GIRLS PARTICIPATION IN OPTIONAL MATHEMATICS IN CHITWAN DISTRICT

A

THESIS

BY

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has been approved in partial fulfillment of the requirements for the Degree of Master of Education

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Letter of Certificate

This is to certify that Miss. Pratima Neupane, a student of academic year 067/068 with Campus Roll No. 2915, T.U. Registration number 9-2-240-357-2005, Thesis No. 943 and Exam Roll. No. 281496 (2069) has completed her thesis under my supervision during the period prescribed by the rules and regulation of Tribhuvan University, Nepal. The thesis entitled "GIRLS PARTICIPATION IN OPTIONAL MATHEMATICS IN CHITWAN DISTRICT'' has been prepared based on the result of her investigation conducted during the period of August 2013 to May 2014 under the Department of Mathematics Education, University Campus, Kirtipur, Kathmandu. I recommend and forward this thesis for the evaluation as the partial requirement to award the degree of Master Education.

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(Mr. Krishna Prasad Adhikari) (Mr. Laxmi Narayan Yadav)

Supervisor For Head

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ABSTRACT

This study focuses on the factor affecting girls' participation in optional mathematics. This is a survey type study that attempts to describe the enrolment of girls students' in optional mathematics and to analyze the factors that affect participation. Five public schools were selected randomly from all public schools of Chitwan District. One set of opinionnaire scale was prepared and distributed to the girls students to find out the effect of family related factors, school related factors, student related factors and other neighboring factors in girls participation. Concerning to above factors unstructured interviews were taken with mathematics teachers from respective sample schools.Statistical test such as; χ^2-value were used to interpret the result and reflection was made over the statistical judgment.

This study shows that the enrolment of girl students is very low in comparison to boys in optional mathematics. The main factors that affect participation are; male dominated society, less priority given by parents to their daughter than sons, school environment and girls haven't self-confidence to learn optional mathematics.

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Chapter I

INTRODUCTION

Background of the Study

Mathematics is an essential part of school curriculum. Which is taught from primary level to secondary level as a compulsory subject and extra optional subject can choose for last two years of secondary education. It is generally agreed that everyone needs the fundamental knowledge of mathematics in daily life. Beside the compulsory mathematics an additional, as one of the optional subject, is offered to willing and worthy students at secondary level. The students have to apply mathematical concept and skills in daily life, professional and vocational fields as well in their higher studies, Generally it is known that students are weak in day to day life application of mathematics. They have poor background of mathematics to study it at higher level. And they can't find vocational use of mathematics. The reasons for this weakness are the inappropriate selection of contents to be taught in school mathematics curriculum.

For the improvement of students' achievement in school mathematics, many researchers have been done to identify the variables that influence the achievement scores of the students. It is believed that girls are weak in math in comparison to boys with respect to educational achievement. Most of the girls students at secondary level do not like to select optional mathematics due to the possibility of failure in examination. When girls are distracted from mathematics, it is certain that women could not get the position of scientist and the domains of works which by tradition is considered as male domain.

The participation of women is very low in economic, intellectual, social and political opportunity in the society; hence involvement of girls in education is very low as compared to boys. According to census 2068 total literacy rate is 65.9%, male literacy rate is 75.1% and female literacy rate is 57.4%. Educational opportunities generally available to boys and girls are clearly illustrated by the literacy rates of the two groups. Mathematics is taken as male domain subject. On this context, it is necessary to study the causing factor to choose mathematics or other subjects as optional. Why girls students take optional mathematics and why girls students doesn't take optional mathematics? Moreover, why they detach from optional mathematics?

Statement of the Problem

Girl students do not select mathematics for the advance mathematics course in faculties like engineering, science and technology. For these faculties, it is necessary to select optional mathematics course at secondary level. But only few number of girls student select optional mathematics. Perhaps, most of the girl students are unknown about the opportunity carried by optional mathematics. While we observe the position of girl student in higher education, there is a few numbers of girls involved in teaching and learning mathematics.

Therefore, the research was based on the following questions and these are the baseline for research activities whose answer was searched during this study.

- How far the enrolment of girl students' in optional mathematics differ than boys?
- What are the factors that affect on participation in optional mathematics?

Research Objectives

The present study is related to girl student's participation in optional mathematics course at secondary level of Chitwan district. The main purpose of the study was;

- To compare the enrolment of girls and boys students in optional mathematics.
- To find the factors that affects the participation of girls in optional mathematics.

Rationale of the Study

The study is significant for the reason that the result of this study would help to identify some of the factors that could affect the girl students' participation in optional mathematics in secondary school education. This knowledge helps to manage pedagogy for creating girls' positive attitude towards mathematics and selecting optional mathematics as their elective subject. This ultimately could increase girls' participation in science and technology field.

Mathematics is an essential part of school curriculum so it is taught as compulsory subjects at all level of the school education also mathematics is include as optional subject at secondary level education. The study had been the following specific significance.

- It would give the information about the enrolment of girl students' in optional mathematics.
- It would help to find the factor that affects the girls' participation in optional mathematics.
- It might suggest the ways to minimize such factors in participation optional mathematics.

Delimitation of the Study

Each study is not rigorous, perfect and free from limitation, they have some sort of limitation and 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 public school of Chitwan district only.
- This study includes only IX students.

Definition of the Related Term

- **Enrolment**: Enrolling a person in optional mathematics.
- **Girl's interest**: This refers interest of the girl students in selecting optional mathematics.
- **Public school**: The schools which are fully financed by the government are called public school they also provide free education.
- **School related factor**: The variables such as teacher's behavior, gender are taken under school related factors. These variables affect the attitude of girl students was selecting optional mathematics.
- **Out of school related factor**: The variables such as family background, self confidence, and further study. Social influence, influence of occupational goal in future study. Social influence, influence of occupational goal in future and girls' interest are taken tinder out of school related factor. These variables affect the attitude of girl students in selecting optional mathematics.

Chapter II

REVIEW OF RELATED LITERATURE

This section presents the review of the related literature of the study and theoretical framework of the study.

Empirical Literature

Attitude and Learning of Mathematics

Children's participation and continuation on education depend upon parent's attitude towards education. How children continue their education is totally depended upon the attitude of the parents. When parent realized the need of their children's education, this is the opportunity to the children in education. Both father's and mother's discipline affects their children to improve their personality (CRED, 1990). The previous researchers have shown that children's education own attitudes towards education, parent's education and income has direct positive influence on scholastic achievement of students (Mathur and Hardrill, 1972). There is positive correlation between attitude towards mathematics and achievement but differs by sex. The main attitude score of boys towards mathematics as school subject was greater than that of female students (Pandit, 1984).

Both boys and girls held positive attitudes towards mathematics but the mean attitude score of boys are higher than that of girls (Tiwari, 1984). Subject related attitude of students were studied. There are positive attitude of secondary level students and teachers towards geometry. The mean attitude scores of boys towards geometry were significantly greater than the mean attitudes of scores of the girls. Parent's attitude

towards the subject itself could work for suggesting and motivating children in studying this subject Pandit, 1999). Tiwari (2002) has reported that 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, farmer and non-former parents had greater attitude score towards their male child than female child in secondary school mathematics. Superiority of the boys over the girls was established with respect to achievement in mathematics by area and also cognitive levels (Rahnian, 1981). Similarly Dhakal, (2002) stressed that the students have negative attitude towards their mathematics classroom. Their attitude remains positive to the well organized mathematics classroom and they have positive attitude towards mathematics textbook and reference book.

Rai (2004) reported that secondary schools trained teachers had positive attitude towards the mathematics than untrained teacher. Students who have positive attitude had achievement higher than students who had negative attitude towards mathematics. Gotame (2005) stressed that there is correlation between parent's beliefs and achievement in mathematics. He also found that mathematical thinking and doing depended on the parental status and beliefs. The upper caste students have higher achievement in mathematics due their parent's high expectation towards mathematics and school system. Parental belief was the main motivation factor in learning of mathematics.

Gender and Mathematics Learning

Teachers' expectation from students can have a direct influence on their learning and achievement. Teachers generally are expecting less academically from girls than from boys and treat girls quite differently from the way of boys are treated. Boys are

praised for their ability when they do well, and criticized for not working harder when they don't where as girls are complimented on their hard work and neat performance when they succeed in mathematics. They are told that they are not bright when they fail. Boys also are attended to teachers more than girls, they receive more help from teachers on area which they have problems academically, and are called on more often to give answers in class (Feldman, 1982; Becker, 1981; Eppesson, 1988; Fennema and Reyes, 1881; Koehler, 1990). If expectations of future successes are low, or if these successes are discounted, students will withhold afford and will avoid contact with the subject in the future. The decision to continue in mathematics is crucial to a student's continued success both academically and professionally. The small differences found between boys and girls performance nearly disappear when the students have taken the same courses (Chipman and Wilson, 1985).

The socio cultural factors influencing girl students' performance and participation in mathematics. Society has the attitude that the girl students do not perform well in mathematics. Such attitude of the society affects the girl students directly in participate the mathematics (Fennema and Sherman 1977, 1978; Schonberger, 1978).

There is influence of peers in the learning of mathematics. Peer's support is important in actual or intended course participation for either sex. The influence of peers on girls' attitude and behavior has been topic of extensive research. Interest in peer effect is based on the belief that peer act as a significant socializing agent for student. Peers have the potential to be valuable educational resources that encourage student participation in mathematics. Greenwood (1997) reported that the latent variable attitude influenced mathematic achievement indirectly with self efficacy as the mediating

variable. Attitude along with internal self and self aspiration influence the latent variable import. The influence of parent and self was significance, but no statistically significant results were found between this work and mathematics achievement.

Self Confidence in Learning Mathematics

Reyes and Stannic (1998) indicate that self- confidence in learning mathematics is defined in most research as how sure a student of his or her ability to learn and to perform well mathematics. Self confidence is also important factors because relatively strong correlations have been found between mathematics achievement and a student's self confidence in learning mathematics (Reyes, 1984). In fact, Reyes, (1984) politico out that self confidence is one of the important affective variables. Students who are confidence about their abilities tend to learn more, to feel better about them and more interested ill pursuing mathematical ideas than students who lack self confidence. As well, self confidence is one of the strongest attitudinal predicators of mathematics course selection. Self confidence is all important construct because it has been shown to have a consistent positive relationship with general academic achievement (Reyes, 1984; Reyes and Stanic, 1988) students' perception of their ability in mathematics directly affect their valuing of mathematics as well as their expectations for success ill mathematics (Meue et al., 1990). Fennema and Sherman, (1997) have shown that even in studies that controlled for the number of mathematics courses taken, males report greater confidence in their mathematics ability than females. In a study of middle school students, Fennema Sherman, (1978) found significant gender related differences for only two affective variables self confidence in learning mathematics and students' perceptions of mathematics as a male domain. Males were significantly more confident of their ability to

learn mathematics than females. Gold, Brush and Sprotzer (1980) report that gender differences in self perceptions of intelligence and self confidences are small but favor the females in third grade. By fifth grade they discovered males were more likely to describe themselves as smart and self confident than were the females.

Campbell (1986), found girl's perceptions on mathematics is as a difficult subject and a male domain that affects their attitudes, achievement and participation in advanced mathematics courses. Hanson, (1992) described research finding that both girls and boys defined mathematics as "male" as early as the second grade, because girls also think mathematics is more difficult than boys do, research suggests that girls will be less likely to enroll in mathematics courses if presented the option.

Eccles, (1987) reported that throughout childhood and adolescence, girls both like and spend more time than boys in reading, writing and participating in activities related to arts and crafts, domestic skills and drama. Boys in contrast, spend more time engaged in sports, working with machine and tools and involved with scientific, math related hobbies. These differences, she reported may have a direct effect on training girls and boys, seek out and on the skills they acquire during childhood.

Conceptual Understanding of the Study

As discussed above related literature, participation of girls in optional mathematics may depend under different variables. Those variables are shown the following framework.

A Framework for Factor Affecting the Girls' Participation in Optional Mathematics

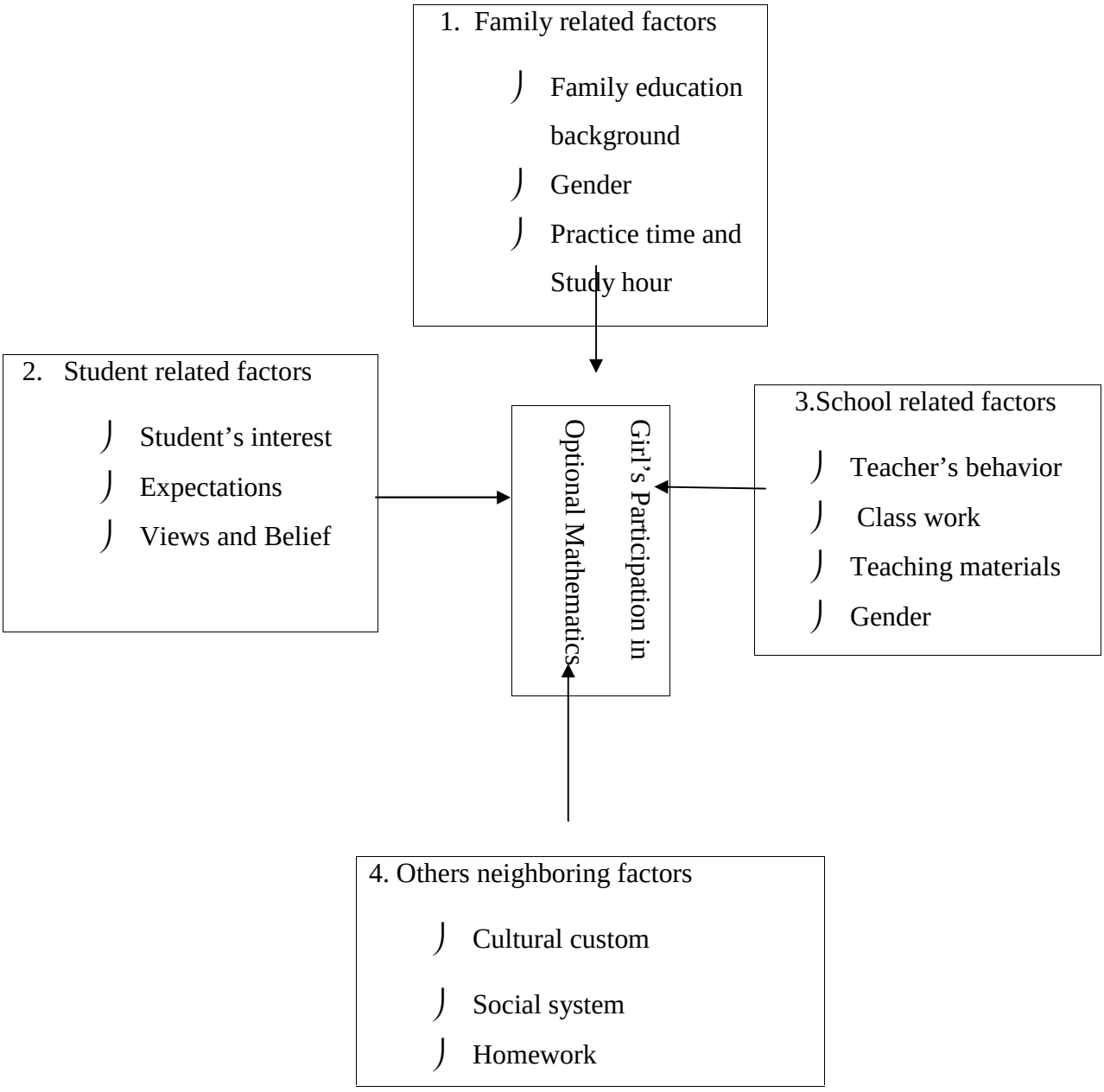

Fig 2.1 Conceptual Understanding of the Study

Source: Pokhrel (2010)

Generally participation in optional mathematics especially of girls influence from family related factors, student related factors, and school related factors and other neighboring factors. Under family related factors are family education background, practice time and study hour and gender may affect in the participation. Student related factors are student's interest, expectations and views and belief. Similarly school related factors are teacher's behavior, gender, teaching materials and class work. Other neighboring factors are culture custom, social system and homework.

Chapter III

METHODS AND PROCEDURES

This chapter presents the procedure of the study, which was carried out to achieve the objectives of study. This chapter delineates design of study, the population, the method of sample and sampling of the study and the data collection tool used to collect the information. It also explains statistical procedure used in analysis and interpretation of the result.

Design of the Study

The design of the study is survey. To explain the term survey it is a form of plan to collect the information for the purpose of analyzing the relationship between certain variables. Thus, this present study is more quantitative as well as qualitative.

Population of the Study

Population of the study consists of all regular girls students in academic year 2070/2071 BS of secondary level public schools at grade IX in Chitwan district.

Sample of the Study

The sample of the study was determined by simple random sampling from Chitwan district. For the sample, 120 students were selected in which 6o were studying optional mathematics and 60 were from other optional subjects. And researcher selected 5 schools. Where in Narayani Model H.S.S 41 boys are participated in optional mathematics and just 22 girls are participated in optional mathematics. Similarly, 37 boys participated in optional mathematics and 22 girls are participated in optional mathematics

at Chitwan H.S.S. 32 boys are participated in optional mathematics and 18 girls are participated in optional mathematics at Bharatpur H.S.S. 32 boys are participated in optional mathematics and 17 girls are participated in optional mathematics at Prembasti H.S.S. 21 boys are participated in optional mathematics and 10 girls are participated in optional mathematics at Sahid Smriti Higher Secondery School.

For the interview, five mathematics teachers were selected as one mathematics teacher from each school. To explore the causes, why girls are not participated in learning optional mathematics, interview was conducted with mathematics teacher.

Instruments for Data Collection

Every study needs tools to collect data. Likewise for this study one set of opinionnaire and one set of interview schedule were used. The construction process and validation of the tools in this study are described below.

Opinionnaire Scale

Information that attempts to measure the attitude or belief of an individual is known as an opinionnaire or attitude scale so one set of opinionnaire was developed as an instrument for the collection of needed information which was used for girl students.

This opinionnaire was used to identify the factors that affect in taking optional mathematics.

One set of opinionnaire scale were developed having twenty seven statements related to the above variables (See Appendix A) for the girls students who are studying at grade IX in Chitwan district. These scales were developed in Likert Scale Point Techniques. Both positive and negative statements were included in the scale. Scoring of the statements was done as shown in the following table.

Table; 3.1

Likert-Scale Point Used in Technique of Scoring

S.N.	Meaning of rating	Positive statement	Negative statement
1.	Strongly Agree	1	5
2.	Agree	2	4
3.	Undecided	3	3
4.	Disagree	4	2
5.	Strongly Disagree	5	1

Interview Schedule

Interview is a process of communication or interaction in which subject or interview gives the needed information verbally in a face to face situation (Koul, 1997). Interview is encouraged to respond towards the question after building a better rapport. In this study the interview schedule was prepared on the basis of conceptual understanding, which was taken with mathematics teacher. There are many types of interview; especially direct interview was conducted with teachers in this study. In this technique, the researcher not only asked the questions but also observed all behavior and answering method of respondents. In this study, on the basis of objectives the researcher developed the interview guideline in a semi-structured from (See-Appendix B) to collect the information from mathematics teacher.

Reliability and Validity of Instrument

Reliability and validity of the research instrument are the necessary qualities of instrument. For the purpose of establishing reliability, pilot study was conducted in Narayani Model H.S.S in Chitwan district. Twenty five students were piloted in opinionnaire scale.

This set of statements were set as an opinionnaire and distributed to the experts for checking the validity. To check the gross defects in language, suitability of the items, appropriateness of the statements, complexity in understanding the meaning of opinionnaire were verified on the basis of the collected information from the piloted opinionnaire and comments received from the experts. The validity of the opinionnaire was established by its approval from the subject experts and thesis supervisor with some attraction and addition of statements.

Data Collection Procedure

After selecting the sampled schools, the researcher visited the related school with instrument to collect data. Before administration of the tools, investigators met the authorities and explained the purpose of the study in detail. Once the principal of the schools agreed to allow the study to be carried out, the researchers arranged the data and time for administrating the instrument when the students and teachers were assembled ready to participate in the study, the researcher explained its purpose and relevance and research tools were administrated in group with direct supervision. For the opinion of girl students, the researcher distributed opinionnaire for sampled students (See in appendix A). After getting response of all the students, the opinionnaire was taken back with thanks.

With the help of semi-structured interview schedule, the interview was conducted with one mathematics teacher of each sample schools. After getting response of all the mathematics teachers, the interview was taken back with thanks.

Data Analysis and Interpretation Procedure

At first the information and opinion gathered related to study. The opinion of students was analysis by using χ^2- test.

- Chi-square test: χ^2- test measured the degree of independency between variables. Because 120 students were selected in which 60 were studying optional mathematics and 60 were from other optional subject. So, it was applied in this study. The statistical device χ^2-test was applied to all statement of opinionnaire scale at α=0.05 level of significance. This indicated that if the χ^2-test for every statement more than obtained value (tabulated value) χ^2 0.05, 4=9.488 then the students has positive attitude towards these statements otherwise negative attitude towards these statement. In this research which has already mentioned that there was one set of opinionnaire with five scales- strongly agree, agree, undecided, disagree and strongly disagree with rating scale value 5,4,3,2,1.

Chapter-IV

DATA ANALYSIS AND INTERPRETATION

The data analysis and interpretation is the process of systematic searching and arranging the information from the opinionnaire scale, interviews and others tools (Begdom and Biklen 1998; Cited: Best and Kahn, 1999). This chapter deals with the analysis and interpretations of the collected information to find the girls participation in optional mathematics and find out the factors that affect the participation of girls in optional mathematics at grade IX. It has already been mentioned that there were one set of opinionnaire scale with five scales—strongly agree, agree, undecided, disagree and strongly disagree with rating values 5,4,3,2 and 1 respectively in each statement and one set of interview schedule (semi-structured interview schedule). The collected data were tabulated and analyzed for the attainment of objectives.

First, the collected information obtained from opinionnaire and interview schedule is based on the conceptual understanding prepared from the review of literature. Theoretically it is assumed that variables such as family related factors, student related factors, and school related factors and other neighboring factors could be the main contributors for the information of participation of girls in optional mathematics. The data were obtained from the girls students who were studying at grade IX in secondary level. The collected information analyzed and interpreted is discussed on following sections separately.

Factors affecting girls' participation in optional mathematics

The information obtained from opinionnaire schedule is analyzed and interpreted in this part. There are several factors affecting the girls participation in optional mathematics with the help of related literature and theory, it was assumed that the different four variables affected the girls participation in optional mathematics. Such variables are described separately as follows:

Influence of student related factors on girls' participation in optional mathematics

Theoretically, it was assumed that girls participation in optional mathematics is influenced by the student related factors student's interest, expectation and views and belief towards optional mathematics. Interest of learners is also an important determining factor in student s' participation. If students do not have curiosity to learn the teacher cannot teach. The expectations of teacher, parents and students themselves have a significant effect on participation levels. Different research shows that students who are expected to learn are more likely to participate in school. It has been shown that teachers generally tend to have lower expectations for minority children and children from poor families (Games and Davis, 1990). Students; attitudes and beliefs also effect the achievement in mathematics. Many articles suggest that girls have negative attitudes and expectations for their performance in mathematics. The following five statements define the student related factors that can influence girl's participation in optional mathematics.

Table 4.1

Influence of student related factors on girls' participation in optional mathematics

S. N	Statements	Strongly agree	Agree	S.A+A (%)	Undecided	disagree	Strongly disagree	S.D+D (%)	χ^2-value	decision
1.	Mathematics is an essential part of the science and technology.	8	14	36.6%	22 36.6%	8	8	26%	12.6	S
2.	I fell difficult in reading mathematics key words and symbol.	6	7	21.6%	9 15%	22	16	63.3%	15.5	S
3.	I study mathematics whenever I am free.	15	21	60%	12 20%	8	4	20%	14.1	S
4.	I am not curious and active while teaching mathematics.	6	8	23.3%	21 35%	14	11	41.6%	11.5	S
5.	I enjoy when solving mathematics problems.	18	22	66.6%	3 5%	10	7	28.3%	20.5	S

The statements were tested using χ^2-test at 0.05 level of significance. All the statements are significance at this level. So, it can be said that the entire student accept these statements. In first statement, 36.6% girls are agreed, 36.6% girls are also undecided and 26. % girls are disagreed. Similarly, 21.6% girls are agreed, 15% girls are undecided and 63.3% girls are disagreed. 60% girls are agreed, 20% girls are undecided and 20% girls are also disagreed. 23.3% girls are agreed, 35% girls are undecided and 41.6% girls are disagreed. 66.6% girls are agreed, 5% girls are undecided and 28.3% girls are disagreed, respectively.

So, from first statement, we can say that many girls are agree and undecided in this statement. From second statement, we can say that many girls are not feeling difficult in reading optional mathematics because 63.3% students are disagreed in this statement. The fifth statement 'I enjoy when solving optional mathematics problem' is highly significant. However many students are agree with this statement. From this we can say that students are enjoying when solving optional mathematics problem.

In addition to quantitative information, the interview was taken from the mathematics teacher to derive qualitative information regarding the influence of student related factor in participation of girl students in optional mathematics. Hence the main influence of students related factors on girls' participation in optional mathematics were the interest of student, expectation view and belief. Teacher said that girl students cannot ask question directly to the teacher because of their society schooling. And girls have no self confidence in participate in optional mathematics so girls' participation in optional mathematics is low.

Hence, from the result analyzed in quantitative techniques and response of math teacher in interview it is concluded that the student related factors are main influence factors in girls participation in optional mathematics.

Influence of school related factors on girls' participation in optional mathematics

There are many factors that affect student participation. This study assumed that the school related factors is one of the important factor of girls participation in optional mathematics. Researchers showed that teacher's behavior, gender and class work are school related factors. Teachers' behaviors towards girl students, sharing of knowledge questions answer to the teacher and student and opportunities given by school

and teachers to the girl students are main determining factors of girls' participation in optional mathematics. The classroom lighting color choices and windows play a significant role in the participation of students. The following seven statements define the positive influence of school related factors on girls' participation in optional mathematics on school curriculum.

Table 4.2

Influence of school related factors on girls' participation in optional mathematics

S. N	Statements	Strongly agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2- value	Decision
1.	Course of optional mathematics is not complete in time.	17	22	65%	6	10 10%	5	25%	17.8	**S**
2.	Teachers teach focusing the boys more than girls.	17	21	63.3%	5	12 8.3%	5	28.3%	17	**S**
3.	Teachers give class work and check it.	18	21	65%	3	10 5%	8	30%	18.1	**S**
4.	School manages all the teaching materials for learning mathematics.	5	8	21.6%	9	23 15%	15	63.3%	17	**S**
5.	All mathematics teachers are trained on motivation students with different ability.	15	20	58.3%	7	11 11.6%	7	30%	10.3	**S**
6.	Teachers are always suggestive to motivate girls' student to study mathematics.	5	8	21.6%	10	20 16.6%	17	61.6%	13.1	**S**
7.	The optional mathematics teacher teaches regular in the class.	24	26	83.3%	2	6 3.3%	2	13.3%	48	**S**

The statements were tested using χ^2-test at 0.05 level of significance. All the statements are significant at this level. So, it can be said that the entire student accept these statement. In first statement 65% girls are agreed, 10% girls are undecided and 25% girls are disagreed. Similarly, 63.3% girls are agreed, 8.3% girls are undecided and 28.3% girls are disagreed. 65% girls are agreed, 5%girls are undecided and 30% girls are disagreed. 21.6% girls are agreed, 15% girls are undecided and 63.3% girls are disagreed. 58.3% girls are agreed, 11.6% girls are undecided and 30% girls are disagreed. 21.6% girls are agreed, 16.6% girls are undecided and 61.6% girls are disagreed. 83.3% girls are agreed, 3.3% girls are undecided and 13.3% girls are disagreed, respectively.

The seventh statement is highly significant, and in this statement 83.3% students are agreed, that means teacher is punctual in class. From second statement shows that in classroom teacher always focus on boys and talent students while teaching optional mathematics. Most of the students (63.3%) disagreed with the statements that 'school manages all the teaching materials for learning optional mathematics' that means schools don't manage teaching materials for learning optional mathematics. From there all statements it can be concluded that school related factors which in existed in our context are also influencing factors on girls participation in optional mathematics.

Interviews were taken with the mathematics teacher to get the qualitative information concerning the role of school related factors on girls' participation in optional mathematics. Most of the teachers' views were the low school facilities; limited teaching materials are culturally biased view about girls students are the main cause of low participation in optional mathematics.

Hence: from the above discussion it can be concluded that the school related factors which is not better to acquire high result is also the cause of low participation in optional mathematics.

Influence of family related factors on girls' participation in optional mathematics

Home is considered as a foundation of education. It is assumed that the participation of girl in optional mathematics is highly influenced by the home environment. Family education background, gender and practice time and study hour as the family related factors. The participation of child depends not only on the part played by teachers but also on the parent's awareness, interest and knowledge about handling and guiding their children at home. The roles, responsibilities, constrains, opportunities, practice time given by family to daughter in home is also played the vital role on the participation of girl in optional mathematics. The following six statements given in table 4.3 are related to the family related factors support in course of learning and sorts of pressure created to girl students' participation in optional mathematics.

Table 4.3

Influence of family related factors on girls' participation in optional mathematics

S. N	Statements	Strongly agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2-value	Decision
1.	My parents do not discuss about my learning progress report with optional mathematics teacher.	5	8	21.6%	9 15%	20	18	63.3%	14.5	**S**
2.	I have no more time to study at home.	9	9	30%	5 8.3%	19	18	61.6%	12.6	**S**

3.	My family manages tuition and coaching if necessary.	15	20	58.3%	5 8.3%	11	9	33.3%	11	**S**
4.	My parents do not manage all request materials for the study of mathematics.	11	11	36.6%	7 11.6%	18	13	51.6%	5.3	**NS**
5.	My parents treat unequally my brothers and me.	5	7	20%	6 10%	23	19	70%	23.3	**S**
6.	Learning environment of mathematics is not better for me at home.	8	9	28.3%	6 10%	20	17	61.6%	12.5	**S**

The table 4.3 shows that χ^2-value of five statements out of six statements are significant at 0.05 level of significance. In first statement 21.6% girls are agreed, 15% girls are undecided and 63.3% girls are disagreed. Similarly, 30% girls are agreed, 8.3% girls are undecided and 61.6% girls are disagreed. 58.3% girls are agreed, 8.3% girls are undecided and 33.3% girls are disagreed. 36.6% girls are agreed, 11.6% girls are undecided and 51.6% girls are disagreed. 20% girls are agreed, 10% girls are undecided and 70% girls are disagreed. 28.3% girls are agreed, 10% girls are undecided and 61.6% girls are disagreed, respectively.

From fist statement we can say that their parents discuss about their learning progress report with optional mathematics teacher, because 63.3% girls are disagreed in this statement. The statements second and third shows that their parents do treat and manage for the learning time at home and their parents manages tuition and coaching if necessary. In fifth statement 70% students are disagreed. So, we can say that their parents treat equally to the son and daughter.

Beside the quantitative data, the researcher had conducted interview to the teacher to collect qualitative information about the influence of family related factors on participation of girls' students in optional mathematics. In course of interview period given by students to learn optional mathematics at home, parents view towards their daughter, extra class managed by parents in family related factors are also the influencing factors on participation of girl in optional mathematics.

Hence: from the above analysis it can be concluded that family education background, gender and practice time and study hour are the influencing factor on participation of girls' in optional mathematics.

Influence of other neighboring factor on girls' participation in optional mathematics

Theoretically it was reviewed that culture and social factors are responsible for the under participation of girls in optional mathematics. The different social variables such as social system, cultural custom and home work are the main factor that causes girls participation in optional mathematics. In our society, boys were educated\exposed to the society but girls were restricted to their kitchen and spent most of their time in helping their mothers in domestic work. This is the traditional effect of gender equality which influences the girls' mental development and achievement. The following eight statements define the social and cultural factor which effects on student participation in optional mathematics.

Table 4.4

Influence of others neighboring factors on girls' participation in optional mathematics

S. N	Statements	Strongly Agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2-Value	Decision
1.	Our society has no idea whether the subjects' matter of optional mathematics is good or bad.	7	7	23.3%	10 16.6%	20	16	60%	11.1	**S**
2.	There are literate people in our society.	11	17	46.6%	6 10%	15	11	43.3%	6	**NS**
3.	The societies do not inspire to learn optional mathematics.	3	18	35%	24 40%	9	6	25%	25.5	**S**
4.	I always complete mathematics homework given by mathematics teacher.	15	22	61.6%	4 6.6%	13	6	31.6%	17.5	**S**
5.	Low rate and opportunity of girls in society.	15	21	60%	13 21.6%	7	4	18.3%	15	**S**
6.	Our society unequally treats boys and girls.	15	22	61.6%	12 20%	5	6	18.3%	16.1	**S**
7.	The society and persons admire the girls in learning optional mathematics.	7	14	35%	16 26.6%	15	8	38.3%	5.8	**NS**
8.	Female have inferior place in our society.	7	10	28.3%	9 15%	25	9	56.6%	18	**S**

The table 4.4 shows that six statements are significant and two statements are insignificant at 0.05 level of significant of χ^2-test. In first statement 23.3% girls are agreed, 16.6% girls are undecided and 60% girls are disagreed. Similarly, 46.6% girls are agreed, 10% girls are undecided and 43.3% girls are disagreed. 35% girls are agreed, 40% girls are undecided and 25% girls are disagreed. 61.6% girls are agreed, 6.6% girls

are undecided and 31.6% girls are disagreed. 60% girls are agreed, 21.6% girls are undecided and 18.3% girls disagreed. 61.6% girls are agreed, 20% girls are undecided and 18.3% girls are disagreed. 35% girls are agreed, 26.6% girls are undecided and 38.3% girls are disagreed. 28.3% girls are agreed, 15% are undecided and 56.6% girls are disagreed, respectively.

In sixth statement 61.6% girls are agreed. So, we can say that the society gives unequal role, responsibilities and opportunities to the girls and boys students. The statement second gives the insignificant result. Which gives the society has equally literate and illiterate people. In first statement 60% students are disagreed so, we can say that their society has some idea whether the subjects' matter of optional mathematics is good or bad. The third statement is highly significant. 40% girls are undecided in this statement. In forth statement is 61.6% students are agreed so, we can say that most of girls are complete homework given by optional mathematics teacher.

Beside quantitative testing qualitative information were collected from mathematics teachers regarding the relation of social variables in girls' participation. By the response of math teachers, it was concluded that there is still misconception that optional mathematics was what men did. On the other hand, a specific obstacle is the prevalent bad image of optional mathematics and mathematics in society and community. Some people hate optional mathematics because it caused their failures or the failure of their students at school. The response of the interview of teacher and the result of opininnaire scales are found in conformist remain same. So, it is concluded that the girl students participation in optional mathematics in influence by other neighboring factors.

Hence; from the above analysis it can be concluded that social system, cultural custom and homework are the influence factor on participation of girls in optional mathematics.

Then, again, 60 girls are taken from other optional subjects.

The information obtained from opinionnaire scale and semi-structured interview schedule is analyzed and interpreted in this part. There are several factors affecting the girls' doesn't participate in optional mathematics with the help of related literature and theory, it was assumed that the different four variables affected the participation in optional mathematics. Such variables are described separately as follows.

Influence of family related factors on girls' who doesn't participate in optional mathematics

Home is considered as a foundation of education. It is assumed that the girls' doesn't participate in optional mathematics is highly influenced by the home environment. Family education background, gender and practice time and study hour as the family related factors.

Table 4.5,

Influence of family related factors

S. N	Statements	Strongly Agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2- value	Decision
1.	My parents treat unequally my brothers and me.	13	20	55%	5 8.3%	13	9	36.6%	10.3	**S**
2.	My family manages tuition and coaching if necessary.	10	8	30%	8 13.3%	20	14	56.6%	8.6	**NS**

3.	Learning environment of mathematics is not better for me at home.	11	22	55%	8 13.3%	10	9	31.6%	10.8	**S**
4.	I have no more time to study at home.	15	20	58.3%	6 10%	10	9	31.6%	10.1	**S**
5.	My parents do not manage all request materials for the study of mathematics.	19	20	65%	12 20%	5	4	15%	18.8	**S**

This table shows that χ^2-value of four statements are insignificant and one statement is significant at 0.05 level of significance. In first statement 55% girls are agreed, 8.3% girls are undecided and 36.6% girls are disagreed. Similarly, 30% girls are agreed, 13.3% girls are undecided and 56.6% girls are disagreed. 55% girls are agreed, 13.3% girls are undecided and 31.6% girls are disagreed. 58.3% girls are agreed, 10% girls are undecided and 31.6% girls are disagreed. 65% girls are agreed, 20% girls are undecided and 15% girls are disagreed.

In first statement 55% girls are agreed so, we can say that their parents treat unequally their son and daughter. From second statement shows that their family doesn't manages tuition and coaching. Because 56.6% girls are disagree in this statement. 55% girls are agreed in third statement so, we can say that their learning environment of mathematics is not better for their at home. In fourth and fifth statements most of girls are agreed so, they have no more time to study and their parents do not manage all request materials for the study of mathematics.

Hence; Due to the less priority given by the parents to their daughter in learning mathematics is main cause of low participation in optional mathematics. From the above

analysis it can be concluded that family education background, gender and practice time and study hour are the influencing factor on girls participation in optional mathematics.

Influence of school related factors on girls' who doesn't participate in optional mathematics

There are many factors that affect student participation. This study assumed that the school related factors is one factor of girls who doesn't participation in optional mathematics. Researchers showed that teacher's behavior, gender, teaching materials and class work are school related factors.

Table 4.6,

Influence of school related factor

S. N	Statements	Strongly Agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2 value	Decision
1.	School manages all the teaching materials for learning mathematics.	7	8	25%	10 16.6%	24	11	58.3%	15.8	**S**
2.	Teachers teach focusing the boys more than girls.	15	21	60%	10 16.6%	9	5	23.3%	12.6	**S**
3.	Teachers give class work and check it.	8	16	40%	4 6.6%	20	12	53.3%	13.3	**S**
4.	All mathematics teachers are trained on motivation students with different ability.	7	10	28.3%	6 13.3%	20	15	58.3%	11.5	**S**
5.	Course of mathematics is not complete in time.	17	23	66.6%	3 5%	12	5	28.3%	23	**S**

6.	Teachers are always suggestive to motivate girls' student to study mathematics.	3	4	11.6%	13 21.6%	24	16	66.6%	25.5	**S**

These statements were tested using χ^2-test at 0.05 level of significance. All the statements are significant at this level. So, it can be said that the entire student accept these statements. In first statement 25% girls are agreed, 16.6% girls are undecided and 58.3% girls are disagreed. Similarly, 60% girls are agreed, 16.6% girls are undecided and 23.3% girls are disagreed. 40% girls are agreed, 6.6% girls are undecided and 53.3% girls are disagreed. 28.3% girls are agreed, 13.3% girls are undecided and 58.3% girls are disagreed. 66.6% girls are agreed, 5% girls are undecided and 28.3% girls are disagreed. 11.6% girls are agreed, 21.6% girls are undecided and 66.6% girls are disagreed, respectively.

The sixth statement is highly significant. In this statement 66.6% girls are disagreed. So, we can say that teachers are not suggestive to motivate girls' students to study mathematics. From first statement we can say that school doesn't manage the teaching materials for learning mathematics. 60% girls are agreed in second statement, it shows that teacher teach focusing the boys more than girls. In third statement 53.3% girls said that teacher doesn't give class work and homework.

Hence; from there all statements it can be concluded that school related factors which in existed in our context is also an influencing actors on girls' participation in optional mathematics.

Influence of student related factors on girls' who doesn't participate in optional mathematics

Theoretically, it was assumed that girls' participation in optional mathematics is influenced by the student related factors student's interest, expectation and views and belief towards optional mathematics are explained under the student related factors. Interest of learners is an important determining factor in students' participation.

Table, 4.7

Influence of student related factors

S.N	Statements	Strongly Agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2-value	Decision
1.	I am not curious and active while teaching mathematics.	15	22	61.6%	6 10%	11	6	28.3%	15.1	**S**
2.	Mathematics is an essential part of the science and technology.	12	15	45%	20 33.3%	9	4	21.6%	12.1	**S**
3.	I enjoy when solving mathematics problem.	3	10	21.6%	13 21.6%	19	15	56.6%	12	**S**
4.	I fell difficultly in reading mathematics key words or symbol.	13	16	48.3%	6 10%	13	12	41.6%	4.5	**NS**
5.	I study mathematics whenever I am free.	9	10	31.6%	8 13.3%	18	15	55%	6.1	**NS**

The statements were tested using χ^2-test at 0.05 level of significance. First, second and third statements are significant and fourth and fifth statements are

insignificant. In first statement 61.6% girls are agreed, 10% girls are undecided and 28.3% girls are disagreed. 45% girls are agreed, 33.3% girls are undecided and 21.6% girls are disagreed. 21.6% girls are agreed, 21.6% girls are also undecided and 56.6% girls are disagreed. 48.3% girls are agreed, 10% girls are undecided and 41.6% girls are also disagreed. 31.6% girls are agreed, 13.3% girls are undecided and 55% girls are disagreed, respectively.

In first statement 61.6% girls are agreed, so, we can say that girls are not curious and active while teaching mathematics. 56.6% girls are disagreed in third statement so, we can say that they are not enjoying when solving mathematics problem. The fourth statement is insignificant, this shows that some girls felt difficultly in reading mathematics key words or symbol and some girls doesn't felt difficultly. 55% girls are disagreed in sixth statement so, we can say that most of girls are not interested in learning mathematics so; they are not study mathematics whenever they are free.

Hence; from all these statements it is concluded that girls have not self-confidence and interest to learning mathematics. They are unknown about the opportunity of optional mathematics in their education. So, they are not participating in optional mathematics.

Influence of other neighboring factors on girls' who doesn't participate in optional mathematics

Theoretically it was assumed that girls participation in optional mathematics is influenced by the other neighboring factor social system, cultural custom and homework are the main factors that the girls doesn't participate in optional mathematics.

Table, 4.8

Influence of other neighboring factors

S. N	Statements	Strongly Agree	Agree	S.A+A (%)	Undecided	Disagree	Strongly disagree	S.D+D (%)	χ^2-value	Decision
1.	Our society unequally treats boys and girls.	15	23	63.3%	5 8.3%	10	7	28.3%	17.3	**S**
2.	I always complete math homework.	9	16	41.6%	4 6.6%	20	11	51.6%	12.8	**S**
3.	Female have inferior place in our society.	9	17	43.3%	10 16.6%	15	9	40%	4.6	**NS**
4.	Low rate and opportunity of girls in society.	14	21	58.3%	12 20%	8	5	21.6%	12.5	**S**
5.	The societies do not inspire to learn optional mathematics.	14	23	61.6%	12 20%	6	5	18.3%	17.5	**S**
6.	The society and persons admire the girls in learning optional mathematics.	5	7	20%	9 15%	20	19	65%	16.3	**S**

This table 4.8 shows that five statements are significant and one statement is insignificant at 0.05 level of significant of χ^2-test. In first statement 63.3% girls are agreed, 8.3% girls are undecided and 28.3% girls are disagreed. Similarly, 41.6% girls are agreed, 6.6% girls are undecided and 51.6% girls are disagreed. 43.3% girls are agreed, 16.6% girls are undecided and 40% girls are disagreed. 58.3% girls are agreed, 20% girls are undecided and 21.6% girls are disagreed. 61.6% girls are agreed, 20% girls are undecided and 18.3% girls are disagreed. 20% girls are agreed, 15% girls are undecided and 65% girls are disagreed, respectively.

In first statement 63.3% girls are agreed so, this shows that in their society unequally treats boys and girls. Second statement shows that most of students are not

complete math homework but some students are complete math homework. The third statement is insignificant. It shows that some girls have inferior place in their society but some girls have not inferior place in their society. In fourth and fifth statements most of girls are agreed so, we can say that low rate and opportunity of girls in their society and their societies do not inspire to learn optional mathematics. 65% girls are disagreed in sixth statement so, we can say that their society don't admire the girls in learning optional mathematics.

Hence; From all these statements it is concluded that girls have no opportunity in their society and their society don't inspire to learn mathematics so, they are not interested and they have not self-confidence to learning optional mathematics.

Chapter-V

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter is basically concerned in deriving some findings and conclusions from the discussion of the previous chapter. Besides finding and conclusion; it has some recommendation which will be useful for further studies and educational implications.

Summary of findings

This study was based on survey. The study design has utilized both quantitative and qualitative research approach. The main purpose of the study was to find the girls' participation in optional mathematics and to identify the factors affecting participation of girl students in optional mathematics. The population of the study consisted of all regular girls' students in academic year 2070/2071 BS of secondary level public schools at grade IX in Chitwan district and the sample of the study was determined by random sampling from Chitwan district. For the total 120 students are selecting 60 girls are participation in optional mathematics and 60 girls are doesn't participation in optional mathematics.

The researcher used one set of opinionnaire scale and one set of semi-structured interview schedule for collecting information or data. Opinionnaire scale was used to girl students to investigate the factors that affects on participation in optional mathematics. The opinionnaire scale was developed on basic of Likert five point techniques. The collected data from opinionnaire scale were analyzed by using χ^2-test in 0.05 level of significance. Interview was carried out to the math teachers of the selected sample school. The data obtained from interview were analyzed by descriptive method. Then the researcher substantiating as triangulation to the quantitative analysis result from the opinionnaire scale and qualitative analysis result from qualitative information from the

interviews from the analysis of the huge number of data at the end the researcher found the major finding of the study are categorized as follows.

- There is a very low participation of girl to compare boys' participation in optional mathematics.
- It is found that family related factors such as gender bias at home, present education, practice time in given to solve problem and study hour of student at home influence in the girls' participation in optional mathematics.
- The students related factors such as students' interest; student's as well as parents, expectations and their views and beliefs directly influence on girls participation.
- The school related factors in which teachers' factors in which teachers' behavior, gender, teaching materials and class work affect the girls' participation in optional mathematics.
- The girls who were encouraged by others neighboring factors such as cultural custom, social system and homework directly influence the participation of girl students in optional mathematics.

Conclusion

Mathematics is a gateway to many areas of further study and a 'critical filter' in employment. It is a source of equality; closes many educational and career opportunities to disadvantaged groups and female children. It is showed that the mathematics participation of female in Nepal is at critical stage in overall school participation. Similarly, the participation of girl students in optional mathematics is also very low society as a whole believed that female is mathematically less capable than male. This belief is communicated by parents and teachers to girl students come to view their

failures in mathematics as evidence that they indeed feel inferior and view their success as flunks. This reinforced the belief that they are not participation in ninth grade optional mathematics classroom.

Although mathematics education has been given an important place in curriculum of all level of school and the university education most of the students fail in this subject. This is unknown factors impeded students' progress in this subject. In this case of failure, the number of girl students is very high. It is felt that girls are unable to catch the mathematical ideas what boys do. However, this reason is not scientific because different researches have shown that girls are also equally capable to do mathematics with boys. But what is the causing factor that makes girls' failure in mathematics study.

In a conclusion of the study, mainly four factors were identified as influential variables for the participation of girl students in optional mathematics. These four variables were the:

- Family related factors
- Student related factors
- School related factors
- Other neighboring factors

At last, it is concluded that girls' are equally talented and should be given equal facilities at home and at school to learn optional mathematics.

Recommendation for further Study

The conclusion of this study cannot be generalized to all schools students and to all areas due to the limitations contained in this study. Thus, after analyzing the

conclusions and implications of the study the researcher has made the following recommendations or suggestions for further study to validate the present study's findings.

- Almost of the girl students are weak in mathematics and are not participation in optional mathematics. So to get optimum output, improvement is needed in all mathematics education programs for girl students. Research should be focused in this area.
- This study was done only in Chitwan district as a case. For generalization of the result of the study, similar study should be done in a wider scope and large sample.

BIBLIOGRAPHY

Astin, H. (1974). *Mathematical Talent: Discovery Description and Development*. Baltimare, MD: Johns Hopkins university press.

Best, J. W. and Kahn, J.V. (1999). *Research in Education*. New Delhi Prentice Hall of India.

CDC, (2054). *Mathematics curriculum class 9 and 10.* Sanothimi Bhaktapur: Janak Education Materials Center.

CERID, (1980*). Achivement study of primary school children*, T.U., Balkhu, Kathmandu.

CERID, (1999). Assessment of learning achievement of lower secondary children. Kathmandu: CERID.

Council for Mathematics Education, *Mathematics Education Forum Vol. I and II*,(2006). Nepal, Kathmandu: Dongal printers.

Dhakal, H. (2006*). A study of the factors affecting the girls students attitude towards selecting optional mathematics at secondary level*. Unpublished Master's thesis. FOE, TU, Nepal.

Eves, H. (1983). *An Introduction to History of Mathematics(5th ED),* New York: The Saunders Series, Saunders College Publishing.

Hyde, J.S., Fennema, E., Ryan, M., Frost,L.A. and Hopp, C. (1990). *Gender Comparision of Mathematics Attitude and Affect.* Psychology of Woman Quarterly, No. 14, pp. 299-324.

Joshi, H. (1997*). Determinants of Mathematics Achivement Using Structural Equation Modeling*, Unpublished Ph. D Dissertation, Department of Educational Psychology, Algebra.

Kothari, C.R. (1995). *Research Methodology (2nd ed).* New Delhi: Vishaw Prakashan.

Koul, L. (2000). *Methodology of Educational Research(3rd ed)*. New Delhi: Vikash Publishing House.

Neupane, S. R. (2001*). Mathematics Achivement of Primary School Children of Various Ethnic Groups in Nepal.* Unpublished Ph. D Dissertation, Banarassi: FOE, B.H.U.

Pant, N. R., D. P. Bhandari and Pant D.R.(1978). *Sumati Tantra*. Kathmandu: CDC.

Senk, S. L. (1989). Van Hiele levels and achievement in writing geometry proofs. *Journal for Research in Mathematics Education,* 20(3), 309-321.

Sharma, L.N. (2004) A critical appraisal with reference to mathematics curriculum in school education. *Mathematics Education Forum*.

Thesis Shobha Kanta Pokherel (2010)

Upadhyay, H.P. (2064). *New Trends in Mathematics Education*. Kathmandu: vidyarthi Prakashan (P.) Ltd.

APPENDIX-A

OPINIONNAIRE FOR STUDENTS

Dear Students,

I am a student of M.Ed. Majoring mathematics. I have tried to prepare a thesis on "A study of the Girl's Participation in optional mathematics at secondary level in public school" for my Master's Degree of Education.

Please, read the statements carefully and give your own opinion about the intensity of statements by putting tick mark on any one of the five rating of each statement.
Here

S.A=Strongly Agree A=Agree U=Undecided
D=Disagree S.D=Strongly
Disagree

Name: Date:
Class: Roll No:
Address:

S.N.	Statements	S.A.	A.	U.	D.	S.D.
1.	My Parents do not manage all required materials for the study of mathematics.					
2	My parents treat unequally my brother and me.					
3	My parents do not discuss about my learning progress report with optional math teacher.					
4	My family manages tuition and coaching if necessary.					

5	I have no more than to study at home.					
6	Learning environment of mathematics is not better for me at home					
7	I am not curious and active while teaching mathematics.					
8	I enjoy when solving mathematics problems.					
9	Course of mathematics is not complete in time.					
10	Mathematics is an essential part of the science and technology.					
11	I study mathematics whenever I am free.					
12	I feel difficulty in reading mathematics key words or symbol.					
13	All mathematics teachers are trained on motivating students with different ability.					
14	School manages all the teaching materials for learning mathematics.					
15	Teachers teach focusing the boys more than girls.					
16	Teachers are always suggestive to motivate girls student to study mathematics.					
17	The optional mathematics teacher teaches regular in the class.					
18	Teacher gives class work and check it.					
19	Course of optional mathematics is not complete in time.					
20	I always complete mathematics homework.					
21	Our society unequally treats boys and girls.					
22	There are literate people in our society.					
23	Female have inferior place in our society.					
24	Low rate and opportunity of girls in society.					
25	Our society has no idea whether the subject's mater of optional mathematics is good or bad.					
26	The society and persons admire the girls in learning					

	optional mathematics.					
27	The societies do not inspire to learn optional mathematics.					

Please give your opinion about any factor that affects girls' participation in optional mathematics.

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…

Thank you very much for your assistance in completing this opinionnaire as well as my research.

THE END

APPENDIX - B

GUIDELINES FOR INTERVIEW WITH SECONDARY MATH TEACHER

Date of interview: - ……

Name of teacher: - ……..

Qualification: - …… Religions: - ……

Trained/ Untrained: - …… Sex: - ……..

Teaching Experience: - ……. Age: - …….

Address: - ……..

The interview with mathematics teacher will take under the following topics.

- Teaching strategies of optional mathematics
- Home environment
- School environment
- Probable error during optional mathematics problem solving
- Social variables and girls achievement
- Study time

Interview questions for teachers

1. What do you feel when you entered the classroom to take the optional mathematics class?

2. Is solving all the optional mathematics problem by the teacher necessary? Should students do exercise them selves?

3. How about the participation of your students in optional mathematics subject? Why?

4. What is the factor that affects students' participation in optional mathematics?

5. How do the students' views and beliefs effect on learning optional mathematics of girls student?

6. Did the home environment affect the girl's participation in optional mathematics? Yes or No. Mention those factors.

7. What do you think about the girl students' interest in reading optional mathematics?

8. Do you use instructional materials while teaching optional mathematics?

9. What types of materials do you use? Are those all materials sufficient?

10. Do you encourage girl students' to study optional mathematics?

11. Is this teachers' behavior helps to increase the girls' participation in optional mathematics?
12. What will be the causes of low participation of girl students in optional mathematics.
13. Do you review the optional mathematics course from time to time?

14. Is there any discrimination between boys and girls in your class?

15. Social variables are also the important factor that affects the girls' participation in optional mathematics. Do you agree? Give reasons to support your view.

16. In your opinion do you think the other probable factors could also effect the girls' participation in optional mathematics?

17. Are there any comments or suggestion to improve girl's participation in optional mathematics?

APPENDIX – C

LIST OF THE SAMPLE SCHOOLS

S. N.	Name of Schools
1.	Narayani Model Higher Secondary School
2.	Sahid Smriti Secondary School
3.	Prembasti Higher Secondary School
4.	Bharatpur Higher Secondary School
5.	Chitwan Higher Secondary School

APPENDIX – D

STATISTICAL FORMULA

1. The computation formula used for the calculation of χ^2-test:

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

Where,

o_{ij}= Observed frequency

e_{ij} = Expected frequency