflecting on them summarized and concluded.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

The collected data from the different tools were analyzed and interpreted to find out the causes which contributed the low enrollment of students in optional mathematics at secondary level. The main source of the data of this study were students who were studying in grade IX and the teachers who had been teaching optional mathematics secondary level. The data for this study were collected from students, teachers and head teachers with help[of different tools. It has already been mentioned that there were two sets of opininnare with five points scales strongly agree, agree, neutral, disagree, strongly disagree with rating values 5, 4, 3, 2 and 1 respectively in each positive statements and 1, 2, 3, 4, and 5 respectively in each negative statements .

The analysis of the collected information is based on the theoretical framework prepared in the review of literature. theoretically it is assumed that variables such as educational and economic status of family, negligence of parents, student's own interest, poor prior achievement, negative thinking towards mathematics, school environment, teacher's behavior and trends of socity could be the main causes for the selecting of mathematics as optional subject by the students. The analysis and interpretation of data is discussed on the following headings:

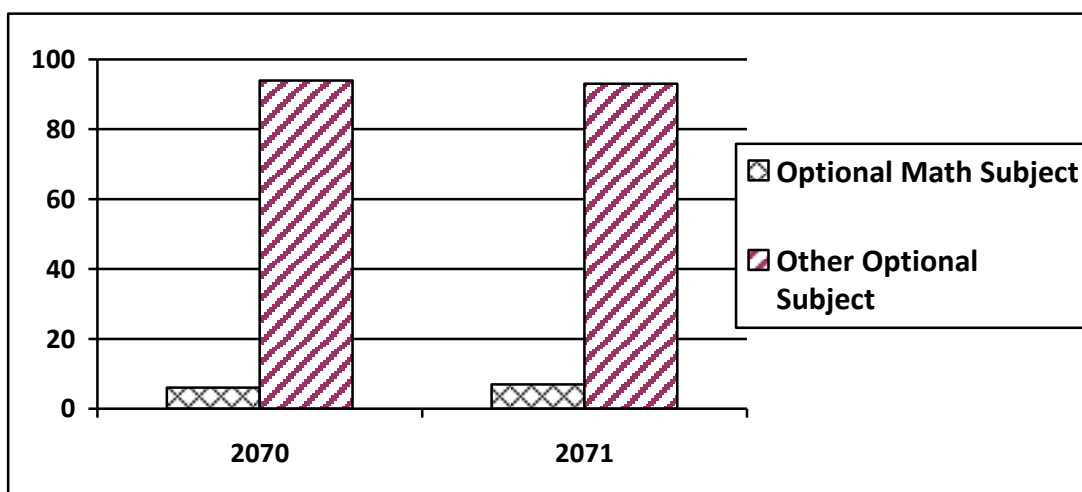
- Current enrollment of girls students in optional mathematics at secondary level.
- Influence of family related factor on the enrollment of girls students in optional mathematics and other optional subject at secondary level.
- Influence of girls students self related factors on the enrollment of students in optional mathematics and other optional subject at secondary level.

- Influence of neighboring factors on the enrollment of girls students in optional mathematics and other optional subject at secondary level.

Current enrollment of girls student’s in optional mathematics at secondary level

Educational statistics (2059-2063 B.S.) showed that only few students are enrolled in optional mathematics which was already noted in introduction part. There are 165 secondary schools in sindhupalchok dsistrict, out of them 156 are public. The researcher selected 20 public schools by using random sampling. There were 940 students, among them only 60 girls students choose mathematics as an optional subject in academic year 2071. There were 915 students, out of them only 55 students chosen optional mathematics in 2070(appendix-I). in academic year 2070, more than 93.9% students selected other optional subjects in grade IX and 93.6% students selected other optional subjects in grade IX in academic year 2071. This shows that there were huge gap between the number of students in optional mathematics and non-optional mathematics. The student’s current enrollment ratio of sampled schools is shown by following percentile bar graph.

Figure 2: Percentage of Students Enrollment Ratio in optional subject



Selection of optional subject at grade IX is essential & important stage in the student’s life. Frequent workshop for students on career choice is necessary.

Experience has been shown that interests in careers change with time. Even though the school offer counseling facilities to students, the effective use of the facility

Should further encouraged. It was found that many students who were not getting good mark in junior (primary to level) secondary school level opted to choose other optional subject (such as geography, economic, history etc.) except optional mathematics. For instance, daily life problem, mathematics modeling, science which rely on the interdisciplinary approach to teaching and learning, can be further introduced into the curricula of teacher training. Further encouragement of the curriculum that is rich in curiosity, reflection to make students wonder about universal phenomena of mathematics. What is happening in the immediate and the global environment of mathematics?

Most of the teacher and head teacher of sample school told that “teacher is taken as role model to their students so each teacher should develop the positive attitude towards mathematics & they should consult to their students about the beauty and importance of mathematics at primary level as well as lower secondary level .at the duration of data collection most of non-mathematics students said that mathematics is for memorization. Due to that, type of concept student’s attraction is going to globally essential & locally useless so teacher can sketch the interaction between daily life situations and mathematics practices to his/her students. Hence teacher training should announce to these scenarios in out context.

Causes of Enrollment of Students in Optional Mathematics and Other Optional Subject at Secondary Level

There are different causes that influence on low enrollment of girls students in optional mathematics at secondary level. With the help of different literature review, it was assumed that these are three domains with each of them have three variables

which are discussed in conceptual understanding of the study. There were 24 statements related to the low enrollment of students in optional mathematics as an optional subject. These statements were categorized in to three domains (family related, students self related and neighbouring factors)on which statement 1-8 were related to the domain family related, statement 9-16 were related with student’s self related and similarly statement 17-24 were related to neighboring factors on both set I (Appendix-A) and set II (Appendix-B). the percentage of student’s attitude towards each statement was presented in the table (Appendix-C and Appendix-D). χ^2 value of each of the 24 statement (set I) and 24 statements (set II) at 0.05 level of significance were calculated (Appendix-E and Appendix F). the analysis and interpretation of causes in enrollment of optional subject are described as follows:

Influence of Family Related Factor on the Enrollment of Students in Optional Mathematics and Other Optional Subject at Secondary level

In this study, the term family background includes the educational status, economic status and job/occupation of family. It was assumed that family background plays the vital role to take optional mathematics at secondary level. The following eight statements in table- I concerned the family related factors.

Table 3: Influence of Family Related Factors on Enrollment of Students in Optional mathematics

S.N	Statements	χ^2 value	Decision
1	Parent’s education helps to offer my optional subject	31.83	Significant
2	My parents don’t know the opportunity created by mathematics .	20.5	S
3	Tuition is necessary for getting good marks in opt mathematics .	21.33	S
4	Family occupation is not related to mathematics	28.17	S
5	I have no time to practice maths by my household work	21.16	S

6	Economic status of people is challenge to choose opt mathematics	42.17	S
7	My guardians don't encourage me to choose Opt mathematics.	19.67	S
8	Our family has not positive attitude towards daughter in OPT mathematics.	9.83	S

The result of the test shows that all of the statements enlisted in family background are significant at 0.05 level of significance. Hence parent's education, economic status and occupation and girls enrolment in household works. greatly influence the low enrollment of students in optional mathematics.

The Appendix-C, statements 1 to 8 in addition, the table revealed that most of the students think their parents do not know why mathematics is important. Around 72% students accepted that their family occupation is not related to mathematics. around 80% students agreed with the statement economic status of people is a challenge to choose optional mathematics. More than 60% of students accepted that tuition is necessary for getting good marks in optional mathematics.

Again the qualitative information was collected by interview to the subject teacher and head teacher. The response of the interview to the teacher and head teacher was focused on the people's awareness towards the importance of mathematics should be provided. Finally, the subject teacher suggested, "*Mathematics should join to the daily life problem of the people directly*". And they also focused that the poor mathematics base of the students is main cause of problem that brings low enrollment of students in optional mathematics. In the result of the opinionnaire, whose parents/guardians are educated they focused to choose optional mathematics to their children.

The separate opinionnaire was prepared for the student who were taking other optional subject. The information about their attitude towards not choosing optional

mathematics at grade IX was determined by family related factors, which is shown by following table.

Table 4: Influence of Family Related Factors on the enrollment of girls Students in other Optional Subject

S.N	Statements	χ^2 value	Remark
1	Parent's education helps to offer my optional subject	44.83	Significant
2	My parents don't know the opportunity created by mathematics .	23	S
3	Tuition is necessary for getting good marks in opt mathematics .	25	S
4	Family occupation is not related to mathematics	22.67	S
5	I have no time to practice maths by my household works	23.17	S
6	Economic status of people is challenge to choose opt mathematics	26.17	S
7	My guardians don't encourage me to choose Opt mathematics.	21.17	S
8	Our family has not positive attitude towards daughter in OPT mathematics.	17.17	S

From above table all the statements related to family related factors were accepted at 5% level of significance. Hence family related factors greatly influence with enrollment of student in other optional subject.

From Appendix-D (from statement 1 to 8) also shows that most of the students almost 79% agree with the statement parent's education helps to offer their optional subject. Around 66% students accepted that their parents don't know the opportunity created by mathematics. 67% students who have taken other optional subject also accepted that tuition is necessary for getting good mark in optional mathematics. Only 40% students agree with family occupation is not related to mathematics. Around

69% students accepted that their families invest sometimes to discuss about their study. Almost 47% students agreed with economic status of people is challenge to choose optional mathematics. But only around 32% students accepted that their guardians don't encourage them to choose optional mathematics. And almost 76% students accepted that their family has not positive attitude towards optional mathematics.

Again in qualitative aspect teacher said that student's family background is an important on the choice of educational career of person. They also focused that *"The student who have educated family background are aware to choose optional subject that of non-educative family background"*. Most of head teacher told that *"Educational and economic status of also encourage choosing an optional mathematics at secondary level"*.

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

Influence of student's self related factors on the Enrollment of students in optional Mathematics and optional subject

The term students self related factors include students own interest, prior achievement and future career. It was assumed that the student's own interest is important key on the choice of the optional subject. Most of the Nepalese students are involved on their choice of optional subject at higher level of education. However, in the secondary level there is direct influence of the students own interest on their choice of optional subject mostly. The information from optinionnaire towards low

enrollment of students in optional mathematics by student`s self related factor is shown by following table.

Table 5: Influence of Students Related Factors on the enrollment of Students in Optional Mathematics

S.N	Statements	χ^2 value	Remark
1	Mathematics is my favorite subject so I choose Optional Mathematics	46.33	Significant
2	I can do well in Optional Mathematics	44.83	S
3	I choose Optional Mathematics due to the good marks of grade VIII.	53.33	S
4	Optional Mathematics helps to get good marks in SLC .	27.5	S
5	I took Optional Mathematics because I know about the essence of Mathematics	6.67	Non significant
6	Mathematics is very hard subject for girls	28.83	S
7	In each and every field, the use of Mathematics is very important .	21.17	S
8	Mathematics is not practicable and not enjoyable subject .	19.67	S

All of these statements except 8th statement related to student`s (self) related factors were accepted in 5 percent level of significance. Hence student`s (self) related factors such as student`s own interest, poor prior achievement and negative thinking towards mathematics influence on low enrollment of student in optional mathematics. But 5th statement was rejected at 5% level of significance .

Again from Appendix- C (statements 9to 16) also students self related factor influence low participation of student in opt mathematics .74% students accept mathematics is their favorite subject. almost 58% students hope that they can do well in mathematics .Only few students were rejected that their choice of optional

mathematics was function of prior achievement. thus students who were studying optional mathematics was function of the good marks at grade eight .58% students

Thought optional mathematics helps to get good marks in SLC. But only 30% students knew about the essence of mathematics. Almost 67% students feel mathematics is very hard subject for girls. 63% student knew in each and every field, the use of mathematics is very important but almost 63% students thought mathematics is not practicable and not enjoyable subject. so it was clearly seen that students who took optional mathematics they also thought that mathematics is very hard subject as well as not practicable and not enjoyable subject .

In qualitative aspect, subject teacher did not provide the suggestion to the student about their future career and opportunities that created by optional mathematics on future as the students require. In the time of interview head teacher also accepted that *“Achievement of mathematics class is very poor mathematical base of students is not good so the students do not accept to take optional mathematics as an optional subject .”* Some of the school administration had taken entrance to select on optional mathematics. these events show that the student’s own interest, poor prior achievement and negative thinking towards mathematics are causing factors of low enrollment of students in optional mathematics at secondary level .

Most of the students are interested on mathematics but they feel that it is difficult to learn. The students self related factors were defined such as students own interest poor, prior achievement and negative thinking towards mathematics. It was assumed that students related factors influence enrollment of students in other optional subject. The information from opinionnaire towards enrollment of students in other optional subject by student’s self related factor is shown by following table .

Table 6: Influence of Students self Related Factors on the enrollment of Students in other Optional Subject

S.N	Statements	χ^2 value	Remark
1	Mathematics is not my favorite subject so I choose Optional Mathematics	17.17	S
2	I can never get success in Optional Mathematics	18.33	S
3	I don't choose Optional Mathematics due to the low score of grade VIII.	43.83	S
4	Optional Mathematics helps to get good marks in SLC	6.17	Ns
5	I didn't take Optional Mathematics because I know about the essence of Mathematics	29.83	S
6	Mathematics is very hard subject for girls	23.83	S
7	In each and every field, the use of Mathematics is very important .	22.5	S
8	Mathematics is not practicable and not enjoyable subject .	16.83	S

From above table 4th statements related to student's related factors was rejected at 5% level of significance and other statements were accepted. Hence student's related factors greatly influenced on enrollment of students in other optional mathematics .

Again from Appendix-D (from statement 9 to 16)shows that more than 61% students said that their favorite subject is not mathematics so they did not choose mathematics as major subject. Around 63% student from other optional subject said that they can never get success in mathematics Almost 77%students didn't take optional mathematics due to the low score of grade VII .around 47% students accepted that optional mathematics helps to get good marks in SLC. More than 72%

Students said they don't know about the essence of mathematics. Almost 59% students agreed that mathematics is very hard subject. Anyway almost 70% students agreed that in each and every field, the use of mathematics is very important. Some students around 48% felt that mathematics is not practicable and not enjoyable subject. We can say from the above result students' self-related factors influence on the enrollment of students in other optional subject at secondary level.

Finally from the response of interview with subject teacher for cause of enrollment of students in other optional subject except optional mathematics, most of teacher revealed the fact that "*The students previous success and understanding of mathematics is complex subject*". Some head teacher said that "Many students have interest in optional mathematics but they have poor economic and unfavorable home environment. They have killed their interest in mathematics due to many factors was cause of selecting mathematics as optional subject". Most of teacher and head teacher accepted that they did not conduct any program to build up the future career of students due to connect the choice of optional subject.

Hence in both qualitative aspect we found that students related factors influenced both optional mathematics student and other optional subject students.

Influences of Neighbouring factor on the enrollment of students in optional mathematics and other optional subject

Different researches show that the low enrollment of girls' students in optional mathematics is the result of school environment is related with the school activities related to optional mathematics and peer group of students. Here we have to find out that teacher behavior motivated the student's to choice or not choice

Of optional mathematics. Human behavior is the by-product of the society so their choice is obviously related to their school environment. Here social influence

was defined in the sense of mathematics teacher's status on society and how society takes mathematics teacher. The following eight statements in following table concerned the neighbouring factors .

Table 7: Influence of Neighbouring Related Factors on the enrollment of Students in Optional Mathematics

S.N	Statements	χ^2 value	Remark
1	Our school has not conducted the program encouraging opt Mathematics students .	23.83	S
2	School has not environment for girls to study Optional Mathematics	11.33	S
3	My entire closed friend took Optional Mathematics in my school so I took.	20.67	S
4	Our teacher didn't explain why mathematics is important .	39.83	S
5	Teacher has more expectations from Optional Mathematic students .	34.83	S
6	Opt .Mathematics is domain of talent students.	30.5	S
7	Our teacher tries to make the Mathematics class interesting.	24.17	S
8	Position of girls Mathematics teacher is good in our society .	35.5	S

From above table it is seen that all statements related to neighbouring factors are significance in 5% level of significance. Hence neighbouring factors such as school environment as well as peer group influence, teacher's behavior and trends of society influence on low enrollment of students in optional mathematics.

From Appendix-C (statement 17 - 24)most of the public school do not encourage choosing optional mathematics to their students .some students accept that they took optional mathematics due to influence of their peer group. This is in

Line with Udoh (1983) who observed that the peer exerts influence on their members in taking decision. about 75% students accepted that their teacher didn't explain why optional mathematics is important and more than 75% students that teacher has more expectation from optional mathematics students. Again more than 75% optional mathematics students thought that optional mathematics is domain of talent students. About only 25% students feel that their teacher tries to make their optional mathematics class interesting but more than 50% students agree that position of optional mathematics teacher is good in our society .

In the interview to the teacher more than 60% of subject teachers responded that "Selection of optional mathematics is by product of students own interest and prior achievement. However our own behavior played nominal role to choice of optional mathematics or other optional subject". In the interview to the Head teacher, researcher discussed about how can make school environment favorable to increase enrollment of students in optional mathematics? Most head teacher responded that they always promote the students to choose optional mathematics. but they said "*We can't able to launch program related promoting optional mathematics teacher and students due to our economic and physical barriers*".

On the other hand it was assumed that neighbouring factors have positive impact to enrollment other optional subjects .school environment, teacher's behavior and trends of society are playing positive role for the students to choose other optional mathematics. the following eight statements in table – 8 concerned the enrollment of other optional mathematics by neighbouring factors:

Table 8: Influence of Neighbouring Related Factors on the enrollment of Students in Optional Mathematics

S.N	Statements	χ^2 value	Remark
1	Our school has not conducted the program encouraging opt Mathematics students .	36.5	S
2	School has not environment for girls to study Optional Mathematics	21.17	S
3	My entire closed friend didn't take Optional Mathematics in my school .	25.83	S
4	Our teacher didn't explain why mathematics is important .	25	S
5	Teacher has more expectations from Optional Mathematic students .	34.17	S
6	Opt .Mathematics is domain of talent students.	28.17	S
7	Our teacher doesn't try to make the Mathematics class interesting.	33.83	S
8	Position of girls Mathematics teacher is not good in our society .	31.17	S

Above table shows that in five percent level of significance all statements related to neighbouring factors were accepted .

Again from appendix –D (statements 17-24) shows that around 45% students accepted that their school has not conducted that program encouraging optional mathematics students. Almost 40% students have positive opinion towards school has not environment to study optional mathematics. Nearly 67% students have positive attitude that they didn't take optional mathematics due to their peer group influence. More than 54% students accepted that their teacher didn't explain why mathematics is important. And around 73% students accepted that teacher has more expectation from optional mathematics students than other optional subject students .many students around 72% agreed that optional mathematics is domain of talent students .Around

42% accepted that their teacher doesn't try to make the optional mathematics class interesting. many students around 59% did not agree that position of mathematics teacher is not good in our society .

Finlly from the response of interview to the subject teacher most of them claimed that "*WE provide equal opportunity for every student to select their opyional subject*". And most of head teacher claimed that "*There was a good environment to study optional mathematics created by school and we equally treats all student without any bias*". But researcher found different situation as a whole .researcher found that the lack of encouragement, negligence of school administration and teacher behavior influence on the enrollment of students in optional subject. most of the students have negative attitude towards selecting optional mathematics but teacher were not conduct any program to cleave their negative attitude towards optional mathematics. some school conduct the entrance program to take optional mathematics.

So,both optional mathematics students and other optional subject students were influenced by neighbouring factor such as school environment, teacher's behavior and trends of society. it was showed that only a few students choose optional mathematics because of neighbouring factors also .

Hence, from the analysis of the variables supposed to influence enrollment of students in optional mathematics and other optional subject came out significant. There for, it is concluded that the factors consists of family related, student's self related and neighbouring factors are responsible to the low enrollment of students in optional mathematics and high enrollment of students in other optional subject .

Chapter V

FINDINGS, CONCLUSION AND RECOMENTDATION OF THE STUDY

This chapter concerns with the summary, findings, conclusion and recommendations. After analysis and interpretation of the data informations, an attempt has been made to summarize and sort list the findings, conclusion and recommendations for the further study on the same and related topics.

Summary

The purpose of the study was to find out the causes of low enrollment of girls students in optional mathematic at secondary level of rual public school in sindhupalchok district. The objectives of the study were :

- To find out the current enrollement of students in optional mathematics in sindhupalchok district.
- To analyze the causes that brings low enrollment of student in optional mathematics at secondary level.

This study was small- scale survey type and used both quantitative and qualitative data. The population of the study was the students were studying in secondary level in public school of sindhupalchok district. 120 students (60 taken from optional mathematics and 60 taken from other optional subject), 10 head teachers and 10 optional mathematic subject teachers of 20 public secondary school of sindhupalchok district were taken as sample of the study. The researcher developed the students opinionnaire from and interview schedule to teacher and head teacher with the help of previous studies and thesis supervisor.

The students opinionnaire form consist attitude scale on the enrollment of students in optional subject at secondary level. Likert 5 point scale was used to analyze the attitude of students towards enrollment of optional mathematics and

enrollment of other optional subject. Various statistical tools such as percentage and χ^2 -test were used to analyze the data by interview were analyzed by qualitative / descriptive way.

Findings

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

- There is vast difference between enrollment on optional mathematics and other optional subject. Most of girls students did not choose mathematics as optional subject. Only 6% of girls students studied optional mathematics and remaining studied other subject as optional paper. So enrollment of optional mathematics girls students was very low.
- Girls Students low enrollment of optional mathematics is a function of educational status of family, job, occupation or economic status of family. Negligence of parents, girls duty on household work, students own interest, poor prior achievement in optional mathematics, negative thinking towards optional mathematics, teacher's behavior, school environment and social and peer group Influence. On which students own interest, school environment, poor prior achievement, and educational and economical status of family played vital role on their low enrollment in optional mathematics.
- Most of the students had not taken optional mathematics because of their bad performance in prior grade and negative thinking towards optional mathematics.
- Most of the parents of students are not concerned to the importance of mathematics. Most students feel mathematics is not linked with job and occupation so they don't enroll in optional mathematics.

- It is found that there is no program launched by school to favour on optional mathematics. Teacher's role is not satisfactory in the sense of proper guidance and counseling.
- Students having strong interest towards selecting optional mathematics, where as those think mathematics as domain of talent students and it is complex subject so , they did not select optional mathematics.
- Most of the teacher did not encourage choosing optional mathematics to their students even school environment plays vital role on low enrollment of students in optional mathematics.
- Most of the students choice their optional subject by the force of their peer group so many students choice other optional subject because many students forced to their fiend not to choose optional mathematics.

Conclusion

From the above findings it is concluded that the students low enrollment in optional mathematics is a by product of family related and neighbouring factors. Concern with peer influences, social influences, school environment such as school administration, teacher's behavior in classroom effects on low enrollment of students in optional mathematics. It concludes that the school environment is very essential for low enrollment of students in optional mathematics, so it should be improved. Negative attitude of society towards optional mathematics obviously decrease students to choose optional mathematics so program should launched related to join optional mathematics. With the daily life to society is very essential. Poor prior achievement of student play vital role on low enrollment of student in optional mathematics, so trained and energetic optional mathematics teacher should provide to teach primary and lower secondary level.

Family background such as educational and economic status of family, job and occupation, negligence of parents play important role on low enrollment of students in optional mathematics, so they should be responsible for their children's education and they should make favorable to optional mathematics, for that require some program should be launched nationally. peer influence such as by cooperative behavior on optional mathematics classes, by force of their friend and by competitive motivates also students doesn't choose optional mathematics so teacher parents and school administrator should manage them properly. specially students do not want to be a teacher as well as mathematics teacher because they have not positive opinion towards teacher so teacher profession should rise up as other profession, then optional mathematics become favorable subject for all level students .

Generally, students don't know the opportunity created by optional mathematics and don't responsible to their future career then they don't choose optional mathematics so future hobbies and career is very essential for increasing the students favor to optional mathematics so it should be provided by teacher, guardians, head teacher and school administration.

Recommendation Suggestion for Further Study

The conclusion of this study cannot be generalized to all schools to all area as (rural and urban) due to the delimitation contained in this study. after conducting this research, the researcher found some findings, the researcher Would like to suggest some recommendation and educational implication for the further study to validate the present study's findings.

- Especially most of the Nepalese students are weak in optional mathematics comparatively that of other subject so they do not like to take optional mathematics. Here some effective mathematics program is needed for

students at school level. Researches should be focused to the enrollement of girls in optional mathematics.

- This study was done in public school of sindhupalchok district. for the generalization of the result of the study, similar study should be done in wider scope and large sample.
- For advising to the students there is need for teacher education program because teacher is seen as parents, role models and advisers in addition to their normal duties. Mostly teacher can promote to the students to enroll in optional mathematics.
- Resaarches can be done in higher secondary (10+2) level and college levels in same field .

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APPENDIX-A

Student's Attitude on low enrollment of students in Optional Mathematics

(Optional Mathematics students Set I)

Dear students,

I am student like you in Tribhuvan University. I am going to study on the topic "Causes of low enrollment of girls students in Optional Mathematics at secondary level" in sindhupalchok District. This opinionnaire is addressed to you. there are five options in each Statements. You should choose one option among five which is true for you. Please read the Statements carefully and choose your own opinion by mark (√). Your positive responses help me to study will on my topic.

Student Name:

roll No:

School Name :

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 know the opportunity created by mathematics .					
3	Tuition is necessary for getting good marks in opt mathematics .					
4	Family occupation is not related to mathematics					
5	I have no time to practice opt maths by my household works.					
6	Economic status of people is challenge to choose opt mathematics					
7	My guardians don't encourage me to choose Opt mathematics.					
8	Our family has not positive attitude towards daughter in OPT mathematics.					

9	Mathematics is my favorite subject so I choose opt mathematics.					
10	I can do well in opt mathematics .					
11	I choose opt mathematics due to the good marks of grade VIII.					
12	Opt mathematics helps to get good marks in SLC .					
13	I took opt mathematics because I know about the essence of mathematics .					
14	Mathematics is very hard subject for girls					
15	In each and every field, the use of mathematics is very important .					
16	Mathematics is not practicable and not enjoyable subject .					
17	Our school has not conducted the program encouraging opt mathematics students .					
18	School has not environment for girls to study Opt mathematics .					
19	My entire closed friend took Opt mathematics in my school so I took					
20	Our teacher didn't explain why mathematics is important.					
21	Teacher has more expectations from Opt mathematics students .					
22	Opt mathematics is domain of talent students .					
23	Our teacher tries to make the mathematics class interesting .					
24	Position of girls mathematics teacher is good in our society .					

Suggestions:

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Please make sure that all items have been attempted. thank you for answering items .

APPENDIX-B

Student's Attitude on low enrollment of students in Optional Mathematics

(other Optional Mathematics students Set II)

Dear students,

I am student like you in Tribhuvan University. I am going to study on the topic "Causes of low enrollment of girls students in Optional Mathematics at secondary level" in Sindhupalchok District. This opinionnaire is addressed to you. There are five options in each Statement. You should choose one option among five which is true for you. Please read the Statements carefully and choose your own opinion by mark (✓). Your positive responses help me to study will on my topic.

Student Name:

roll No:

School Name :

S	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Parent's education helps to offer my optional subject					
2	My parents don't know the opportunity created by mathematics .					
3	Tuition is necessary for getting good marks in opt mathematics .					
4	Family occupation is not related to mathematics					
5	I have no time to practice opt maths by my household works					
6	Economic status of people is challenge to choose opt mathematics					

7	My guardians don't encourage me to choose Opt mathematics.					
8	Our family has not positive attitude towards daughter in OPT mathematics.					
9	Mathematics is my favorite subject so I choose opt mathematics.					
10	I can do well in opt mathematics .					
11	I choose opt mathematics due to the good marks of grade VIII.					
12	Opt mathematics helps to get good marks in SLC .					
13	I didn't take opt mathematics because I do',t know about the essence of mathematics .					
14	Mathematics is very hard subject for girls					
15	In each and every field, the use of mathematics is very important .					
16	Mathematics is not practicable and not enjoyable subject .					
17	Our school has not conducted the program encouraging opt mathematics students .					
18	School has not environment for girls to study Opt mathematics .					
19	My entire closed friend take Opt mathematics in my school .					
20	Our teacher did't explain why mathematics is important.					
21	Teacher has more expectations from Opt mathematics students .					
22	Opt mathematics is domain of talent students .					

23	Our teacher tries to make the mathematics class interesting .					
24	Position of girls mathematics teacher is good in our society .					

Suggestions:

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Please make sure that all items have been attempted. thank you for answering items .

APPENDIX-C

Student's Attitude on low enrollment of students in Optional Mathematics

Percentage for Each Statement

(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	33.33	41.67	10	8.33	6.67
2	My parents don't know the opportunity created by mathematics .	8.33	13.33	10	35	33.33
3	Tuition is necessary for getting good marks in opt mathematics .	26.67	33.33	26.67	13.33	0
4	Family occupation is not related to mathematics	38.33	33.33	16.67	8.33	3.33
5	I have no time to practice opt maths by my household works	26.67	38.33	5	10	20
6	Economic status of people is challenge to choose opt mathematics	38.33	41.67	10	10	0
7	My guardians don't encourage me to choose Opt mathematics.	11.67	11.67	13.33	41.67	21.67
8	Our family has not positive attitude towards girls in OPT mathematics.	8.33	21.67	26.67	30	13.33
9	Mathematics is my favorite subject so I choose opt mathematics.	21.67	53.33	11.67	8.33	5
10	I can do well in opt mathematics .	11.67	46.67	33.33	8.33	0
11	I choose opt mathematics due to the good marks of grade VII.	26.67	53.33	13.33	6.67	0

12	Opt mathematics helps to get good marks in SLC .	33.33	25	33.33	8.33	0
13	I took opt mathematics because I know about the essence of mathematics .	11.67	18.33	25	30	15
14	Mathematics is very hard subject for girls	33.33	33.33	26.67	5	1.67
15	In each and every field, the use of mathematics is very important .	33.33	30	25	5	6.67
16	Mathematics is not practicable and not enjoyable subject .	26.67	35	25	8.33	5
17	Our school has not conducted the program encouraging opt mathematics students .	13.33	26.67	41.67	10	8.33
18	School has not environment for girls to study Opt mathematics .	13.33	16.67	13.33	36.67	20
19	My entire closed friend took Opt mathematics in my school so I took	8.33	8.33	16.67	38.33	28.33
20	Our teacher didn,t explain why mathematics is important.	41.67	33.33	21.67	3.33	0
21	Teacher has more expectations from Opt mathematics students .	26.67	46.67	13.33	8.33	5
22	Opt mathematics is domain of talent students .	43.33	30	10	8.33	8.33
23	Our teacher tries to make the mathematics class interesting .	11.67	13.33	26.67	41.67	6.67
24	Position of girls mathematics teacher is good in our society .	26.67	41.67	26.67	5	0

APPENDIX-D

Student's Attitude on low enrollment of students in Optional Mathematics

Percentage for Each Statement

(other Optional Mathematics students, Set II)

S N	Statements	Strongly yAgree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
1	Parent's education helps to offer my optional subject	33.33	44.67	13.33	5	1.67
2	My parents don't know the opportunity created by mathematics .	28.33	38.33	20	8.33	5
3	Tuition is necessary for getting good marks in opt mathematics .	26.67	41.67	15	11.67	5
4	Family occupation is not related to mathematics	25	15	8.33	41.67	10
5	I have no time to practice opt maths by my household works.	38.33	30	10	16.67	5
6	Economic status of people is challenge to choose opt mathematics	13.33	33.33	38.33	8.33	6.67
7	My guardians don't tencourage me to choose Opt mathematics.	18.33	13.33	3.33	38.33	26.67
8	Our family has not positive attitude towards daughter in OPT mathematics.	38.33	38.33	18.33	5	0
9	Mathematics is my favorite subject so I choose opt mathematics.	33.33	28.33	21.67	3.33	13.33
10	I can do well in opt mathematics .	38.33	25	18.33	11.67	6.67
11	I choose opt mathematics due to the good marks of grade VII.	46.67	33.33	5	11.67	3.33
12	Opt mathematics helps to get good marks in SLC .	26.67	21.67	26.67	13.33	11.67

13	I took opt mathematics because I know about the essence of mathematics .	33.33	38.33	16.67	11.67	0
14	Mathematics is very hard subject for girls	36.67	21.67	3.33	8.33	30
15	In each and every field, the use of mathematics is very important .	38.33	30	13.33	13.33	5
16	Mathematics is not practicable and not enjoyable subject .	26.67	18.33	28.33	26.67	0
17	Our school has not conducted the program encouraging opt mathematics students .	26.67	16.67	5	46.67	5
18	School has not environment for girls to study Opt mathematics .	21.67	16.67	13.33	41.67	6.67
19	My entire closed friend took Opt mathematics in my school so I took	40	26.67	8.33	21.67	3.33
20	Our teacher did't explain why mathematics is important.	41.67	15	26.67	11.67	5
21	Teacher has more expectations from Opt mathematics students .	46.67	26.67	6.67	11.67	8.33
22	Opt mathematics is domain of talent students .	30	41.67	10	13.33	5
23	Our teacher tries to make the mathematics class interesting .	13.33	25	46.67	11.67	3.33
24	Position of girls mathematics teacher is good in our society .	3.33	16.67	21.67	16.67	41.67

APPENDIX-E

χ^2 -Test for Each statements (Optional Mathematics students)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	χ^2 value
1	Parent's education helps to offer my optional subject	20	25	6	5	4	31.83
2	My parents don't know the opportunity created by mathematics .	5	8	6	21	20	20.5
3	Tuition is necessary for getting good marks in opt mathematics .	16	20	16	8	0	21.33
4	Family occupation is not related to mathematics	23	20	10	5	2	28.17
5	I have no time to practice opt maths by my household works	16	23	3	6	12	21.16
6	Economic status of people is challenge to choose opt mathematics	23	25	6	6	0	42.17
7	My guardians don't tencourage me to choose Opt mathematics.	7	7	8	25	3	19.67
8	Our family has not positive attitude towards girls in OPT mathematics.	5	13	16	18	8	9.83
9	Mathematics is my favorite subject so I choose opt mathematics.	13	32	7	5	3	46.33
10	I can do well in opt mathematics .	7	28	20	5	0	44.83
11	I choose opt mathematics due to the good marks of grade VII.	16	32	8	4	0	53.33
12	Opt mathematics helps to get good marks in SLC .	10	15	20	5	0	27.5
13	It took opt mathematics	7	11	15	18	9	6.67

	because I know about the essence of mathematics .						
14	Mathematics is very hard subject for girls	20	20	16	3	1	28.83
15	In each and every field, the use of mathematics is very important .	20	18	15	3	4	21.17
16	Mathematics is not practicable and not enjoyable subject .	16	21	15	5	3	19.67
17	Our school has not conducted the program encouraging opt mathematics students .	8	16	25	6	5	23.83
18	School has not environment for girls to study Opt mathematics .	8	10	8	22	12	11.33
19	My entire closed friend took Opt mathematics in my school so I took	5	5	10	23	17	20.67
20	Our teacher didn't explain why mathematics is important.	25	20	13	2	0	39.83
21	Teacher has more expectations from Opt mathematics students .	16	28	8	5	3	34.83
22	Opt mathematics is domain of talent students .	26	18	6	5	5	30.5
23	Our teacher tries to make the mathematics class interesting .	7	8	16	25	4	24.17
24	Position of girls mathematics teacher is good in our society .	16	25	16	3	0	35.5

APPENDIX-F

χ^2 -Test for Each statements (other Optional Mathematics students)

SN	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	χ^2 value
1	Parent's education helps to offer my optional subject	20	28	8	3	1	44.83
2	My parents don't know the opportunity created by mathematics .	17	23	12	5	3	23
3	Tuition is necessary for getting good marks in opt mathematics .	16	25	9	7	3	25
4	Family occupation is not related to mathematics	15	9	5	25	6	22.67
5	I have no time to practice opt maths by my household works	23	18	6	10	3	23.17
6	Economic status of people is challenge to choose opt mathematics	8	20	23	5	4	26.17
7	My guardians don't encourage me to choose Opt mathematics.	11	8	2	23	16	21.17
8	Our family has not positive attitude towards girls in OPT mathematics.	13	14	7	2	0	23.10
9	Mathematics is my favorite subject so I choose opt mathematics.	20	17	13	2	8	17.17
10	I can do well in opt mathematics .	23	15	11	7	4	18.33
11	I choose opt mathematics due to the good marks of grade VIII	28	20	3	7	2	43.83
12	Opt mathematics helps to get good marks in SLC .	16	13	16	8	7	6.17

13	I took opt mathematics because I know about the essence of mathematics .	20	23	10	7	0	29.83
14	Mathematics is very hard subject for girls	22	13	2	5	18	23.83
15	In each and every field, the use of mathematics is very important .	23	18	8	8	3	22.5
16	Mathematics is not practicable and not enjoyable subject .	16	11	17	16	0	16.83
17	Our school has not conducted the program encouraging opt mathematics students .	16	10	3	28	3	36.5
18	School has not environment for girls to study Opt mathematics .	13	10	8	25	4	21.17
19	My entire closed friend took Opt mathematics in my school so I took	24	16	5	13	2	25.83
20	Our teacher didn,t explain why mathematics is important.	25	9	16	7	3	25
21	Teacher has more expectations from Opt mathematics students .	28	16	4	7	5	34.17
22	Opt mathematics is domain of talent students .	18	25	6	8	3	28.17
23	Our teacher tries to make the mathematics class interesting .	8	15	28	7	2	33.83
24	Position of girls mathematics teacher is good in our society .	2	10	13	10	25	31.17

APPENDIX-G

List of sample school

S.N	Name of School
1.	Rajeshwory H.S.S Sipapkhare
2.	Bhimeshwory H.S.S Bhimtar
3.	Sipatindhara Secondary School, Bhotsipa
4.	Chandeshwory H.S.S Bhotsipa
5.	Setidevi Secondary School, Bhimtar
6.	Phataksila H.S.S Phatakisla
7.	Kalikachetana H.S.S Phatakisha
8.	Baghbhairab H.S.S Thokarpa
9.	Mahendrakanti H.S.S Kalika
10.	Sindhuparanagaun H.S.S Sindhukopt
11.	Aisalukharka H.S.S Badegaun
12.	Kamaladevi S.S Badegaun
13.	Nawalpur H.S Mawalpur
14.	Mahendra H.S.S Kunchok
15.	Jalpadevi H.S.S Bhaunepati
16.	Saraswati H.S.S Galthung
17.	Bhumeshwori H.S.S Kewl
18.	Thampaldhap H.S.S Thampalkot
19.	Setidevi H.S.S Thulosurbari
20.	Gyanmandir H.S.S Sansusirbari

APPENDIX-H

Interview Questions for Teacher and Head teacher of sample school

- What are Causes behind on low enrollment of girls students in opt mathematics?
- What are Difficulties on enrollment of girls students in opt mathematics ?
- How does the School environment effect the girls enrollement in optional mathematics?
- What is the importance of Guidance and counseling for students on their career choice ?
- Does teacher training Teacher training and counseling affect to enrollement of girls in optional mathematics?
- Does Teacher's behaviors effect on girls enrollement in opt maths?

APPENDIX-I

students enrollment Ratio In Optional Mathematics and other opt Subject of
sampled school

(Academic year: 2070and 2071)

ACADEMIC YEAR							
2070					2071		
S.N	Name of School	Optional maths	Other optional subjects	Total	Optional maths	Other optional subjects	Total
1	Rajeshwory H.S.S Sipapkhare	4	74	78	3	71	74
2	Bhimeshwory H.S.S Bhimtar	1	43	44	2	40	42
3	Sipatindhara Secondary School, Bhotsipa	3	21	24	2	18	20
4	Chandeshwory H.S.S Bhotsipa	4	66	70	5	70	75
5	Setidevi Secondary School, Bhimtar	2	28	30	3	29	32
6	Phataksila H.S.S Phatakisla	3	41	44	3	42	45
7	Kalikachetana H.S.S Phatakisha	2	35	37	4	31	35
8	Baghbhairab H.S.S Thokarpa	3	37	40	4	38	42
9	Mahendrakanti H.S.S Kalika	4	35	39	3	33	36
10	Sindhuparanagaun H.S.S Sindhukopt	5	60	65	5	61	66
11	Aisalukharka H.S.S Badegaun	2	36	38	2	68	70
12	Kamaladevi S.S	3	17	20	4	18	22

	Badegaun						
13	Nawalpur H.S Mawalpur	2	39	41	3	37	40
14	Mahendra H.S.S Kunchok	3	45	48	3	47	50
15	Jalpadevi H.S.S Bhaunepati	3	52	55	4	51	55
16	Saraswati H.S.S Galthung	3	45	48	4	56	60
17	Bhumeshwori H.S.S Kewl	1	46	48	2	42	44
18	Thampaldhap H.S.S Thampalkot	2	40	42	1	44	45
19	Setidevi H.S.S Thulosurbari	1	50	51	1	49	50
20	Gyanmandir H.S.S Sansusirbari	3	53	56	2	35	37
	Total	55	860	915	60	880	940

APPENDIX-J

Statistical Formula used for Data Analysis

1. For χ^2 -test

$$\chi^2 \text{ value} = \sum \frac{\{f(o_{ij}) - f(e_{ij})\}^2}{e_{ij}}$$

O_{ij} = Observed Frequency

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

Level of significance (α) = 0.05

2. For Percentage (%)

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