

Chapter I

Introduction

Background of the Study

The word “Mathematics” is derived from ancient Greek word “Matheanein” which means “to learn”. Mathematics is the study of quantity, structure, space, number and Science. It developed with abstraction and logical reasoning from counting, calculation, measurement and from the study of the shapes and motions of physical objects. Mathematics began with the civilization and practice. In ancient period, mathematics was originated from counting by using pieces of stones and by cutting notches in a piece of sticks or by tying knots in a string with gradual evolution of society (Eves, 1981).

The study on the history of mathematics, is not only exciting but also important. The history of teaching mathematics is as old as the human civilization. The history of mathematics is a powerful tool for disseminating and understanding the development of mathematics. According to Oxford dictionary, history means that “branch of knowledge dealing with past events, political, social, economic of a country, continent or the world; orderly description of past events” (E.R. Acharya). Mathematics is directly concern with human life. It is believed that development and civilization and the development of mathematics appeared mutually. Mathematics was developed through the ancient Civilization like Egyptian, Greek, Roman, Hindu, Chinese and Babylon . Archimedes, Pythagoras, Euclid, Plato, Descartes, Newton, Cantor, Thales, Hippocrates, papus, Liu Hui, Mahavira, Braham gupta, Bhaskara etc. were contributed to develop the mathematical concepts.

Mathematics is a way of thinking, a way of organizing, analyzing and synthesizing a body of data. Mathematics is a body of knowledge, in the area of

Science, with its own symbolism, terminology, contents, theorems and techniques (foundation of mathematics). Paul procter (1995) in Cambridge international Dictionary of English defines mathematics as “ the study of numbers, shapes and space using reason and usually a special systems of symbols and rules for organizing them”. In reality, mathematics has its own language, own tools and mode of operations. It is the science of measurement, quality and magnitude. It is the numerical and calculation parts of human’s life and knowledge. Low achievement is a major problem in mathematics education. It has been an ongoing cause for concern as a major factor in mathematics. Webster (2002) reported that the focus was laid more on mathematics nationally and internationally for the countries which reportedly had low level of mathematical skills (K.P. Ghimire, 2014).

In the ancient period of mathematics was used different civilization like Tigris and Euphrates, Mahenzedaro Harappa . Hwang Ho and Yang Sikang were the another subject of civilization, where the mathematics was used gradually first and rigorously today. So it is not new subject for the different entho groups . But only the difference is the way of getting mathematics knowledge the formally and informally, how the different entho groups are using mathematical activities.

Early mathematics arose with evolution of advance from the society in those civilization because life was easier in the plain area and river side. There used to be convenience of transportation and irrigation where survival was possible. These regions, aborigines became rich and prosperous so that it was possible them to think mathematically or technologically. Gradually in the field of agriculture , the manufacture simple tools to cultivate the length which was the human pioneer engineering . Later on the knitted their acquired skills and used it to disacuminate to

the next and new generation too. Even they used their innovation for administration and financial management . Eves (1983,p.22)

On examining the history of educational development in Nepal . It is found that astrology, through not mathematics, used taught as a separate discipline under the Gurukul system during the vedic period . Adopting Indian curriculum, arithmetic and Algebra were used to be taught at durbar high school, the first government school established 1910 B.S. in Nepal . After having establishment of the school leaving certificate Board in Nepal in 1990 B.S., the Board managed to teach various subjects of 700 full marks. Among which mathematics was a separate subject with 100 marks in secondary and lower secondary schools.

National education system plan (2028 B.S.) contributed to a great extend by making mathematics move systematic. Mathematics education was made a compulsory subject from grade one to ten. Mathematics is also an optional subject at secondary level in the existing curriculum shows the great importance of teaching mathematics. The sound background of mathematics is necessary for the study of science and technology.

Now mathematics is considered as social creation . At one level it might be called math in the environment and in the community and society. Culture is the contributing factor for the development of the mathematics. Mathematics plays vital role in the development of culture and civilization. Now it is concerning to the specific cultural groups so that the task of counting, measuring, classifying, ordering, inferring and modeling have been given cultural interpretation. So mathematics is the cultural revolution of society (D' Ambrosio, 1984). First time D' Ambrosia used the term ethno-mathematics in 1985. He is known as the father of ethno-mathematics. He defined ethno-mathematics by different ways and term such as ethno-mathematics as

the math practiced among cultural groups such as notional trouble societies, labour group, children of certain age group, professional classes and so on. He also define ethno-mathematics as “the relation between anthropological, cultural, historical and mathematical terms towards the recognition of different way of thinking in every place.” Hence mathematics is developed form of ethno-mathematics which refers to any form of cultural knowledge or social activity, characteristics of social and cultural group that can be recognized by other cultural groups and society (flash,1982).

NESP-1971 has emphasized on making mathematics life oriented and practical by introducing revised curriculum content, textbooks and conducting teacher training programme and supervision system. After the establishment of school leaving certificate (SLC) board in 1934 A.D, the first curriculum was introduced in Nepal for secondary level in which mathematics was divided into compulsory and optional part, each consisting 100 of 100 marks out of 800 full marks(Pandit,2050,p.165). The secondary curriculum of Nepal has made a provision of six core subjects and two optional paper subjects. The six secondary core subjects are Nepali, English, Mathematics, Science, Social Studies, Health, Population and environment [HPE] with two optional papers with full-marks 100 and pass-marks 32 while the optional mathematics (paper 1) has also got weight 5 with full-marks 100 and pass-marks 32 (High level National Education Commission [HLNEC],1999,p-1o).

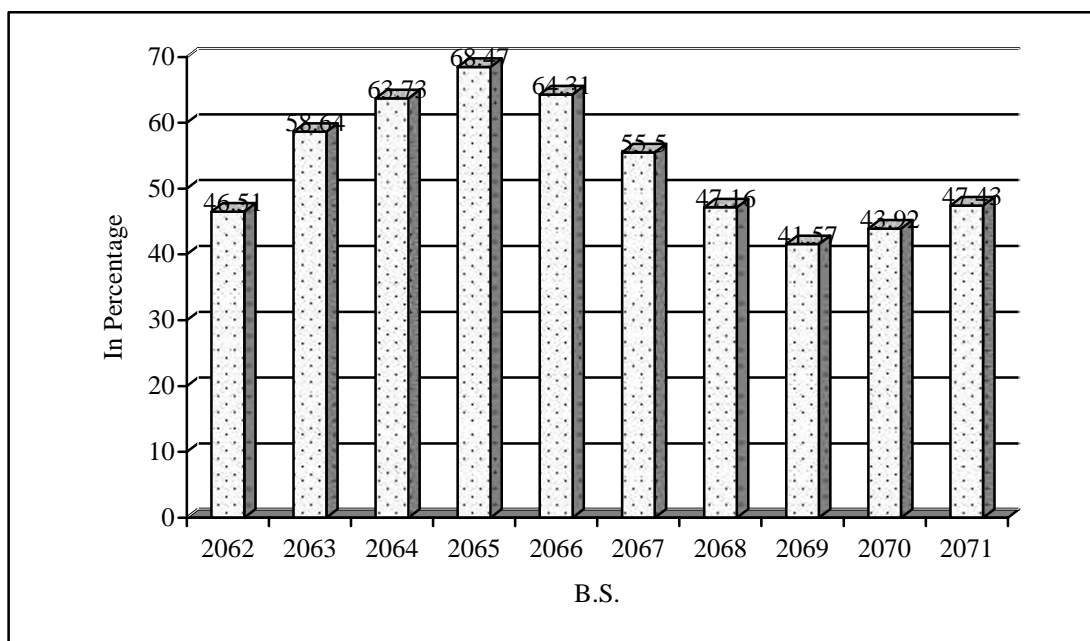
Now mathematics is compulsory subject categorized into: A. compulsory 1 paper (any one) and B. optional 2 paper (any one).Mathematics has got weight through grade one to ten and optional mathematics is optional subject for the students who choose it for last two years of secondary education. Historically,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

observation show that the rate of selection of mathematics as optional subject is very low. So, most of the students are being far from the optional mathematics. This study concerned with mathematics which is related to student have low enrollment and their low participations.

Optional mathematics 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 strees will be load investigating to the cause of low enrollment of students towards optional mathematics. We have data of SLC result before ten years since 2062 B.S. to 2071 B.S. students are passed in SLC.

Table No 1 : Result of S.L.C.

Exam. years	Passed percentage
2062 B.S.	46.51%
2063 B.S.	58.64%
2064 B.S.	63.73%
2065 B.S.	68.47%
2066 B.S.	64.31%
2067 B.S.	55.50%
2068 B.S.	47.16%
2069 B.S.	41.57%
2070 B.S.	43.92%
2071 B.S.	47.43%

Fig. No 1 : Result of S.L.C.

In each year highly numbers of students fail in mathematics. So, the SLC result depend upon the mathematics passer and failure rate of the students. (E.kantipur) So, from different flash reports and from difference researchers we see that low enrollment of students in optional mathematics is taken as complex and tedious subject high failure rate in mathematics in school education. On this content it is necessary to study the causing factor to choose mathematics as optional study is to improve the participation in optional mathematics, why students don't want to read optional mathematics? Why they detach from optional mathematics? What are the difficulties in learning optional mathematics for students? Why the students want to be far from mathematics? Thus this study will find the causes of low enrollment of students in optional mathematics and to find the level of achievement of students an optional mathematics of secondary level especially public school of Kathmandu district.

Statement of the Problem

The ability of students to know about mathematics depends not only upon attitudes but also upon their skills, interest and concerning. And students gain the knowledge of mathematics by different approaches and way of learning. Mathematics is essential for human beings. Without mathematical concept one can't structure or restructure of minimal events of life. Therefore it is the elementary root of education. Without education one can't perform his full academic energy during his life.

The majority of Nepalese students are unidentified about the opportunity formed by optional mathematics in judgement to non mathematics subject while ingoing the grade IX after passing district level examination of grade eight and they decide two optional subjects. Therefore, I believe selection of optional subjects in grade IX is essential in the student life. The enrollment of students an optional mathematics is very low then that of other optional subjects.

The study is related to the causes of low enrollment in optional mathematics at secondary level of Kathmandu district and it is intended to answer the following research questions:

-) What is the level of achievement of students in optional mathematics?
-) What are the causes of low enrollment of students in optional mathematics?

Significance of the Study

Mathematics is the discipline which knowingly or unknowingly every human individually or socially acknowledge for creation, pleasure and survive. Mathematics is an important component of school curriculum. So, every student should strike for the better results, because of the importance given to it . Without better results, the students neither get opportunity for further study nor get better chance in any job

market. For the improvements of students helps to know achievement level of mathematics.

Education is the stamina for the development of the nation. Education presents the maximum potential for reducing poverty through rising production. True learning is only possible when the student get freedom in selecting subjects that is possible only through the consciousness in the significance of optional subject. The enrollment of student in optional mathematic is very; the majority of the students would like to depart extreme from mathematics subject. Agriculture based financial system, intense poverty, poor literacy, joblessness, teacher's supremacy of optional subjects are obstacles in implementing students' educational right in Nepalese context. We have a lot of data gap on these issues. However, we can barely find out the outcome among these issues in secondary level. In such condition, a booming research on "causes of low enrollment of students in optional mathematics at secondary level" of Kathmandu district is very important. Therefore, the significance of this study are as follows;

-) This study helps to find out the causes that are related to low enrollment of students in optional mathematics.
-) The study helps to find out the achievement level of students in optional mathematics.
-) The study finds the trends of enrollment of students in optional mathematics.
-) This study helps to bring existing factors that are related to choose mathematics as optional subjects.
-) This study helps to facilitate the comparative study on math and non-math related to the enrollment and selection of optional subject for students.

Objectives of the Study

Objective is the main goal to the research, study. Objective should be realistic, measurable, behaviourable, believable, applicable. Obviously only good objectives give good results. So, objective should be selected carefully. This study should be conducted with the following specific objectives:

-) To find out the level of achievement of students in optional mathematics in public school.
-) To find the causes that brings low enrollment in optional mathematics.

Statistical hypothesis

The statistical and null hypothesis of this study were as follows:

The null hypothesis (H_0) : $\hat{\mu}_1 = \hat{\mu}_2$ i.e. the achievement of girls and boys in optional mathematics is not significant difference.

The alternative hypothesis (H_1) : $\hat{\mu}_1 \neq \hat{\mu}_2$ i.e. the achievement of girls and boys in optional mathematics is significant difference.

Where, $\hat{\mu}_1$ and $\hat{\mu}_2$ are the corresponding means achievement score of boys and girls students in optional mathematics.

Delimitation of the Study

This study was delimited in the following aspects.

-) This study was done within Kathmandu district.
-) Only the public schools were included in the study.
-) It is limited only at secondary level.
-) This study was limited to 60 students of public schools of situated in Kathmandu district.
-) This study was limited only to causes of low enrollment of students in optional mathematics at secondary level in Kathmandu district.

) This study was estimated to do the researcher himself by using school records of students enrolment.

Definitions of the Related Terms

The terms related to this study we defined in the following paragraph.

Enrolment: It refers to the students registration in grade nine according to the optional subject at the public school.

Secondary level: School level grade IX and X as Government of Nepal. It is also related to the class 9 and 10 of public school in Nepal. In this study we will be observed class 9 and 10 students at public school.

Public School : The school that supported by the Government of Nepal. Public schools are those schools. Which receive the government grant for the salary of teacher and other purpose. This type of school conducts with the rule and regulation of Ministry of Education of Nepal Government.

Student's achievement: Achievement is the stage of attainment by the students, generally expressed in terms of grade or scores. It is defined as performance of students in education tests based on scores. Student's achievement means the scores obtained by the students on the achievement test which is prepared by researcher himself.

Cause: 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, neighboring factors, student's own interest, school environment, content matter, subject teacher, peer groups etc.

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

Family background: The overall position education, job\occupation, economic and cultural position are termed as family background.

Mathematics: Optional mathematics is considered as mathematics. It is also known as an elective mathematics.

Optional mathematics Students: The student of grade nine who take mathematics as optional subject of Nepal recently learning in Kathmandu district of public school in the day of enumeration.

Optional subjects: The subject under optional one and optional second paper as prescribed by the recent secondary curriculum. a. Optional first paper: 1. Language 2. Humanities, social science 3. Optional mathematics. b. Optional second paper: Interdisciplinary subject prescribed by curriculum of the secondary level.

Subject Teacher: The term subject teacher is defined in the sense of a teacher who teaches optional mathematics at grade IX.

Chapter II

Review of Related Literature

A researcher must have deep knowledge of already established theories and researches, which closely resembles to the problem of study. The literature review helps the researcher to know the works carried out in the area of his research and helps to explore and appropriate research problem and procedures to carry out the research project. The related studies construct the knowledge of further study. There were different research studies were consulted related to low enrollment of students, and how they participate in mathematics; that helps researcher to forward the research and draw necessary conclusion.

Empirical Literature

Empirical Literature are those literatures which are authentic knowledge from research. This literature provides methodology and procedure in related topics.

Baral (2011) conducted the study entitled “Causes of failure in mathematics in SLC examination: A case study of school in Bharatpur Municipality of Chitwan district.” This was a case study related to the causes of failure in mathematics in SLC examination. The objectives of this study were to explore the main causes of failure in mathematics in SLC examination and to suggest for improvement in result by finding the programme that can be carried out in school level. It is a case study and qualitative in nature. This study was conducted with the sample of the students of SLC, 2066 chosen purposively according to the performance in supplementary examination 2066 of Shree Ramnagar Secondary School. Ramnagar – 1 Bharatpur, Chitwan. Direct interview with students, Head teacher, math teacher and parents were taken. Classroom observation was done regularly for five days. Thus, collected data were

analyzed according to the theoretical understanding in the study developed by the researcher. The major findings were as follows:

On the SLC examination of 2066, 17 students, out of 57 were failed in mathematics, the highest and lowest marks obtained in this exam were 74 and 15 respectively. The school had sufficient rooms, desks, benches and playground with playing materials. The school's library was not sufficient for study materials belonging to mathematics. Academically, the teachers of mathematics were trained but the teaching style were traditional that indicated the lack of trainings. The school was trying to reduce problem of mathematics failure by managing extra extra classes in the evening. The extra classes managed by school was not sufficient for students because of the large number of students in one class. The school has a big communication gap with the guardians.

Also, Subedi (2005) did a study on "Factors affecting failures in mathematics in SLC examination" with the objectives; to measure the effect of school and out of school contextual factors in mathematics achievement to determine the correlation between affecting factors and mathematics achievement. So, students were selected through the purposive sampling of eight schools in Sarlahi District. Questioners were applied to collect the data of this study. Mathematics achievement of failure students are strongly positive core-subjected with the school environment, effective classroom teaching and time variable which is significant. The teacher's behavior, peer's behavior, interest of learner and motivation with occupational goal are low positive correlate with the achievement of mathematics. School environment is an important causing agent on the failure's mathematics achievement.

Similarly, Koirala (2009) has done a study entitled "Major units causing higher failure rate in mathematics in the district level examination of class VIII" and

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

Similarly, Sapkota (2011) studies on 'cause of failure in mathematics at school' of a public school in Lalitpur district with the objectives 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.

From the above four researches, the researcher concluded that more students were failed in mathematics and optional mathematics. The reports of all thesis showed that the failure rate of students was high in mathematics. These researches could not give good conclusions. However, there is necessary to fulfill the gap of failure students and causes of low enrollment of students in optional mathematics. So, I choose this research to fulfill the gap of above researches.

Bohara (2011) concluded the study entitled “Mathematics Learning Environment in an Effective school (A Case Study in Rukum District)”. This case study attempt to describe the existing learning environment in this case school and analyze how school related factors affect students, betterment towards successful learning. This study was qualitative as well as descriptive in nature. Semi-structure face-to-face interview was taken with mathematics teacher, students, head teacher and parents. Observations and schools record and files were being used to collect primary data from school. The collected information were analyzed, using thematic categorization and interpreted according to principle of effective school. Ten students of grade X of case school and their parents, mathematics teacher and head teacher were selected.

The findings of this study show that learning environment is the most supportive factor for promoting mathematics learning in the school. Only the single intervention for mathematics learning environment can't give students' better toward their successful learning. Collaborative planning, functional organization, professional team of staff, better evaluation and best implementation toward learning environment only possible to make school effective. Good planning and best management of learning environment possible to make school effective.

Also, Dhewaju (2011) conducted the study entitled “A Study on factors influencing on the selection of optional mathematics at grade nine student of Kaski district: A case study of reading optional mathematics students in public secondary schools of pokhara valley of Kaski district.” The objectives of this study were to recognize the reasons influencing on the selection of optional mathematics in secondary level public schools and to find enrollment ratio in mathematics and non-mathematics students in secondary level of public schools of Kaski District. Data were composed from a case of 60 students from grade IX of public secondary schools of Pokhara valley of Kaski district among them 30 were optional mathematics students and 30 were other optional subjects’ students. Questionnaire form and five point Likert scale type of opinionnaire were administered as tool for the compilation. χ^2 -test was used to investigate the statistics from attitude scale. Interview to the head teacher and subject teachers of sampled school was performed by researcher .The result of the study revealed that there was small involvement on optional mathematics in public schools. A main discovery was the first choice of mathematics by students as of their family background and former accomplishment. The majority of students were not conscious for their advance profession. The support and back up of teacher, head teacher, parents was very little for preference of mathematics as optional subject.

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

significance difference between attitudes of urban and rural girls towards optional mathematics.

Similarly, 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 school of Parbat district percentage and χ^2 test were used to analyzed data by attitude scale and the data gained by interview and questionnaire related to the students background was analyze by qualities way.

This study concluded that the students choice of optional subject is by product of family background students self derive 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.

From the above only four researches, the researcher conclude that more students couldn't select or choose to read mathematics and optional mathematics .The reports of all thesis showed that there were different factors, causes and situation created which obstacle for the students to read mathematics and optional mathematics. These thesis could not give good methodologies. However, there is necessary to fulfill the gap of select or choose mathematics students and causes of low

enrollment of students in optional mathematics. So, I choose this research topic to fulfill the gap of above researches.

Neupane (2015) conducted the study entitled “Causes of low enrollment of girls in optional mathematics: A case study of girls students in Sindhupalchok district.” 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.

Also, Pandey (2007) conducted a research on topic “Factor influencing mathematics achievement (A case studies of ineffective secondary school of Kailai district)”. This case study was done in one of the secondary school of Kailali district only 20 students each from effective and ineffective school were chosen as sample. Interview schedule, observation, survey from and school documents were used as tools to collect data and information. This case study was focused on multiple factors and its influence on mathematics results. Personal and environmental factors such as gender, age, prior knowledge, attendance, motivation, study at home, parental support, quality of teacher, class size, student teacher interaction, physical and environment condition and school leadership were in consideration.

Similarly, Paudel (2005) did a study on “correlation study between beliefs and mathematics achievement of the student of grade IX. 118 students in grade nine were selected from the Gauri Shankar H.S.S. and Step by Step Secondary School at Pokhara in Kaski district. Questionnaire was applied as tools for data collection. The report showed that there is no significance difference between the public and private school student belief. The role of the teacher is to transmitting the mathematical knowledge students were less confidence in learning mathematics, no paper use of mathematics in the social context. Sex role theory shows that being biologically different boys or girls does not affect in mathematics achievement. According to this theory the different between boys and girls is created by our society and culture. They conduct the role of man according as biological differences. Society has believes that girls cannot have good mathematics achievement so it is better to take other non math subject as optional. Due to the lack of confidence, girls are weak in mathematics. Interest of reading mathematics in future blows away. So they are not motivated

towards mathematics subjected job. As a result they do not dare to take optional mathematics.

Similarly, Janwali (2007) studied on topic "Causes that affect mathematics achievement of girl`s students" determine the correlation between affecting factors and mathematical achievement. The researcher adopted the survey method in this study. The sample of the study was determined by convenience sampling from Rupandehi district. Researcher selected 25 sample students from different school of district situated in rural and urban area. In this study one set of questionnaire was developed and three point likert scale for the convinces of the respondent were developed for the collection of needed information which was used for students. The conclusion of this research work was effective classroom teaching such as planning environment, less use of instructional materials, appropriateness to teaching participation on discussion, activity have strongly positive effect on mathematics achievements of girl students. It conclude that the effective classroom teaching is very essential for increasing the mathematics achievement of girl`s students so it should be improved. The teacher behavior 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 girl students.

The above review reveals that there are some research concerning factor 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.

From the above only four researches, the researcher conclude that more students had low achievement in mathematics and optional mathematics .The data of

all these thesis showed that the level of achievement in mathematics was very low. These thesis could not give good delimitation and data interpretation. So, there is necessary to fulfill the gap of level of achievement of students and causes of low enrollment of students in optional mathematics.

However, there is no research in exact form has been carried out concerning to "Causes of low enrollment of students in optional mathematics at secondary level in Kathmandu district". Therefore, I choose this topic to full-fill the gap between above researches.

Theoretical Literature

The researcher introduced the theoretical discussion which are relevant for the interpretation of the study.

There are various learning theories related to children's learning and development. Some of them are Gestalt theory, The zone of proximal development, classical conditioning, operant conditioning, trial and error, social learning, social development, constructivism, cognitive learning, socio-cultural, multiple intelligence and so on.

The theoretical discussion is needed for the interactive finding of the study. Many theories about learning and development of children such as cognitive, behaviorist, humanist, social constructivism of which constructivism is one of the theories to analyze and interpret the data of mathematics of resolve the problem. To analysis and find the suitable solution in the area of low achievement in mathematics; construction becomes one the possible theory to solve the problem on the topic of "causes of Low achievement in mathematics students". Every student learns from social contact with home family and universe. According to them, knowledge can be constructed from society. This kind of thoughts can be given by constructivism.

Constructivism

Constructivism is related to educational theory to deal with the problem of mathematics. It helps to find out the problem of low achievement in mathematics. It is the theory based on observation and scientific study to deal the problem of learning. It assert on forming the understanding and knowledge of the word through experience things. When we encourage something our mind perceives the things and reconcile with pre exist idea. It means our mind becomes active creator to reach and act with present surrounding In the similar way constructivist idea of learning can point towards number of different teaching practice. It encourage the student to involve themselves activity and used technique of learner centered, group work discussion, learning by doing, use outside tools to be more practical and gain high achievement I mathematics rather than classroom it focus on real to be life learning environment, social interaction and use of complex ideas share with outside of classroom easily. Constructivism transforms the students from passive receipting o information to active participation in teaching process. Constructivism based on their axioms that are as follows Learners gain knowledge from their active participation .Learners gain knowledge while reflecting on their own action. Learners gain knowledge when they try to convey their solution to others.

From above axioms upadhyay (2001) took their teams action, reflection and scaffolding to describe three board aspects off constructivism, psychological aspect, philosophical aspect and sociological aspect. Piaget stresses on the key word "action " through which he advocated that knowledge is gained. He said that essential way of knowledge is not directly through our sense but primarily through our action. Philosophical aspect of constructivism is also called radical constructivism which is

led by Glaserfeld who advocate as social constructivism led by vygotsky who states that knowledge is socially constructed.

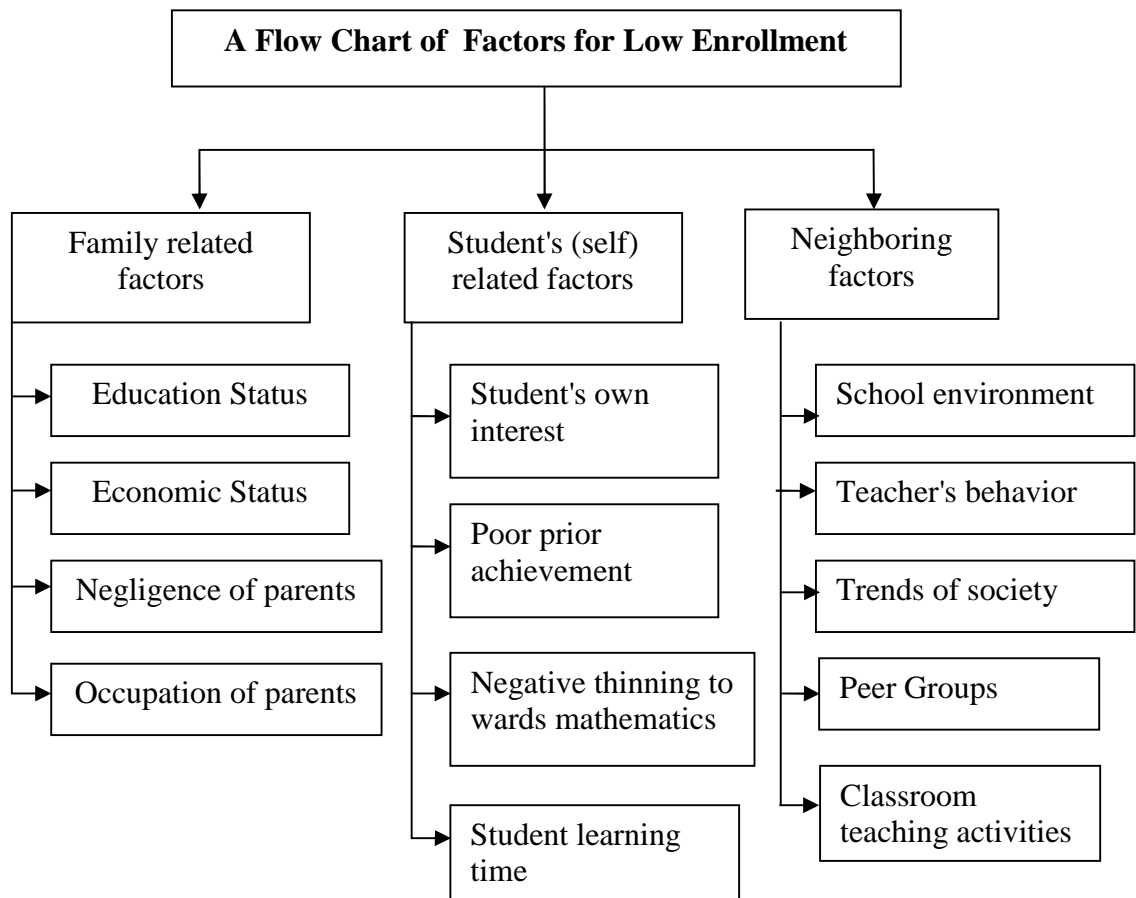
Thus we see that there are many variables which affect the result of the in mathematics from the review of some international literature. the variable is aren't fixed which influences of the achievement of student in mathematics.

Barites and Akdemir (2009) identified the following variable which directly effect the mathematics achievement of the student such as socio economic status, parent's education, Instructional factor, instructional strategies and method, teacher school context and facilities individual factors arithmetic ability, motivation and concentration. But other researcher focuses on other variables. So these variables aren't fixed which effects the result of the student in mathematics.

Conceptual Understanding of the Study

This study primarily concerns with the question that causes influence the low enrollment of 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 enrollment of students in optional mathematics at secondary level



Source: Neupane S.R. (2015)

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 of parents, economical status of parents, negligence of parents and occupation/job of parents .Generally, student doesn't choose optional mathematics by their own interests, poor prior achievement, negative thinking towards mathematics and student's learning time period . 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, peer groups and classroom teaching activities, these factors are taken as neighbouring factors. Finally the research concludes that the students low enrollment 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 enrollment of students in optional mathematics. It is concluded that the economical status of parents, student's own interest, peer groups is very highly essential for low enrollment of students in optional mathematics. Also, occupation/job of parents, student's learning time period, Negative attitude of society or trends of society towards mathematics is less essential for low enrollment of students in optional mathematics.

Chapter-III

Methods And Procedures

This chapter presents the procedure carried out to achieve the objectives of the study. It provides a way to research about how to conduct the research systematically. In this chapter researcher discusses the various aspect of the study like populations of the study, sample of the study, tools for data collection, data collection procedure and data analysis procedure etc.

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. The design of this study was a survey design concerning with both primary and secondary data in public school of Kathmandu district. This was the quantitative and qualitative research as well as descriptive in nature.

Population of the Study

The population of study was chosen from public secondary schools situated in Kathmandu district. It was 2016/2017 academic year. All total, there are 284 public schools running in Kathmandu district. Among them the secondary schools' number is 157 and the basic level's school number is 127. Out of 157 secondary schools ,the researcher had randomly selected only ten schools. From those schools, ten head teachers and ten subject teachers (who were teaching optional mathematics) for holding interview. Likewise, Thirty optional mathematics learnt students and thirty other optional subject learnt students were selected as sample. Then the questionnaires had distributed on them.

Sample of the study

There are 1360 secondary and basic level public and private schools running in Kathmandu district. Among them, 182 are public secondary schools. Out of 182 schools, only 157 secondary school had already participated in SEE. The researcher had only selected ten public secondary schools as his sample using stratified random sampling. The researcher had selected thirty optional mathematics learning students and other thirty students who were taken other optional subjects and the all students were from grade IX. The optional mathematics subject teachers and head teachers were taken from each sample school as the respondent to conduct the interview. The list of schools which were selected as a sample of study is as following:

A list of the sample schools of this study

S.N.	Name of School	Number of Students		Total
		Opt. mathematics	Other opt. subjects	Students
1.	Bagh Bhairav Secondary school Champadevi, Kirtipur	5	10	15
2.	Bal Kumari Secondary school Sarangkhel, Kirtipur	5	24	29
3.	Naranjan Secondary school, Machchhegaun	5	25	30
4.	Jansewa Secondary school, Panga, Kirtipur	23	21	44
5.	Adhinath Secondary school, Chovar, Kirtipur	5	18	23
6.	Biswarastriya Secondary school, Dhalpa, Kirtipur	5	18	23
7.	Kirtipur Secondary school, Kirtipur	3	14	17
8.	Mangal Secondary school, Kirtipur	40	38	78
9.	Janpath Secondary school, Kalanki	5	54	59
10.	Prabhat Secondary school, Naghal	12	18	30

Tools/Instrument for Data Collection

The researcher used three types of instruments in this study; Questionnaire, interview and the administrative records of the students.

Questionnaire

The researcher had designed two sets of questionnaire for the optional mathematics learnt students and other optional subjects learnt students separately. The questionnaire was developed into two parts. The first part was the information about optional subject and it was asked to all the students who were learnt optional mathematics and other optional subjects. The first part had covered five different questions. Those questions had hoped to collect the reasons of selecting their optional subjects differently. Similarly, the second part of the questionnaire had included eight questions in both sets. The first set is designed to identify the students' attitude towards enrollment of optional mathematics and level of its achievement in secondary level. Likewise, the second set is designed to identify the students' attitude towards enrollment in optional mathematics and its achievement.

Interview schedule

The researcher had designed an interview schedule and began to carry out the interview with the students. At first the researcher asked them what were their feelings about mathematics. Similarly, he asked them how did the teachers behave while teaching mathematics in the classroom. Did the teachers and students be regular in the classroom or not? Likewise, he asked them if the teacher supported in their poor performance in the class or not. How was their home environment especially for doing homework (task) ? Did their parents help while doing homework? Could they get a lot of time to learn mathematics at their home? In the same way, the researcher asked them a lot of questions to know about the teaching learning activities; mainly its

approaches methods and techniques and its classroom response and evaluation system too. Likewise, the researcher questioned terms what the school or classroom environment was while learning it, was the relationship between teachers and students good or not? etc.

Similarly, the researcher had designed an interview schedule and began to carry out the interview with the teachers who used to teach optional mathematics. The researcher asked them if they were trained or not. what was their relationship with students and their parents in the school and out of school while teaching? Similarly, the researcher asked them (the teachers) how the students' parents academic qualification, economical status, behavior and home environment were seen while teaching them (students). Likewise , he asked them (teachers) how did they manage the class in course of teaching. Especially, classroom space placement of blackboard, benches and desks, sitting of boys and girls students in the classroom, classroom environment and so on. Similarly, the researcher also asked them whether they used teaching learning materials or not while teaching. If they had used the materials then what types of materials could they have used. Likewise, he asked them what kinds of teaching learning approaches, methods, techniques or activities did they use while teaching in the classroom. Similarly, the researcher asked them, “how did they supervise the class and what kind of evaluation techniques did they use for evaluating them?” In the same way, the researcher asked them,” how did they check their homework on a week?” Similarly, the researcher asked them , “did they support the poor students or not?” “what kinds of strategies did they implement for improving the weak students' achievement level?” and so on.

The researcher had designed an interview schedule and began to carry out the interview with the head teachers based on the following aspects;

The researcher asked them what their views were about the optional mathematics. Similarly he asked them what sort of socio-economic backgrounded students admitted in the optional mathematics class. The researcher asked them ,”what were the causes of low students’ achievement on optional mathematics?” “what types of facilities did you provide the optional mathematics students in your school?” “what was the relationship between you and optional mathematics teacher? Or between you and other staff, you and guardians?” “did you think any policy or plan to improve the quality of optional mathematics and improve the level poor students?” likewise, the researcher asked them how the classroom management was while teaching. He asked them, “how was the role of management committee?” “what was the teacher training condition? Similarly, he asked them, “were they going to change to something in their schools about the optional mathematics?” “how did they manage the funds in their schools?”. Finally, the researcher asked them ,”how was their leadership in their school? “were they satisfied with their leadership or not?” and so on.

Administration Record

The administrative record such as student's enrollment on optional subject at grade nine of this academic year, mark ledger of second terminal examination result of students in optional mathematics, gender and other related documents were collected from each sampled schools.

Reliability and Validity of Tools

The reliability and validity of tools was established by its approval from subject expert and supervisor with some alternate and addition of the statements. For the validity of the result, the researcher will attempt to analyze finding on the basic of Questionnaire, interview, Administration record and mark ledger of Second terminal examination of grade nine results.

Data Collection Procedures

The researcher was 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 administering of questionnaire to the students and registered for mark ledger of second terminal examination of academic year 2073.

Researcher distributed the student questionnaire form to the students then explained and clarify if any confusion in any questionnaire and multiple choice answer. Researcher distributed questionnaire set- I for the optional mathematics students and questionnaire set- II to other optional subject students. Finally the researcher was requested them to rectum back that day after choosing up the best answer and own view of questionnaire form completely. Researcher was collected the complete answer of questionnaire forms that day. The secondary data students enrollment according to optional subjects in different public school of academic year 2016/2017 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 was written the main points on the paper which would tell by the teacher and head teacher in the duration of interview.

Procedure of Data Analysis and Interpretation

The collected data through questionnaire interview and schools administrative records was categorized and analyzed according to their themes. First of all to show the level of achievement of boys and girls students in optional mathematics at secondary level by taking Second Terminal examination of academic year 2016/ 2017 result from sample schools in Kathmandu district the mean and standard deviation table was developed and . Z-score test were used for analysis of data in the test statistics. Similarly, to show the current enrollment of the students in optional

mathematics at secondary level the percentage table was developed and describe according to the students participation and affecting different family related, student's related and neighboring factors. The descriptive analysis was done for qualitative data from the questionnaire and interview through successively. The researcher taking a wide angle lens to gather data and then by shifting, sorting, reviewing and reflecting on them summarized and concluded for the further study.

Chapter - IV

Analysis And Interpretation of Data

The collected data from different tools were analyzed and interpreted to find out the causes which affected 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 the help of different tools. It has already been mentioned that there were two sets of questionnaire . Set-1 for optional mathematics students and set-2 for non optional mathematics students were distributed. The data collected from the informants were analyzed and interpreted to identify the effect of family related factors, student (self) related and neighboring related factors which affect the optional mathematics achievement of students and to determine the mean and , standard deviation between affecting factors and optional mathematics achievement. It has already mentioned that there was one set of questionnaire written in statement form with four alternatives. Other set of questionnaire were given for find causes low enrollment of students in optional mathematics for non optional mathematics students. The collected data were tabulated and analyzed for attainment of objectives.

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 society 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:

-) The level of achievement of boys and girls students in optional mathematics.
-) The enrollment of students in optional mathematics in public school.

Mean and Standard Deviation of optional Mathematics Achievement of Students according to Sample school

The mean and standard deviation of the optional mathematics achievement score in grade nine of second terminal obtained by the boys & girls students is given to the following table:

Table No. 2

Mean and Standard deviation of optional Mathematics achievement of Students of sample schools

Compared group	No. of Students	Mean	Standard Deviation	Z-score	Remarks
boys	63	48.76	21.12	1.95340	1.95340 < 1.96
girls	45	40.46	22.22		
Total	108	45.30	21.97		

Since $1.95340 < 1.96$ i.e. calculated value of z is less than tabulated value of z.

So, we accept null hypothesis H_0 , means that we reject the alternative hypothesis H_1 .

Hence, we conclude that at 0.05 level of significance, there is not significance difference in the achievement of two groups of boys and girls. It means that the achievement of boys and girls is probably same.

Table No. 2 shows that the number of sampled students of boys and girls was 63 and 45 respectively. The mean score of boys and girls of the public schools were 48.76 and 40.46 respectively. The standard deviation of the boys and girls calculated by mean score is 21.12 and 22.22 respectively. The Z-value calculated by mean and standard deviation is 1.95340. Since, the calculated Z-value is smaller than the tabulated Z-value 1.96, the difference in mean value is found to be 8.30 at 0.05 level.

It indicates that there is no difference between the public school boys and girls in mathematics achievement. Hence, the null hypothesis in optional mathematics achievement is accepted.

Factors Affecting Low Enrollment of Students

Different factors affecting of low enrollment of students in optional mathematics at secondary level at public school. Mainly, affecting factors low enrollment of students in optional mathematics at secondary level are as follows:

Family Related Factors

Family Related Factors play the vital role to the enrollment of the students in optional mathematics at secondary level of public school. From the questionnaire report; the factor related to family for affecting enrollment of students are given in the following table :

Family Related Factors	Optional mathematics students	Other optional subjects students	Total	Percentage
Educational status of parents	4	9	13	21.67%
Economic status of parents	10	10	20	33.33%
Negligence of parents	7	8	15	25.00%
Occupation of the parents/ others	9	3	12	20.00%
Grand Total	30	30	60	100.00%

Parents education is one of the aspect of family related factor which influence the enrollment of the children. According to the report from questionnaire, out of sixty students, 21.67% students answered that educational status of parents influences the enrollment of students.

“My parents are illiterate, so I have difficult to do my homework.” (Students)

“Parents education helps continuous attend children in school.” (Teachers)

“Enrollment of literate parents children is low in public school.” (Head teachers)

From the above responses we see that the literate parents help their children but the illiterate ones simply fulfill their duties by sending their children to school. Finally we can say that the parents education can be an added asset to improve the students achievement level.

Parents economic status is one of the other aspect of family related factor which influence the enrollment of the children. According to the above report from questionnaire, out of sixty students, 33.33% students answered that economic status of parents influences the enrollment of students.

“My parents economic condition is poor, so I help my parents in daily kitchen work.” (Students)

“Poor Students don’t their homework due to lack of necessary stationary materials.”(Teachers)

“The enrollment of low economic children is high in public school, so we can’t improve their achievement.” (Head teachers)

From the above responses we see that the economically better parents help their children but the economically poor ones simply fulfill their duties by sending their children to school. Finally we can say that the parents economic condition can be an added asset to improve the students achievement level.

Negligence of Parents is one of the other aspect of family related factor which influence the enrollment of the children. According to the report from questionnaire,

out of sixty students, 25% students answered that negligence of parents influences the enrollment of students.

“My parents are so busy, that’s why they can’t help in my study.” (Students)

“Parents don’t come school while inviting them to discuss about their children.” (Teachers)

“Parents don’t come school while inviting them in important meeting from school.” (Head teacher)

From the above responses we see that the parents of the students is not serious for their children future. So, negligence of parents influences the enrollment of students.

Occupation/other factors of Parents is one of the other aspect of family related factor which influence the enrollment of the children. According to the report from questionnaire, out of sixty students, 20% students answered that other factors of parents influences the enrollment of students.

“My parents are labour, that’s why they can’t help in my study.” (Students)

“Government job holder’s children is continuous as comparison to other occupational children,” (Teachers)

“The enrollment of job holder children is low but the level of achievement is high.” (Head teacher)

From the above responses we see that the occupation, other family related factors influences enrollment of students in optional mathematics.

Student’s (self) Related factor

Student’s (self) Related Factors play the vital role to the enrollment of the students in optional mathematics at secondary level of public school. From the questionnaire reports; the factor related Student’s for affecting the low enrollment of the students in optional mathematics are given in the following table:

Student's Related factors	Optional mathematics Students	Other Optional subjects Students	Total	Percentage
Student's own interest	14	19	33	55.00%
Poor prior achievement	2	5	07	11.67%
Negative thinking towards mathematics	12	5	17	28.33%
Student's learning time	2	1	03	5.00%
Grand Total	30	30	60	100.00%

Student's own interest is one of the aspect of student related factor which influence the enrollment of the children. Mathematics is one of the important subject in school curriculum. It is very difficult subject then other subject. So students are afraid from mathematics. Most of the students are interested to study Nepali and other subjects without mathematics. According to the report from questionnaire, out of sixty students, 55% students answered that student's own interest influences the enrollment of students.

"I have no interest in mathematics." (Students)

"Foundation of mathematics is very poor." (Teachers)

"The mathematics achievement of our school's students is not satisfactory, so the low enrollment of students in optional mathematics." (Head teachers)

From the above responses we see that students interest is great thing to improve enrollment of students and achievement of students in optional mathematics.

Poor prior achievement is one of the aspect of student related factor which influence the enrollment of the children. According to the report from questionnaire, out of sixty students, 11.67% students answered that student's Poor prior achievement influences the enrollment of students.

"It is the continuity of the previous years." (Head Teacher)

"The achievement of students in mathematics is very low". (Math Teacher)

"We usually fail in mathematics because it is hard." (Students)

"I got an accident last year, after then I failed." (Students)

From the above responses we see that students base is weak in mathematics. Optional mathematics is a kind of mathematics. So, we can see in public school low number of enrollment in optional mathematics.

Negative thinking towards mathematics is one of the aspect of student related factor which influence the enrollment of the children. According to the report from questionnaire, out of sixty students, 28.33% students answered that negative thinking towards mathematics influences the enrollment of students.

"We usually get confuse in exam, so fail the exam". (Students)

"It is not a big matter because we usually fail in mathematics." (Students)

"Mathematics is very hard so I don't study" (Students)

"Mathematics is not hard subject but our society is made so hard." (Teacher)

"Negative thinking about mathematics is more seen in our society." (Head Teacher)

From the above responses we see that students parents is not conscious for their children future. So, in our society, negative thinking about mathematics is daily growth. Therefore, it impact the enrollment of students in optional mathematics.

Student's learning time is one of the aspect of student related factor which influence the enrollment of the children. Because of different causes, student can't learn properly full time. According to the above report from questionnaire, out of sixty students, only 5% students answered that Student's learning time influences the enrollment of students.

"I don't like to discuss about mathematical problem in classroom because I am very weak in mathematics. I do not have enough time in my home for mathematics practice. I should do various work in my home such as carrying water, cutting grass etc." (Student)

"More students are the children of labour, because of their family problem they don't learn daily classroom." (Teacher)

"Our students involve in different work in house." (Head Teacher)

From the above responses we see that students can't manage time to their study. Mostly students spent their time in different family related work. On the other hand, mathematics is one practice subject. So lack of time and work load at house is main reasons of low mathematics achievement for students. Therefore, low number of students enrollment is seen in mathematics.

Neighboring factor

Neighboring Factor play the vital role to the enrollment of the students in optional mathematics at secondary level of public school. From the questionnaire reports; the neighboring factors affecting for enrollment of students are given below:

Neighboring factors	Optional mathematics students	Other optional subjects students	Total	Percentage
School environment	6	8	14	23.33%
Teacher's behavior	13	4	17	28.33%
Trend's of society	2	8	10	16.67%
Peer's group	9	10	19	31.67%
Grand Total	30	30	60	100.00%

School environment is one of the aspect of neighboring factor which influence the enrollment of the children. School environment first influences the new comer students. According to the report from questionnaire, out of sixty students, only

23.33% students answered that school environment influences the enrollment of students.

“Our school environment is peace.” (student)

“Our teacher is regular in school, they teach us by learning our child psychology.” (Student)

“Our school environment is attractive, we do more remaining in school.”
(Head Teacher)

“ We can’t conduct school in Nepal Banda.” (Head Teacher)

From the above responses we conclude that school environment is most powerful weapon which attracts the children. School is a beautiful temple of education. School environment influences in mind of child. So, school environment influences the enrollment of students.

Teacher’s behavior is one of the aspect of neighboring factor which influence the enrollment of the children. Good teacher products good children. Teacher’s behavior is nearly impact the child psychology. According to the report from questionnaire, out of sixty students, 28.33% students answered that teacher’s behavior influences the enrollment of students.

“We are afraid from our mathematics teacher.” (Students)

“Mathematics teacher teaches us practically.” (Students)

“Minor mathematical concept is not provided to students, so the base of mathematics students is weak. That’s why they don’t choose optional mathematics.” (Teacher)

“Our mathematics teacher could work hard but the result of mathematics is not satisfactory, mostly students fail in mathematics.” (Head Teacher)

From the above responses the researcher conclude that the attachment of teacher and student must be near. Then the enrollment of student and the level of achievement is improved, otherwise public school couldn't success.

Trend's of society is one of the aspect of neighboring factor which influence the enrollment of the children. Our society makes mathematics is hard subject. School is a mini society. So its direct impact to the society. School environment is suffered by outer surroundings. According to the report from questionnaire, out of sixty students, only 16.67% students answered that trend's of society influences the enrollment of students.

“our course content of mathematics is not practicable, focused on problem solving, so can't interest in it.” (Students)

“Our mathematics course could not attempt the our social problems.”

(Teacher)

“ Social problem and mathematics could not connected.” (Head Teacher)

From the above responses the researcher conclude that the society is a major part of learning. The relation between society and school must be near. Mathematics connected the social problem, if not we can't improve it. So, trend's of society influences the enrollment of students.

Peer's group is one of the aspect of neighboring factor which influence the enrollment of the children. Children can spend more times with their peer's group. According to the report from questionnaire, out of sixty students, nine students who had taken optional mathematics and ten students who had taken other optional mathematics answered that peer's group influences the enrollment of students. "How does the peer group affect in their education?" The answer to this question was as follows.

“ We choose optional mathematics as a co-operation in our friends.”

(students)

"They choose optional subjects under the influence of their friends". (Head

Teacher)

"The students in a group choose the same subject as optional". (Teacher)

"The influence of "Peer group" plays a vital role in choosing the optional subjects". (Teacher)

All the respondent researchers agree that children are influence by the decision of their peer groups especially in choosing optional subject in grade IX. they choose the same subject as their peers choose. If the peer's behavior is co- operative then its brings improvement in the performance of mathematics. But if the peer's behavior is not co-operative it decreases the achievement in mathematics.

Classroom teaching activities is one of the aspect of neighboring factor which influence the enrollment of the children. Students mostly learn from their classroom teaching activities.

“There are different instructional materials for mathematics but not sufficient in optional mathematics.” (students)

“we would try to make effective mathematics classroom but no success yet.”

(Teacher)

“We provide the mark sheet of student to their parents. Also we inform them about their children’s performance in mathematics. If they failed in mathematics, we advice them admit their children in extra coaching class provided by school in minimum cost. Also the fifty percentage of the fee is barred from school administration.” (Head teacher)

“The school provides the extra coaching class for low performer students if their parents request and inform to the school administration.” (Teacher’s view)

“The teacher generally gives equal emphasis to all students in classroom for mathematics teaching. The teacher emphasis to the low performer and suggest personally to learn mathematics. Teacher gives more questions for practice if we face problem in mathematics learning.” (Student’s view)

From the above responses the researcher conclude that the classroom teaching activities including teaching materials, students' participation in discussion and pleasing environment. Teacher emphasis equally to all students. He encourages the low performer suggesting him personally. He also made such student practice more in classroom by giving extra additional questions. If the classroom teaching is not affective, it decreases the level of achievement and enrollment of all students in mathematics.

This research tries to test the questionnaire and interview to find the causes of low achievement of students in mathematics. Economic status of parents, student’s interest, peer group, educational status of parents are strongly correlated with enrollment. These factors also affected the achievement of students. If school environment is suitable for teaching learning activities, then students achievement also high. On the other side interest of learner, family background, peer’s behavior, teacher behavior also directly proportional to the achievement of students. Mostly students were enrollment in optional mathematics to get high marks in SEE, to further study science, to get job early and to make doctor, engineer . someone says “ there is no option to choose other optional subject in my school, so we must read optional mathematics. on the other hand, other optional subject students were not

selected optional math by getting low marks in mathematics from previous years, no interested in mathematics, poor economic condition. The above factors and causes gives the result low achievement and enrollments in optional mathematics.

Finally from the response of interview to the subject teacher most of them claimed that “We provide equal opportunity for every student to select their optional 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 neighboring 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 neighboring 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 neighboring factors are responsible to the low enrollment of students in optional mathematics and high enrollment of students in other optional subject .

Chapter V

Findings, Conclusions And Recommendations

This chapter concerns with the summary, findings, conclusion and recommendations. After analysis and interpretation of the data, information, 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

Mathematics is taught at every level of our formal education which takes an important place in our curriculum. But most of the students fail in this subject. The purpose of the study was to find out the students' enrollment in optional mathematics of public school in Kathmandu district. The objectives of the study were :

-) To find out the level of achievement of students in optional mathematics
-) To find the causes that brings low enrollment in optional mathematics of public schools.

This study was in 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 Kathmandu district. The student`s questionnaire form consists 13 questions, out of them 5 was general information about optional subjects and 8 was related to family , students and neighboring factor related and causes of low enrollment in optional mathematics focused questions. 60 students (30 taken from optional mathematics and 30 taken from other optional subject), 10 head teachers and 10 optional mathematic subject teachers of 10 public secondary school of Kathmandu district were taken as sample of the study. The researcher developed the students Questionnaire from and interview schedule to teacher and head teacher with the help of previous studies and thesis supervisor.

The students Questionnaire form consist attitude scale on the enrollment of students in optional subject at secondary level. From the result of questionnaire and inter views the researcher compared enrollment of optional mathematics and enrollment of other optional subject. Z- score test were used to analyze the data by taking second terminal examination marks obtained by optional mathematics students of grade IX at public school in Kathmandu district.

Findings

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

-) The mean score of optional mathematics achievements of boys students is better than that of girls students in public schools.
-) Achievements score of students in optional mathematics are strongly positively related with the educational status of parents, interest of students and peer's group behavior which are significant.
-) The occupation of parents, time variable and trends of society have low positively related with optional mathematics achievements of students.
-) The enrollment of students in optional mathematics students are strongly positively related with school environment, interest of learner and economic status of parents which are significant.
-) Time of the learner, occupation of parents and trends of society have low positively related with the enrollment of students in optional mathematics students.
-) To find the level of achievement of boys and girls in optional mathematics we analyze data by using Z-score test in statistics .Since $1.95340 < 1.96$ i.e. calculated value of z is less than tabulated value of z. So, we accept hull

hypothesis H_0 , means that we reject the alternative hypothesis H_1 . Hence, we conclude that at 0.05 level of significance, there is not significance difference in the achievement of two groups of boys and girls. It means that the achievement of boys and girls is probably same.

-) Low enrollment of students in optional mathematics is a function of educational status of family, job, occupation or economic status of family. Negligence of parents, public schools student's duty on household work, students own interest, poor prior achievement in optional mathematics, negative thinking towards optional mathematics, teacher's behaviour, school environment and social and peer group Influence. On which students own interest, school's environment, teacher's behaviour, peers group, negative thinking towards optional mathematics and educational and economical status of family played vital role on there low enrollment in optional mathematic.
-) Most of the students had not taken optional mathematic because of their bad performance in prior grade, negligence of parents 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 link with job and occupation, so they don't enroll in optional mathematics.
-) It is found that there is no programme launched by school to favour on optional mathematics. Teacher's role is not satisfactory in the sense of proper guidance and counselling.
-) 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 friend not to choose optional mathematics.

Conclusions

Mathematics is one of the most important subjects offered at secondary level. The performance of students in mathematics is very poor. From the above findings it is concluded that the students low enrollment in optional mathematics is a by product of family related and neighboring factors. Concern with peer influences, social influences, school environment such as school administration, teacher's behavior in classroom teaching activities 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 programme 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 basic and 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 programme should be launched nationally. Peer group influence such as by co-operative 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.

Recommendations for Further Study

The conclusion of this study cannot be generalized to all schools to all area of Nepal 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 programme is needed for students at school level. Researcher should be focused to the enrollment of students in optional mathematics.

-) Exhibition programme of mathematics should be conducted among local schools in different time period by students, teacher and expert of mathematics. The role of students should be more active to learn.
-) This study was done in public school of Kathmandu 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 programme 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.
-) Researches can be done in higher secondary (10+2) level and college levels in same field It is suggested to involve the teachers, parents, headmaster and educational planners to identify the factors which affect the mathematics achievement of students and their minimization or elimination technique as far as possible.
-) Topic has to be related with the same for further researches.

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APPENDICES

APPENDIX – I

A list of the sample schools of this study

S.N.	Name of School	Number of Students		Total
		Opt. mathematics	Other opt. subjects	Students
1.	Bagh Bhairav Secondary school Champadevi, Kirtipur	5	10	15
2.	Bal Kumari Secondary school Sarangkhel, Kirtipur	5	24	29
3.	Naranjan Secondary school, Machchhegaun	5	25	30
4.	Jansewa Secondary school, Panga , Kirtipur	23	21	44
5.	Adhinath Secondary school, Chovar, Kirtipur	5	18	23
6.	Biswarastriya Secondary school, Dhalpa, Kirtipur	5	18	23
7.	Kirtipur Secondary school, Kirtipur	3	14	17
8.	Mangal Secondary school, Kirtipur	40	38	78
9.	Janpath Secondary school, Kalanki	5	54	59
10.	Prabhat Secondary school, Naghal	12	18	30
Grand total		108	240	348

Number of students taken optional mathematics=108=31.05%

Number of students taken other optional subjects=240=68.95%

Appendix-2

A list of the sample schools of this study

S.N.	Name of School	Number of Students studying optional mathematics		Total
		No. of Boys	No. of Girls	
1.	Bagh Bhairav Secondary school Champadevi, Kirtipur	1	4	5
2.	Bal Kumari Secondary school Sarangkhel, Kirtipur	5	0	5
3.	Naranjan Secondary school, Machchhegaun	4	1	5
4.	Jansewa Secondary school, Panga , Kirtipur	6	17	23
5.	Adhinath Secondary school, Chovar, Kirtipur	2	3	5
6.	Biswarastriya Secondary school, Dhalpa, Kirtipur	5	0	5
7.	Kirtipur Secondary school, Kirtipur	3	0	3
8.	Mangal Secondary school, Kirtipur	30	10	40
9.	Janpath Secondary school, Kalanki	4	1	5
10.	Prabhat Secondary school, Naghal	3	9	12
Grand Total		63	45	108

Number of boys students taken optional mathematics=63=58.33%

Number of girls students taken optional mathematics=45=41.64%

Appendix-3

Achievement level

Name of school :Second terminal examination Grade: IX

Students	Achievement in Opt. Math (in second term)	Gender B for boy & G for girl
1	32	B
2	57	G
3	40	G
4	33	G
5	33	G
6	60	B
7	40	B
8	45	B
9	53	B
10	34	B
11	90	B
12	70	B
13	75	B
14	65	B
15	56	G
16	62	B
17	58	B
18	61	G
20	55	G
21	52	G
22	54	B
23	69	B
24	59	B
25	65	B
26	58	B
27	45	B
28	33	B

29	72	B
30	57	B
31	73	B
32	69	B
33	14	B
34	39	B
35	26	B
36	07	B
37	82	B
38	76	B
39	47	B
40	76	B
41	18	B
42	31	B
43	24	B
44	56	B
45	56	B
46	36	B
47	21	B
48	86	B
49	25	B
50	40	B
51	87	G
52	47	G
53	32	G
54	94	G
55	94	G
56	75	G
57	29	G
58	66	G
59	61	G
60	31	G

61	43	B
62	39	B
63	13	B
64	15	B
65	65	G
66	13	G
67	24	G
68	15	G
69	32	G
70	29	G
71	23	G
72	21	G
73	21	G
74	21	G
75	26	G
76	09	G
77	37	B
78	41	B
79	23	B
80	62	B
81	61	B
82	56	B
83	48	B
84	51	B
85	66	G
86	70	B
87	73	B
88	69	B
89	44	B
90	32	B
91	63	B
92	62	B

93	37	G
94	42	G
95	61	G
96	71	G
97	26	G
98	27	G
99	36	G
100	23	G
101	64	B
102	03	B
103	05	B
104	28	G
105	12	G
106	11	G
107	29	G
108	21	G

Appendix - 4

Achievement of Boys on optional mathematics in public school

Obtained marks (x)	No. of Students (f)	fx	$d=x-x_{\bar{x}}$	d^2	fd	fd^2
03	1	3	-45.76	2093.9776	-45.76	2093.9776
05	1	5	-43.76	1914.9376	-43.76	1914.9376
07	1	7	-41.76	1743.8976	-41.76	1743.8976
13	1	13	-35.76	1278.7776	-35.76	1278.7776
14	1	14	-34.76	1208.2576	-34.76	1208.2576
15	1	15	-33.76	1139.7376	-33.76	1139.7376
18	1	18	-30.76	946.1776	-30.76	946.1776
21	1	21	-27.76	770.6176	-27.76	770.6176
23	1	23	-25.76	663.5776	-25.76	663.5776
24	1	24	-24.76	613.0576	-24.76	613.0576
25	1	25	-23.76	564.5376	-23.76	564.5376
26	1	26	-22.76	518.0176	-22.76	518.0176
31	1	31	-17.76	315.4176	-17.76	315.4176
32	2	64	-16.76	280.8976	-33.52	561.7952
33	1	33	-15.76	248.3776	-15.76	248.3776
34	1	34	-14.76	217.8576	-14.76	217.8576
36	1	36	-12.76	162.8176	-12.76	162.8176
37	1	37	-11.76	138.2976	-11.76	138.2976
39	2	78	-9.76	95.2576	-19.52	190.5152
40	2	80	-8.76	76.7376	-17.52	153.4752
41	1	41	-7.76	60.2176	-7.76	60.2176
43	1	43	-5.76	33.1776	-5.76	33.1776
44	1	44	-4.76	22.6576	-4.76	22.6576
45	2	90	-3.76	14.1376	-7.52	28.2752
47	1	47	-1.76	3.0976	-1.76	3.0976
48	1	48	-0.76	0.5776	-0.76	0.5776
51	1	51	2.24	5.0176	2.24	5.0176

53	1	53	4.24	17.9776	4.24	17.9776
54	1	54	5.24	27.4576	5.24	27.4576
56	3	168	7.24	52.4176	21.72	157.2528
57	1	57	8.24	67.8976	8.24	67.8976
58	2	116	9.24	85.3776	18.48	170.7552
59	1	59	10.24	104.8576	10.24	104.8576
60	1	60	11.24	126.3376	11.24	126.3376
61	1	61	12.24	149.8176	12.24	149.8176
62	3	186	13.24	175.2976	39.72	525.8928
63	1	63	14.24	202.7776	14.24	202.7776
64	1	64	15.24	232.2576	15.24	232.2576
65	2	130	16.24	263.7376	32.48	527.4752
69	3	207	20.24	409.6576	60.72	1228.9728
70	2	140	21.24	451.1376	42.48	902.2752
72	1	72	23.24	540.0976	23.24	540.0976
73	2	146	24.24	587.5776	48.48	1175.1552
75	1	75	26.24	688.5376	26.24	688.5376
76	2	152	27.24	742.0176	54.48	1484.0352
82	1	82	33.24	1104.8976	33.24	1104.8976
86	1	86	37.24	1386.8176	37.24	1386.8176
90	1	90	41.24	1700.7376	41.24	1700.7376
	N=63	fx=3,072			fd=0.12	fd ² =28119.4288

$$\text{Mean } (\bar{X}) = \frac{fX}{N} = \frac{3072}{63} = 48.76$$

Achievement of girls on optional mathematics in public school

Obtained marks (x)	No. of Students (f)	fx	d=x-x-	d ²	fd	fd ²
9	1	9	-31.46	989.7316	-31.46	989.7316
11	1	11	-29.46	867.8916	-29.46	867.8916
12	1	12	-28.46	809.9716	-28.46	809.9716
13	1	13	-27.46	754.0516	-27.46	754.0516
15	1	15	-25.46	648.2116	-25.46	648.2116
21	4	63	-19.46	378.6916	-77.84	1514.7664
23	2	46	-17.46	304.8516	-34.92	609.7032
24	1	24	-16.46	270.9316	-16.46	270.9316
26	2	52	-14.46	209.0916	-28.92	418.1832
27	1	27	-13.46	181.1716	-13.46	181.1716
28	1	28	-12.46	155.2516	-12.46	155.2516
29	4	116	-11.46	131.3316	-45.84	525.3264
31	1	31	-9.46	89.4916	-9.46	89.4916
32	2	64	-8.46	71.5716	-16.92	143.1432
33	2	66	-7.46	55.6516	-14.92	111.3032
36	1	36	-4.46	19.8916	-4.46	19.8916
37	1	37	-3.46	11.9716	-3.46	11.9716
40	1	40	-0.46	0.2116	-0.46	0.2116
42	1	42	1.54	2.3716	1.54	2.3716
47	1	47	6.54	44.7716	6.54	42.7716
52	1	52	11.54	133.1716	11.54	133.1716
55	1	55	14.54	211.4116	14.54	211.4116
56	1	56	15.54	241.4916	15.54	241.4916
57	1	57	16.54	273.5716	16.54	273.5716
61	3	183	20.54	421.8916	61.62	1265.6748
65	1	65	24.54	602.2116	24.54	602.2116
66	2	132	25.54	652.2916	51.08	1304.5832
71	1	71	30.54	932.6916	30.54	932.6916
75	1	75	34.54	1193.0116	34.54	1193.0116
87	1	87	46.54	2165.9716	46.54	2165.9716
94	2	188	53.54	2866.5316	107.08	5733.0632
	N=45	fx= 1821			fd= 0.3	fd ² = 22223.202

$$\text{Mean } (\bar{X}) = \frac{fX}{N} = \frac{1821}{45} = 40.46$$

Achievement of Boys & Girls on optional mathematics in public school

Obtained marks(x)	No. of Students (f)	fx	$d = x - x_{\text{D}}$	d^2	fd	Fd^2
3	1	3	-42.30	1789.29	-42.30	1789.29
5	1	5	-40.30	1624.09	-40.30	1624.09
7	1	7	-38.30	1466.89	-38.30	1466.89
9	1	9	-36.30	1317.69	-36.30	1317.69
11	1	11	-34.30	1176.49	-34.30	1176.49
12	1	12	-33.30	1108.89	-33.30	1108.89
13	2	26	-32.30	1043.29	-64.60	2086.58
14	1	14	-31.30	979.69	-31.30	979.69
15	2	30	-30.30	918.09	-60.60	1836.18
18	1	18	-27.30	745.29	-27.30	745.29
21	5	105	-24.30	590.49	-121.50	2952.45
23	3	69	-22.30	497.29	-66.90	1491.87
24	2	48	-21.30	453.69	-42.60	907.38
25	1	25	-20.30	412.09	-20.30	412.09
26	3	78	-19.30	372.49	-57.90	1117.47
27	1	27	-18.30	334.89	-18.30	334.89
28	1	28	-17.30	299.29	-17.30	299.29
29	4	116	-16.30	265.69	-65.20	1062.76
31	2	62	-14.30	204.49	-28.60	408.98
32	4	128	-13.30	176.89	-53.20	707.56
33	3	99	-12.30	151.29	-36.90	453.87
34	1	34	-11.30	127.69	-11.30	127.69
36	2	72	-9.30	86.49	-18.60	172.98
37	2	74	-8.30	68.89	-16.60	137.78
39	2	78	-6.30	39.69	-12.60	79.38
40	3	120	-5.30	28.09	-15.90	84.27
41	1	41	-4.30	18.49	-4.30	18.49
42	1	42	-3.30	10.89	-3.30	10.89
43	1	43	-2.30	5.29	-2.30	5.29
44	1	44	-1.30	1.69	-1.30	1.69
45	2	90	-0.30	0.09	-0.60	0.18

47	2	94	1.70	2.89	3.40	5.78
48	1	48	2.70	7.29	2.70	7.29
51	1	51	5.70	32.49	5.70	32.49
52	1	52	6.70	44.89	6.70	44.89
53	1	53	7.70	59.29	7.70	59.29
54	1	54	8.70	75.69	8.70	75.69
55	1	55	9.70	94.09	9.70	94.09
56	4	224	10.70	114.49	42.80	457.96
57	2	114	11.70	136.89	23.40	273.78
58	2	116	12.70	161.29	25.40	322.58
59	1	59	13.70	187.69	13.70	187.69
60	1	60	14.70	216.09	14.70	216.09
61	4	244	15.70	246.49	62.80	985.96
62	3	186	16.70	278.89	50.10	836.67
63	1	63	17.70	313.29	17.70	313.29
64	1	64	18.70	349.69	18.70	349.69
65	3	195	19.70	388.09	59.10	1164.27
66	2	132	20.70	428.49	41.40	856.98
69	3	207	23.70	561.69	71.10	1685.07
70	2	140	24.70	610.09	49.40	1220.18
71	1	71	25.70	660.49	25.70	660.49
72	1	72	26.70	712.89	26.70	712.89
73	2	146	27.70	767.29	55.40	1534.58
75	2	150	29.70	882.09	59.40	1764.18
76	2	152	30.70	942.49	61.40	1884.98
82	1	82	36.70	1346.89	36.70	1346.89
86	1	86	40.70	1656.49	40.70	1656.49
87	1	87	41.70	1738.89	41.70	1738.89
90	1	90	44.70	1998.09	44.70	1998.09
94	2	188	48.70	2371.69	97.40	4743.38
	N=108	fx=4893			fd =0.6	fd ² =52148.92

$$\text{Mean } (\bar{X}) = \frac{fX}{N} = \frac{4893}{108} = 45.30$$

APPENDIX - 5
For Individuals Series

1. Mean (\bar{X}) = $\frac{\sum X}{N}$ where $N = \sum f$ = Frequency of series
2. Standard deviation (σ) = $\sqrt{\frac{\sum (x - \bar{x})^2}{N}}$
or, $\sigma = \sqrt{\frac{\sum d^2}{n} - \frac{d^2}{n}}$

For Discrete Series

1. Mean (\bar{X}) = $\frac{\sum fX}{N}$
2. Standard deviation (σ) = $\sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$
or, $\sigma = \sqrt{\frac{\sum fd^2}{N} - \frac{fd^2}{N}}$

For Continuous Series

1. Mean (\bar{X}) = $\frac{\sum fm}{N}$
or, $\bar{X} = A + \frac{\sum fd}{N}$ where A = Assumed mean
2. Standard deviation (σ) = $\sqrt{\frac{\sum f(m - \bar{x})^2}{N}}$
or, $\sigma = \sqrt{\frac{\sum fd^2}{N} - \frac{fd^2}{N}}$

Interview Questions for Teacher and Head teacher of sample school

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

APPENDIX - 6

Student-questionnaire form

Information about optional subject:

1. Which is your optional subject?
 - a) Optional Mathematics
 - b) Others
2. Which factor encourages you to choose your optional subject?
 - a) Family Background
 - b) Own interest
 - c) Social environment
 - d) Result of grade 8
 - e) To get good marks in SLC
 - f) Job opportunities in the future
 - g) Others
3. By whom did you motivate to select this subject?
 - a) Parents
 - b) Teachers
 - c) School Administration
 - d) Friends
 - e) Others.....
4. In your view, which one of the following family factors plays a crucial role to choose the optional subject?
 - a) Occupation\job
 - b) Economical status
 - c) Educational status
5. Which one of the following neighboring factors plays a vital role to select the optional subject ?
 - a) behavior of teacher
 - b) social trend
 - c) school environment
 - d) peer group

Questionnaire for optional mathematics students

1. What is the main family related factor that affects to the enrollment of students in optional maths ?
 - a) Education of guardian
 - b) economical status of guardian
 - c) negligence of parents
 - d) Occupation/other.....
2. What is the main student related factor that affects to the enrollment of students in optional math?
 - a) Student interest
 - b) student's previous achievement
 - c) negative attitude about math
 - d) student's learning time
3. What is the main neighboring factor that affects to the enrollment of students in optional maths ?
 - a) School environment
 - b) teacher's behavior
 - c) social trend
 - d) peer's group
 - e) Classroom teaching activities

4. What is the main family related factor that affects on their achievement in optional maths ?
 - a) Education of guardian
 - b) economical status of guardian
 - c) negligence of parents
 - d) Occupation/other.....
5. What is the main student related factor that affects on their achievement in optional maths ?
 - a) Student interest
 - b) student's previous achievement
 - c) negative attitude about math
 - d) student's learning time
6. What is the main neighboring related factor that affects on their achievement in optional maths ?
 - a) School environment
 - b) teacher's behavior
 - c) effective class room teaching
 - d) peer groups
 - e) Social trend
7. Why did you select (choose) the optional mathematics among the other optional subjects ?
8. Why are you interested to learn the optional mathematics ?

APPENDIX - 7

Student-questionnaire form

Questionnaire for other optional subject students

1. What is the main family related factor that affects to the enrollment of students in optional maths ?
 - a) Education of guardian
 - b) economical status of guardian
 - c) negligence of parents
 - d) Occupation other
2. What is the main student related factor that affects to the enrollment of students in optional math?
 - a) Student interest
 - b) student's previous achievement
 - c) negative attitude about math
 - d) student's learning time
3. What is the main neighboring factor that affects to the enrollment of students in optional maths ?
 - a) School environment
 - b) teacher's behaviour
 - c) social trend
 - d. peer's group
 - e) classroom teaching activities
4. What is the main family related factor that affects to the level of achievement of students ?
 - a) Education of guardian
 - b) economic of guardian
 - c) negligence of parents
 - d) occupation/ other
5. What is the main student related factor that affects to the level of achievement of students ?
 - a) Student interest
 - b) student's previous achievement
 - c) negative attitude about math
 - d) student's learning time
6. What is the main neighboring related factor that affects to the level of achievement of students ?
 - a) School environment
 - b) teacher's behaviour
 - c) effective class room teaching
 - d) peer groups
 - e) social trends
7. Why did not you select (choose) the optional mathematics among the other optional subjects ?
8. Why are not you interested to learn optional mathematics ?

Appendix - 8

Guidelines for interview with head teachers

Name : _____ School : _____
 Sex : _____ Experienced of head teacher : _____
 Qualification : _____ Age : _____

This interview with head teacher was taken on the basis of the following main topic :

-) View towards mathematics achievement
-) View towards socio-economic background
-) View towards low achievement of students
-) School's facilities
-) Relation between staff and students
-) Policies for low achievement students
-) Relationship with guardians.
-) Classroom management
-) Role of school management committee.
-) Evaluation of students learning difficulties and progress .
-) School establishment
-) Training of teacher
-) Educational aspect and physical aspect
-) School management committee
-) School funds and financial management
-) Change in school
-) Leadership

APPENDIX 9

Guideline of Interview for Mathematics Teacher

Name :	School :
Qualification :	Age :
Teaching experience :	Sex :

The Interview with mathematics teacher was taken under the following area:

-) Training
-) Relation with students and parents, Parent's status, qualification of parents, help of parents, financial supports.
-) Home environment
-) Classroom management
-) Space, black board, physical facilities, number of students, school environment
-) Teaching learning activities
-) Method, encouragement for students, relative question, materials, learning environment.
-) Instructional materials
-) Supervision of class
-) Evaluation techniques
-) Course of low achievement
-) Strategy of low achiever student
-) Application of homework and class work.
-) Professional life, Academic leadership

Guideline of Interview for Students

Name:

School:

Class:

Age:

Address:

Interview with students was taken under the following areas:

-) Feeling about Mathematics
-) Teacher 's behavior
-) Regularity of students and teachers
-) Support for low performer
-) Home Environment of the Students: Task, Help, facility, parents, family
-) Opportunity to learn to home
-) Teaching learning activities starting situation, methods, response, management, question, evaluation system, summarize
-) School environment of class room management
-) Relation between teacher and students
-) Class behavior towards students
-) Opportunity provided by school group work given in classroom.
-) Case of the low mathematics achievement.