FACTORS AFFECTING ACHIEVEMENT IN MATHEMATICS AT SECONDARY LEVEL

A

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GOPAL MISHRA

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FACTORS AFFECTING ACHIEVEMENT IN MATHEMATICS AT SECONDARY LEVEL

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

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LETTER OF CERTIFICATE

This is to certify that Mr. Gopal Mishra, a student of academic year 2067/068 with the campus roll no. 781, T.U. registration number 9–2–225–303–2006, thesis number 1154 and exam roll no. 281346 (2071) has completed this thesis under my supervision for period prescribed by the rules and regulation T.U., Nepal. The thesis entitled "**Factors Affecting Achievement in Mathematics at Secondary Level" (A Case Study in Saptari District)** embodies the result of his investigation conducted during the period 2017 under the Department of Mathematics Education, University Campus, Kirtipur, Kathmandu. I recommend and forward that his thesis be submitted for the evaluation for awarding the degree of Master of Education.

.....	.....
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.....

Gopal Mishra

ABSTRACT

This study focuses on the factors affecting achievement in mathematics at secondary level students toward optional mathematics. This is case study related to affecting factor on the achievement in mathematics. The objectives of this study were to identify the factors that affect of the achievement in mathematics and to analyze the strategies taken by school to promote mathematics achievement. It is case study and qualitative in nature. This study was conducted with the sample of one school from public selected by convenience sampling. Two guardian, one head teacher and one mathematics teacher and four students through convenience sampling. Direct interview with students, head teacher, maths teacher and parents were taken. Classroom observation was done for three times with different days during teaching learning activities. The collected information from teachers and students were analyzed with the help of theoretical and conceptual framework developed by the researcher.

The finding of study shows that the major findings of the study were as followings.

- The school had enough rooms, desks, bench and playground with playing materials concerning mathematics.
- Truly, the teacher of mathematics were having high academic but the teaching style was poor and old.
- The single teacher taught different subjects like compulsory mathematics, optional mathematics and science.
- They were unable to prepare lesson plan effectively.
- Evaluation process at school were terminal, half terminal exam and annual exam.
- Homework given by teachers were not satisfactory.

- There was not enough references book and practice book.
- Class size was big so that disturb in teaching.
- Communication between teacher to parents and students was minimal.
- School management committee had planed to adopt new policies but failed to follow.
- There was poor economical home environment.

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Chapter - I

INTRODUCTION

Chapter Overview

This chapter begins with its introductory part, highlighting the background of study, statement of the problem, objectives of the study, significance of the study delimitation of the study and definition of the related terms.

Background of the Study

Mathematics directly deals with human life. It is believed that the development of mathematics and development of human civilization go together. Mathematics was crated to fulfill the human needs. Through mathematics was introduced later in the education system, it has been developed simultaneously with the development of society. Mathematics is not only through and practiced through the formal institution, the contemporary societies have been practicing it with own ideas and belief system. Mathematics is dynamic in nature as discipline and an essential part of human life. It is etymologically derived from an ancient Greek word "manthanician" mean "to learn". It has been developed through the human endeavors in different eras has come to this height of development and will still be in the mathematics has been accepted as an important components of formal education from ancient period to the present day. History show that ancient people developed mathematics practically being obliged to solve day to day problem. Later on advanced form of mathematics structure, rules, formulas, theories have been developed and used on solving social problem through empirical observation and experiences. Now a day every human discipline is

interpreted in mathematical models. Therefore, there is a definite need of mathematics to everybody daily life and also for the base of future studies.

People have a practical need to count certain things: cattle, cornstalks, and soon. There is the need to deal with simple geometrical situations in providing shelter and dealing with land. Once some form of writing is added into the mire, mathematics cannot be far behind. It might even be said that the symbolic approach precedes and leads to the invention writings. Mathematical documents from ancient Egypt date back to 1900 B.C. The practical need to redraw field boundaries after the annual flooding of the Nile, and the fact that there was a small leisure classes with time to think, helped to create a problem oriented, practical mathematics. Early mathematics required a partial basis for its development and such a basic arose with the evaluation of more advanced form of society. It was along some great rivers of Africa and Asia that the new form of society made their appearance that Nile in Africa, the Tigris and Euphrates in western Asia, The Indus and the Ganges in south, central Asia and Huango Ho and then the Yangtze in eastern Asia. Thus early mathematics can be said to have originated in certain areas of agricultural and engineering pursuits (Best & Khan, 1999).

Mathematics is the central part of school curriculum not only in Nepal but in the entire world. Every society has observed mathematics as basic need of human civilization. It is not easy to say when and from where mathematics had started but one can see that mathematics as an essential part of human civilization. It was created to fulfill the daily needs of human life. Thus the nature and structure of mathematics was built with the development of human civilization ancient civilization such as Babylonian, Egyptian contributed for the development mathematics (Guragain, 2001).

Mathematics has longest history from integrity. It has been developing with the different civilization. It has played an important role in building up by

perfecting all the sciences. It is one of the important subject in school education. It provides platform for the development of entire mathematics education as well as foundation for higher study of science and technology. In general mathematics learning helps people to understand and interpret the very important quantitative except of living and natural phenomena. In Nepal the present curriculum system has introduced mathematics as one of the core subject in school education. Historically, literature shows that mathematics originated from practical experiences. It was used in which building bricks, house, gutter, bridges, temples, pyramids, different handicrafts, and planed cities. This is found from the evidence of Babylonia and Egypt civilization at around 3000 BC to 200 A.D. to you and to me for its method content as well as characterized by order and internal consistency. It is queen of all sciences. Elementary mathematics including ancient in most ancience civilization including ancient Greek, the Roman empire, Vedic society and ancient Egypt. Inmost cases, a formal education was only available to male children with a sufficiently high states wealth or caste (Tuncay and Omkar, 2009).

Mathematics developed from society. The history of mathematics education reflects that the contemporary society has served today's situation in the field of mathematics. It was developed to fulfill the necessities of the society. Mathematics is developed in different societies in their own means and ways for their requirements (Best and Khan, 1999). Basically it is very much older which begins in 11^{th} century as well known as for the first mathematician of any note was a Greek named zeno. Zeno of Elea is memorable for arguments like racecourse (Stephen and Sue, 2001).

Mathematics and mathematics education are two separate disciplines in the field of education. Mathematics primarily focuses on the process and product of what mathematics does. The focus of mathematics is on creating mathematics with understanding its basic structure. It does not give much concern on how mathematics should be taught, what mathematics should be

taught, who can learn mathematics and why one can't learn mathematics like issues. Mathematics education deals with mathematics from perspective of education. It is concerned with the development and implementation of appropriate mathematics curriculum and with all issues associated with the teaching and learning of mathematics. In keeping with concept of lifelong learning, mathematics education covers learners of all ages and at all levels from early childhood to adult. Thus, mathematics education is not solely concerned with curricula, classrooms, teachers and learner in school, nevertheless, issues associated with school mathematics will major focus. The area of mathematics education are curriculum, teaching, learning and evaluation. Five foundations philosophies, psychology, sociology, mathematics and technology guide these three areas. Hence mathematics education is applied discipline that deals with the wider application of mathematics in different sector and fields. Mathematics carrying full marks 100 along with optional mathematics 100 marks in both private and public school in secondary level (Ghimire, 1997).

The word "mathematics" itself derives from the ancient Greek word *mathematica*, meaning "subject of instruction", that means "to learn". Therefore, mathematics is the process of learning and it is an expression of human mind, concerned chiefly with idea, process and reasoning. Mathematics is the collection of experience of many previous thinkers. Therefore, it has a long history. Different thinkers and philosophers developed mathematics as a discipline for developing rules, formulae and system based on solving their social problems throughout the continuities of the civilization and social life. Mathematics is the necessity of the civilization. It has been originated with the raise of the human beings. Mathematics has been accepted as an important component of formal education from ancient period to till now. History shows us that ancient people developed mathematics practically being obliged to solve day to day problem. Later on advanced form of the mathematics structure,

rules, formula, theories have been developed and used on solving social problems through empirical observation and experiences. Now a day, every human discipline is interpreted in mathematical model. Therefore, there is crucial role of mathematics to the everybody's daily life and also for the base of further studies. Early mathematics required a practical basis for its development and such a basis arose with the evolution of more advanced form of society. It was along some great rivers of Africa and Asia, that the new form of society made their appearance. Thus, early mathematics can be said to have originated in certain areas of agricultural and engineering pursuits (Yadav, 2001).

Nowadays, more of the students seeking admission in the previous fields of science and technology is increasing every year. Most of the educated parents in Nepal want their son and daughter study science and mathematics. They not only inspire but also compel their children to study these subjects. In effect most of time they get adverse result due to their children's interest, aptitude, attitude, ability and intelligence. They are even not capable to find whether their children have a favorable attitude for the study of the particular subject (mathematics) or not. As a result, there is a huge failure rate in mathematics subject. Therefore, it becomes essential before giving admission to student in any specified branch of the subjects to investigate the attitude and capability of the students. The factor, which affect achievement level of students of any grades in mathematics, are changeable in time and space. So achievement itself requires further analysis after the certain interval of time. In order to suggest measures for enhancing achievement level of secondary level students in mathematics first the factors affecting it needs to be identified. Relevant to this context, the present research was under taken to make a thorough assessment of achievement level of secondary level students and also identify the factors that determine the level of achievement among those

students. In fact, such types of studies are necessary in order to make education better and fruitful (Joshi, 1997).

Before the development of mathematics education there were no trained teachers, teacher used to teach through teacher's centered method without using teaching materials and there were no appropriate textbook but after the development of mathematics education there are trained teacher in school and they use student centered method by using appropriate teaching materials. Syllabus is also designed according to need and demand of society. Due to development of mathematics education it affects positive attitude in the school. Mathematics education effect in private school better than public school because the achievement in mathematics is better than in public school. There may be different reasons behind it such as physical facilities, lack of textbook, lack of teaching materials, large size of class which are school related factor as well as parent's participation, home environment, parents education etc. Therefore, I am motivated to explore the factors affecting learning mathematics in school level.

Statement of the Problem

It has been depicted in various achievement researchers that student achievement in mathematics in Nepal is relatively low and unsatisfactory. There is a deeper relation between achievement and learning variables. As mathematics is emphasized like language, most of students feel it as a difficult subject and some of students fail in optional mathematics in SLC examination. By this problem the great deal of time, money effort and manpower of the nation have been wasted. And it seems that it is affected by various factors like home and school environment, physical facilities, attitudes towards the subject, peer groups, teaching learning process, equipment etc. We cannot achieve the expected goal without improving appropriately the management of above mentioned factors to facilitates the students learning.

Regarding this many students feel to learn the optional mathematics is very difficult task. That is why, the result of SLC in 2073 was not so good in public schools. The private schools have been some how successful in effective teaching learning activities and getting good result of their students in SLC examination with higher scores. Even though the result of SLC in 2073 was not so good on both private and public schools. It is due to the case of learning process. There may be some factors which affect the learning process of students. So I wanted to seek the factors affecting learning in optional mathematics. There was no investigation on factors affecting on learning in optional mathematics. I sought the answer of the following specific questions :

- What factors affect the learning optional mathematics ?
- What types of strategies could be adopted by the school for low achiever to improve their score ?
- How can the low performer students in optional mathematics be promoted ?

Objectives of the Study

- To identify and analyze school related factors and out of school factors that affect learning in mathematics of students.
- To identify the strategies taken by the school administration in improving mathematics learning.

Significance of the Study

As far as possible, researcher will be great endeavor to assemble his real experience, feeling and thought. As his belief and great effort on this study, researcher hopes that his finding will be fruitful for me as well as also productive for others. This study is helpful to the students who are teaching optional mathematics. Those teachers who are novice in teaching career they may take benefit from this study. This study will be helpful for the author of

optional mathematic who will write text of optional mathematics. Also it will be beneficial how the optional mathematical content will be associated in the curriculum. It will be fruitful for the stakeholder and agencies to step further. In short, following are the significance of the study.

1. It would contribute to find the way to decrease the failure rate of the students.
2. It would help to guide the instruction on the basis of the individual difference.
3. It would help the curriculum planners, textbook writer, police maker equally.
4. It would help the government to adopt globally for the education level.
5. It would beneficial to the math teacher and parents.

Delimitation of the Study

The delimitation of the study are as follows :

- This study is limited to the public secondary school appearing in S.L.C. examination 2073 B.S. from Saptari district.
- It is limited to optional mathematics.
- The study is based on qualitative analysis.
- This study is limited only the responses of head teacher, mathematics teacher, parents and students.

Definition of the Related Term

Amount of Homework : It helps elementary students develop proper study skills which, in turn, influence grades. The national education association along with the national PTA suggests adding 10 minute of homework per night incrementally with each grade level, as a general rule of thumb.

Class size : Class size refers to the number of students in a given course or classroom specifically either the number of students being taught by individual teachers in a course or classroom or the average number of students being taught by teachers in a school district, or education system.

Home Environment : Home environment is the such components which describes about the reading room, parents and other education related behaviours. It is crucial component which is directly associated with learning of students.

Interest of Learner : Student interest in a topic holds so much power. Factoring for student interests works well with instructional planning based on readiness and learning profiles.

Peer Group : A peer group is both a social and a primary group of people who have similar interest, age, background or social status. The member of this group are likely to influences the person belief and behaviors.

Peer's behaviors: It is related to the behavior among student about mathematical problem and way of solutions. It helps to exchange their knowledge.

Public school : All the government school in Nepal

School's Policies for Learning Mathematics : School's policies play great role in the learning process. A critical study of all aspects such as administration, commodity, relations, students' performance, staff's relations etc.

Teacher competency : Teacher competence refers to "the night way of conveying units of knowledge, application and skills to students." Competence is understood as excellent capability.

Textbook : A textbook is a manual of instruction in any branch of study. Textbook are produced according to the demands of educational institution school books are textbooks and other books used in school.

Time schedule : The scheduled time of any crew is the time, calculated at the beginning of the vent, that they should arrive at any given control, which is fixed from the start of the event.

Chapter- II

REVIEW OF RELATED LITERATURES

Chapter Overview

This chapter begins with its empirical review, theoretical construction, theoretical understanding, and conceptual framework.

A literature review is the process of locating, obtaining, reading and evaluating the research literature in the area of the research. The main purpose of review of related literature is to develop some expertise in one's area to see what new contributions can be made and to receive some ideas for developing a research design.

Review of literature is an essential part of studies. It is a way to discover what other research in the area of one's problem has uncovered. A critical review of the literature helps the researcher to develop through understanding and insight into previous researcher works that relates to the present study. It is also a way to avoid investigating problems that have already been definitely answered. The present chapter attempts to review the research studies and literature in the domain of cause of failure in mathematics in SLC examination with special references. Also, the purpose of this chapter is to analyze the research literature relevant to the purpose and question addressed in this study.

There are some studies related to factor affecting in learning mathematics. The review of related literature helps to make the concept clear

for the study and also directed to analyze and interpret the data sufficient literature related to this study in Nepalese context could not be found. Despite the fact, few related literature had been reviewed as follows.

Research in any sector of skill wants a suitable studied with the works in which there many have many research been done in the same area. We get deep knowledge from research which must have already developed theories and researches which is approximately connected with the problem chosen by him or her. From review of literature we became identify of what has been established, known or studied and what has not been try to be found yet. It also provides knowledge find out the difference in research for further study. The purpose of review literature is to spread upon the text and background of the study. There are so many books, report and related studies have been reviewed in order to explain the present problem of the study.

Empirical Review

Pant (1978) did an experimental research work on "Effectiveness of the use of unit test results in enhancing pupil achievement in mathematics" with the objectives to find out the effectiveness of unit test as a teaching tool for enhancing achievement in mathematics at the seventh grade level of a secondary school in Kathmandu Town Panchayat. He selected eight students from one school by systematic sampling and taught eight units from textbook. Unit test were given at the end of each unit in experimental group. A comprehensive test has given the multiple choices, completion items. He found that the achievement of two groups differed significantly.

Raliman (1981) did his thesis for Master's Degree on "Achievement in mathematics by sex: A study of sex differences in achievement in mathematics of seventh grade students in selected schools of Kathmandu Nagar Panchayat Area with the objectives to investigate whether sex influenced the achievement in mathematics. Achievement test (Knowledge, Skill, Comprehension and Application) in Arithmetic, Algebra, and Geometry was prepared and

administered in five schools. The t-test was applied to conclude that the superiority of the boys over the girls with respect to achievement in mathematics as a school subject with regard to achievement in mathematics by area and also cognitive levels.

Ghimire (1997), studied on 'A study on factors affecting teaching/ learning mathematics at secondary level' with the object to study the factors affecting in learning of schools in terms of the following: school environment, family background, motivational factors, physical facilities, interest of the learners, instructional materials. The tools for the study was administered to sample of ninety students and test was applied to conclude the following results.

- Environment of school in both rural and urban areas affects equally but the boys are more affected those girls. Students of Argakhanchi and Chitwan were more affected than that of Kathmandu.
- Home environment affects more to the subject of rural areas and girls were affected more than bosy.
- The students of Kathmandu were more motivated to study mathematics than that of Arghakhanchi and Chitwan.
- The students of urban areas were more interested in the study of mathematics and the girls paid more attention for this study.
- The students of the rural areas were more affected by the use of instructional materials and girls paid more attention to the use of instructional materials.

Guragai (2001) did research on "A study of achievement in mathematics of primary level students of Morang and Dhankuta districts" with the objectives to compare the achievement in mathematics of primary level students between Morang and Dhankuta districts resembling Terai and Hilly region of Koshi

Zone. Researcher developed an achievement test from the prescribed curriculum of grade V. Four hundred students from twenty jour schools were selected. Z-test was applied to conclude that Morang district surpassed Dhankuta district students in every aspect male, female, rural and urban.

Pant (2001) did a research work on "A study of achievement in mathematics at primary level in Doti district" with the aim to study the achievement level in mathematics of grade V students as a whole, by gender and location. Mathematics Achievement Test was prepared by the investor and administered on two hundred students, in six-government school. He concluded that the achievement level of fifth grade students in mathematics o Doti district was 44.16% and there were significant difference in the achievement among the rural schools' students and urban schools' students in mathematics.

Pokhrel (2001) had studied entitled, "Mathematics achievement in school leaving certificate examination between public and private school student at Kaski district." The main conclusion of this study was to mean achievement scores and correlation of private school student in compulsory and optional mathematics was greater than public school student in Kaski district in S.L.C. examination he concluded that the mathematics achievement of private school is better than public school Richard (1983) had made study titled "Factors related to student's school achievement." He concluded the important factors related to students school achievement in mathematics are classroom behavior (time spend in learning, student attention, method of teaching

Teachers background (trained, experience ability) of private & public school student's characteristics (prerequisite knowledge student attitude daily attendance)

Neupane (2001) did his experimental research on "A Study on the Effectiveness of Play Method in Mathematics Teaching at Primary Level." His study intended to answer the question whether the performance of the pupils of primary level taught by play-way method affects on the mathematics

achievement as compared to traditional method. He collected the data through pre test and post-test in class one on addition and subtraction. Two equivalent groups were established on the basis of pre test results and randomization. Researcher taught in experimental and control group at the duration of one week and took post-test to both groups in some way. The data was analyzed and interpreted statically with t-test and discovered that experimental group achieved better performance than the control group. Hence his finding is that the achievement of students taught by play way method was significantly different than the achievement of the students taught by traditional method.

Poudel (2001) did a research work on "A study on the effectiveness of class work while teaching geometry at the secondary level" with aim to investigate if the class work turn to be effective while teaching geometry. The research conducted experimental studies. The researcher taught geometry to both the groups (experimental and control). The experimental group was taught the units class works entwined with the regular classroom whereas the control group was kept detached as far as possible classroom work activities. An achievement test was given. The t-test vas used to conclude that experimental group did better than control group.

Yadav (2001) did a survey type research carried out on topic "A study on the effectiveness of the primary school teachers of the district of Sirha" with the objectives to explore the extent of effectiveness parameters in determining the effectiveness of primary school teachers and to compare the effectiveness of rural and urban primary school teachers. Twenty-eight teachers (twenty-two trained six semi-trained teachers) were as a sample. A questionnaire was prepared to solicit the opinions of the teachers. A classroom observation form was also developed to record the classroom situation and activities. U-test and z-test were applied to conduct that teachers were found to be effective. The effectiveness of urban teachers was not found to be significantly different from those of rural teachers.

Shrestha (2002) did research work depending upon the secondary data of the result of SLC examination on "A study of mathematics achievement of private and regular students in SLC examination." With the aims to identity the trend in mathematics achievement of the students attempting the SLC examination privately and regularly and to compare the overall mathematics achievement of private and regular students. Data were collected from Lalitpur district of the five years 2054 BS to 2058 BS. The t-test was applied to conclude that the trends in achievement of private and regular students in Lalitpur district in terms of mean scores were decreasing in both the cases in similar manner. The study concluded that mathematics achievement of the private and regular students did not different in the examinations.

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Tharu (2004) studies on 'Impact of socio-economic status on mathematics achievement' with the objective to find the level of mathematics achievement of students with respect to their socio-economic status and to determine the correlation between socio-economic status and mathematics achievement and to determine the correlation between socio-economic status and mathematics achievement by gender. The tools for the study were administered to the sample of 140 students of Bardiya district and mean,

standard deviation, correlation co-efficient and multiple regression were used applied to conclude the following results :-

- The mean scores of educated father's children is higher than the mean score of literature, illiterate father's children and the mean score of literature fathers' children is higher than those illiterate father's children.

- The mean score of job father's children is higher than the mean score of trade and agricultural occupation father's children.

- Mathematics achievement of students were found to be strongly associated with the father's education and father's occupation whereas family income variable had the low relationship that positively affected children's mathematics achievement.

- The variable family size and birth order of child were negatively correlated with mathematics achievement that adversely affective children's mathematics achievement.

- The variable family size and birth order child had a mid negative effect on mathematics achievement.

- Mathematics achievement status of boys and girls were found consistently positive associated with their variable father's education, father's occupation and family income that positively affected on boys and girls mathematics achievement and family size and birth order of child had negatively correlated that adversely affected boys and girls achievement in mathematics.

Sapkota (2005), studied on 'A Comparative Study of the Mathematics Achievement on SLC Result of Kathmandu and Kavre District of Nepal.' The major findings of the study in several variables are presented as follows: There is signs scant difference between the achievement in mathematics students of Kathmandu and Kavre district. There is significant difference between the

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

Subedi (2005), studied on "Factors Affecting Failure in Mathematics in SLC examination". The major findings of the study are given below:

The variable school environment has strongly positive effect on the failure's mathematics achievement. The variables effective classroom teaching and time variable have a mid positive effect on the mathematics achievement. The physical interest of the learner has low positive effect on mathematics achievement.

Neupane (2006) conducted a research on "Effect of socio-economic status on mathematics achievement". For this study researcher developed the achievement test paper, parent's questionnaire form and 84 sample students of grade III from V government school's of Lamjung district. From this research he concluded that the score obtained by students in mathematics was founded significantly correlated with parent's education, occupation, family size and structure of family size and structure of family were founded negatively correlated with mathematics achievement.

Bhattarai (2007) identity the factors that "Affect the use of instructional materials in teaching mathematics at primary level". And to study the existing condition of availability and use of instructional materials. It is also intended answer the questions.

- How many instructional materials are there in the primary schools?
- Are the available materials come into practice ?

This study through the purposive sampling twenty public schools and twenty primary mathematics teachers were chosen from the Tanahu district. The sample of the teachers was selected on the basis of one from each school.

The data of sampled schools and teachers were obtained through the questionnaire and check for the purpose of analysis and data mean correlation co-efficient and regression analysis was used. After the analysis and interpretation of the obtained data the researcher found the following results :-

- The variables teacher training space available pre-students, availability of instructional materials and students teacher ration have strongly positive effect on the use of instructional materials.
- The variables teacher's attitude toward the use of instructional materials and teaching experience had negative effect on the use of instructional materials.

Nath (2007), did a study on a topic "A Study of Causes of Failure in Optional Mathematics in SLC Examination". The main findings of this study fir as follow, which are the causes of being failure. Text books are more theoretical. Lack of teaching materials in teaching activities. Teaching without familiar with students' previous knowledge.

Giri (2008) "A critical analysis of SLC Compulsory Mathematics scores 2063." Intending well educational out comes the state has finance large amount of money as well as guardian also have invented their children education, but result of SLC is still poor. Mathematics is being the major causes to make students failure. There is a saying that the course content, the way of managing circumstances, evaluation system all are within the favor advantages group, which always ignore the marginalize and deprived group. Almost all research finding have shown that there is not a unique determination, with affects students' achievement. Factors or variable such as students' gender, as parents' education, occupation, location of school, students' religion, eco-status, teaching skill, environment, class size, medium of instruction are supposed to be the most influencing factors in mathematics achievement. This study was carried out with the view of finding among all variable state about which variable is most influencing.

Yadav (2008) did a survey type research work on "Causes of low a achievement mathematics" with the objectives are to analyze the mathematics achievement of Musahar students, to find the mathematics learning environment of Musahar students at school and home, to find the causes of low achievement of Musahar students at primary level.

Parajuli (2011) has studied entitled "Causes of failure in mathematics in S.L.C. examination in community school (A case study of Dhankuta district). In his study he found school related factors are peer group, class structure, school presentation, amount of homework and out of school related factors are parent's participation, curiosity of learner, time schedule, father's education affects the student's mathematics achievement by using one way Anova at the significance level $\alpha = 0.5$ with the objective what are the causes of failure in mathematics in S.L.C. exam, to what extent school related factors such as peer group, class structure, amount the homework affects the student's achievement. The tools for the study were administered to the sample of 100 students. The population of his study students failure in mathematics in SLC examination of 2066 B.S. one way Anova was applied to conclude the following result:

- There was favorable opinion in parents in academic learning
- There was significantly different in children in mathematics achievement on basis of parents involvement.
- There was significantly difference in children mathematics achievement of non involved parents.

CERID did a national work shop (12 - 16 January, 1987) and found the following factor play great role on achievement in raising the performance level in primary education such as teaching strategies parental support and school management. The student who completed secondary school can achieve differently in private and public S.L.C. examination but what is influencing factor in private and public S.L.C. examination ? What is the significance of influencing factor in mathematics examination ? These are interesting question

so researcher will wanted to be comparing the mathematics achievement of private and public school's student achievement.

Baral (2011) has studied entitled "Causes of failure mathematics in SLC examination (A case study of school in Bharatpur)." In his study he found school related factors are associated with school environment, physical facilities, teacher's behaviour, peer's behaviour, manageable library, classroom environment, regularity of teacher and student, instructional teaching materials etc. and out of school related factors are associated with family background, interest of learner towards mathematics, amount of time student spent on school activities such as leisure reading, homework, discussion with peers economic condition, motivation etc. affect mathematics achievement through qualitative as well as descriptive research. With the objective to explore the main cause of failure in mathematics in SLC examination and to suggest the main causes of bring improvement in result by finding the improvement programme that can be carried out in school level. The population of his study students failure in mathematics in SLC examination of 2066 B.S. in public school of Saptari district. The tools for the study were administered to the sample of eighty students of eight school in which forty boys and forty girls from the population of the student failure in mathematics in SLC exam which concluded the following result :

- The student were found to be indifferent in study because the same teacher who taught more than two subjects (i.e. comp. mathematics, science, opt. maths)
- The mathematics teacher was enable to address for varied cognitive level's students in class room while teaching.
- The school was trying to reduce problem of mathematics failure by managing extra classes in the evening

Tuncay Saritas and Akdemir (2009) study indicated the studies are affected by various factor. In their study they found school related factors are curriculum, instructional strategies and methods, teacher competency in math education, motivation or concentration method, participation instrument procedure analysis, self directed learning, arithmetic ability and out of school related factors are associated with gender, socio-economic status, parents educational level. They concluded purpose of the study as follows:

1. How much to mathematics department students think demographic factors, including gender, parents' educational level and socio-economic status, influence their achievement in mathematics ?

2. How much do mathematics department students think instructional factors including curriculum, instructional strategies and methods, teacher competency in math education, and school context and facilities influence mathematics achievement ?

3. How much do mathematics department students think individual factors including self-directed learning, arithmetic ability, and motivation or concentration influence mathematics achievement ?

4. What are the three most influential factors on the mathematics achievement of students ?

The finding of their study reported that instructional design of a mathematics course is important and should be compatible to the factors identified for mathematics achievement. Educators need to adapt and create alternative innovative learning and teaching strategies for effective mathematics education. The findings also suggest that different instructional design strategies should be studied and applied in different contexts.

Above literature mainly focused on the causes of failure and low rate of achievement. In the past decades it was practiced researching about the causes of failure of students in mathematics. To improve the learning not only finding

causes of failure and low achievement but here needs to find affecting factors of learning mathematics. So I was interested to find the affecting factors of learning. Still the researcher is unable to address the factors affecting mathematics at secondary level. The previous researcher had addressed only comparison of public school's and private school's marks result. By comparing that the researcher have shown better result of private school in the comparison of public schools. It was found that there is gap between causes of failure and low learning. Thus, to fulfill this gap, this research had been conducted.

Theoretical Construction

In the section, the researcher introduced the theoretical discussion which is relevant for the interpretation of the findings of the study. There are various learning theories related to children's learning and development. Some of them are classical conditioning, operant conditioning, trial and error, social learning, social development, constructivism, cognitive learning, socio-cultural, multiple intelligence and so on.

From a contemporary constructivist perspective of mathematics education, personal experiences and previously learned knowledge and skills are,, encouraged as components for understanding. Observations, hypothesis and conclusions are made tested and drawn within a social environment that allows sense to be made. Unreasonable or meaningless mathematical solution would be medical by cultural knowledge, and skills acquired in class could be used in real contexts. Increased understanding should result from mathematical tasks being linked to personal student experiences, and form the incorporation of the linguistic and culturally of students' lives.

Basically, constructivism views that knowledge is not 'about' the world, but rather constitutive of the world. Knowledge is not fixed object, it is constructed by an individual through his/her own experience. This theory of learning acknowledges that individual is active agents, they engage in their own knowledge construction by integrating new information into a meaningful

way. Constructivist argue that it is impractical for teachers to make all the current decisions and dump the information to students without cling students in the decision process and accessing students abilities to construct knowledge.

The constructivist approach to mathematics learning is argued to lead understanding of mathematics when applied to the physical, social and cultural experiences and developmental contexts of the learner whereas traditional mathematics' use of highly structured worksheets, step-wise rulers practice examples, and formulaic solutions to word-problems has been criticized for its poor survival of understanding and application beyond the classroom. Conditions of classroom that foster a constructivist approach involve the use of realistic problems and conditions and the use of multiple perspectives, active engagement, group participation, frequent interaction and feedback, contexts that connect learning to real world, and integration of assessment into instruction.

Social constructivism is focused much on learning through cooperative group learning. It emphasizes the importance of culture and context in understanding what occurs in society and constructing knowledge based on this understanding. Social constructivism is based on specific assumptions about reality, knowledge and learning. To understand and apply models of instruction that are rooted in the perspectives of social constructivists, it is important to know the premises that underlie them. Social constructivists believe that reality is constructed through human activity. Member of society together invent the properties of the world. For the social constructivist, reality cannot be discovered that; it doesn't exist prior to its social invention.

Theoretical Understanding

There are many learning theories which can be used for the analysis and interpretation of data such as classical conditioning, operant conditioning and trial and error theory and so on.

Walberg Model (1981) has defined learning as a function personal variables and instructional treatment. Learning and performance of learned behaviors are influenced by several factors. Walberg describes a theory of educational productivity requiring optimization model, which mentions nine factors to influence achievement of cognitive and effective outcomes. This model includes a paradigm connecting aptitude (ability or prior achievement, motivation or self concept and age), instruction (quantity of instruction and quality of the instruction) and environment (home environment, the classroom or school environment, the peer group environment and the mass media) as inputs to learning (effective, behavioral and cognitive).

Walberg (1981) proposed a theory of educational productivity which has theoretical foundation of Lewin (1963), formulation of behavior as a function of personality and environment. Walerg's theory requires optimization of nine factors to increase student's achievement of cognitive and affective outcomes. The nine productive factors the students related variables

a) Ability or prior achievement
b) Age
c) Motivation of self-concept; the instructional variables
d) Quantity of instructions
e) Quality of instructional experiences; and educationally stimulated psychological aspects
f) Home environment
g) Classroom or school environment
h) The peer group environment
i) The mass media (especially television)

These factors were classified into three general groups by Wilkins et al (2002) :

a) Personal variables, such as prior achievement, age and motivation of self-concept

b) Instructional variables, such as amount or instruction, and

c) Environmental variables related to the home, teacher, classroom, peers and media exposure

Caroll Model (1982)

This model mentions that students achievement depends on the degree of learning. It is a function of the ratio of tasks to the total amount of time assigned. In the learning model, Caroll describe students achievement, which is affected by five factors.

1. Institute for particular kind of learning

According to carol, aptitude is the amount of time required by a learner to attain mastery of a given learning tasks.

2. Quality of instruction

This should be considered in terms its effect on individual learns rather than on groups of learners.

3. Ability to understand instructions

This is largely determined by verbal ability and reading comprehension. To meet students need's instruction must be modified.

4. Perseverance

Students, vary tremendously in the amount of perseverance, they bring to a specific learning task. Perseverance can be increased.

5. Time allowed for learning

This the key to mastery. Amount of time provided for traditional courses is too much for some and too little for others.

Bigg's Model (1985)

This model mentions that student achievement is influenced by students' personal and situational factors. It directly influences students performance. Students learn by three types of processes- deep achieving and surface. It is also influences students performance in a given subject. Student's ability and personality also affect achievement process. The personal factor are affected by ability, prior knowledge, personality and home background of a students. The situation factors also remain influential in student achievement. The course structure, instructional methods, time assigned to perform the task and task demand are the relevant situational factors.

Conceptual Framework

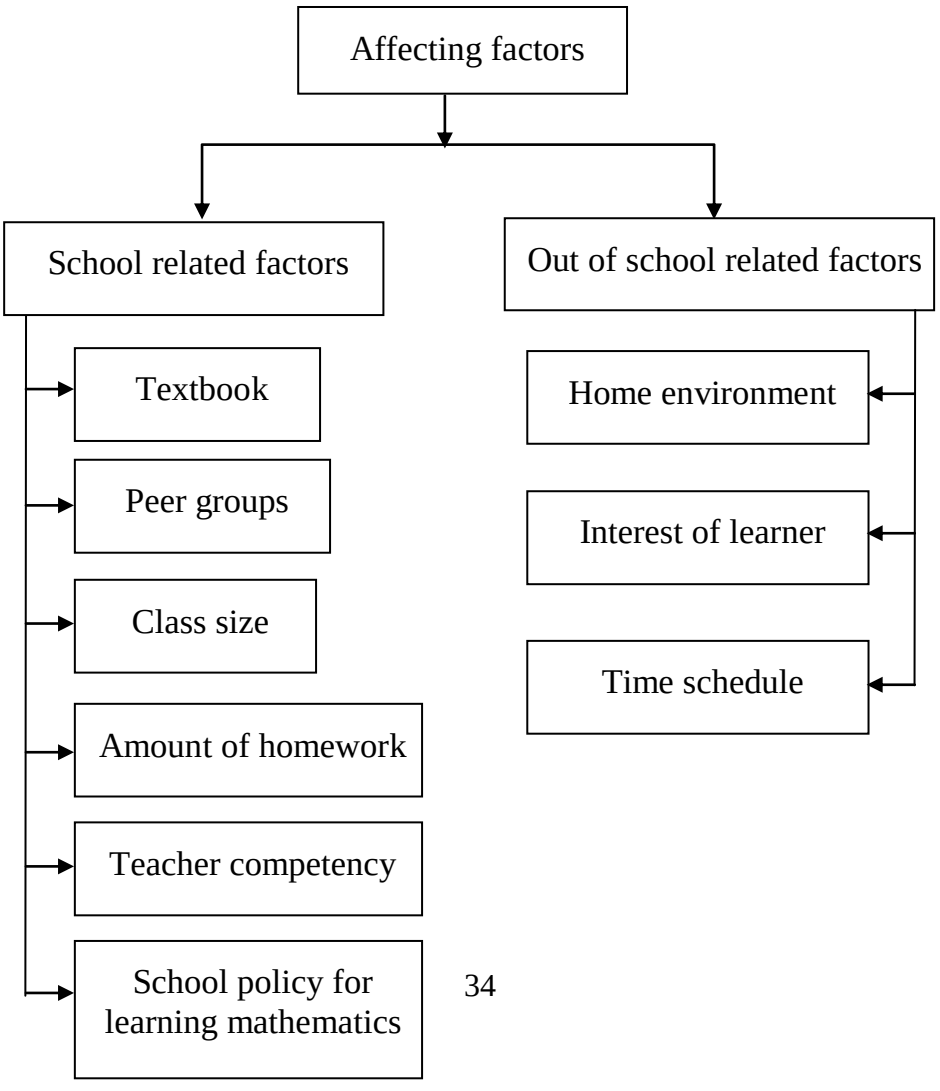

Figure 1

Source: Walberg (1981) Wilkins et al (2002)

From the above table, it is found that there are many sort of factors which affect in mathematics learning. Mainly it is categorized into two factors as school related and out of school related factors. In the school related factors basically there are six crucial factors that is text book, peer group, class size, amount of homework, teacher competency and school policies. On the other hand there are three out of school related factors which are home environment, interest of learner and time schedule.

Chapter - III

METHODS AND PROCEDURES

Chapter Overview

This chapter begins with its design of the study, population of the study, sample and sampling strategy, study area/field, data collection tools and techniques, data collection procedure and data analysis procedure.

Qualitative research takes an interpretative, naturalist approach to its subject matter, qualitative researchers study things in their natural setting, attempting to make, phenomena, in terms of meaning that people bring to them, so, I chose this methodology. The chapter explained the plan and method of study which helped to achieve the objectives of the study.

Design of the Study

Research design is a plan and strategy of investigation concerned so as to obtain answer to the research questions. The research design is the detailed plan of the investigation. In fact, it is the blueprint of the investigation. In other words, it is the blueprint of the detailed procedures of analyzing the obtained data (Singh, 2008, p.450). The learning in optional mathematics, which is directly or indirectly related to the school and out of school factors. The study is designed to determine the factors affecting learning of optional mathematics in public schools. Later, it is qualitative to describe findings. I used, interview schedule. The design of research is case study with qualitative approach as well as in descriptive nature.

Population of the Study

Every research needs the population. Without population research can not be conducted. It has the crucial role. So the researcher made the population where studied. The population of the study consisted secondary level students who has chosen optional mathematics in Saptari district.

Selection of Respondents and Selection Strategy

First of all the list of secondary school prepared from the list maintained by the district education office. There are eighty-five secondary schools in Saptari district, according to district education office in Saptari. But I took one school from public selected by convenience sampling. Four students were taken from school. Two guardians, one head-teachers and one mathematics teacher and four students according to convenience of researcher.

Study Area/Field

Every study needs study area, researcher has chosen one public secondary schools of Saptari district. It was included Raj Devi Thaku Devi Jogender Bhagat Secondary School.

Data Collection Tools and Techniques

The study intended to find the affecting factors behind the optional mathematics learning in governmental school in S.L.C. graded students. For this, I used the following instrument to gather the data.

Observation Note : The class observation note prepared to observe classroom management and physical environment, beginning of class, acquisition of learning used of materials, closures of lesson and current evaluation of students during teaching learning activities.

Interview Schedule: The way of having face to face conversation in specific subject matter between more than one people is called interview. It is done to get the real and actual data from the research area. It is carried out by the researcher to prove his subject matter logically. It is more important because it gives real and accurate data for the research study. The interview is one of the major sources of data collection, and it is also one of the most difficult ones to get right. In qualitative research the interview is a form of discourse. According to Mischler (1986) its particular features reflect the distinctive structure and

aims of interviewing, namely, that it is discourse shaped and organized by asking and answering questions. An interview is a joint product of what interviewees and interviewers talk about together and how they talk with each other. The record of an interview that we researchers make and then use in our work of analysis and interpretation is a representation of that talk. Two types of interviews are used in qualitative research in-depth interview and group interview.

In-depth interview is used basically in qualitative study design. With the same respondents several interviews are taken in different times. The term in-depth it suggests that one after another interview, new themes, perspectives or issues are explored and these newly generated themes/issues are followed in the next interview. So in-depth interview attempts to draw very inner meaning of phenomena from the perspective of the respondents. It is taken periodically in different settings, and different circumstances of the respondents but the settings all the time in natural. It is administered to know head-teachers, mathematics teacher, parents and students view about the factors affect learning optional mathematics.

Data Collection Procedure

The schools record as studied such as mark ledger of students, teachers, profile, physical facilities and other relevant documents. The researcher recorded the behavior and activities both teachers and students during teaching learning activities. The researcher emphasized on primary and secondary information. The primary information was collected from head teacher, math's teacher, parents and students as well as from educated people of the society. Firstly for the purpose of the study, I visited all selected school of Saptari district. For the research interview conducted to parents, head teachers, teachers and students to collect required facts. I organized interview schedule in which parents, teachers, students and guardians for the teachers knowledge in subject matter. Parents role discussed with parent and subject teacher.

Data Analysis Procedure

The data were collected from the different ways. The different data were collected from interviewing the students, record of school, as well as from the various people who were interested about this case. While analyzing the data head teachers, students, parents were involved. We collected important data and remarks of those people. The researcher collected data through interview head teacher, teachers, students and parents. School records of students helps researcher to collect data. The collected data in qualitative research is not of structured form and it is time the research has to do a lot in making workable structure of the collected information so as to make the meaning or theory. The various themes were generated and using triangulation of field, literature, and my experience interpretation and analysis of data were done.

Chapter - IV

ANALYSIS AND INTERPRETATION OF DATA

Chapter Overview

This chapter deals with analysis and interpretation of the collected information. The researcher visited the school, parents and students. Researcher takes the responses of the respondent during the face to face interview were carefully noted. the researcher had observed mathematics class with math teacher during teaching learning activities. Then, the classroom observation note was prepared on the basis of the class observation. Every activities and behaviors of the students were carefully observed and noted. The responses of the respondents during faced to face interview were carefully noted. They were able to express freely whatever they have in their mind to analyzed the data., first he collected information were categorized according to different themes given in the vent of interview.

There was no limitation to responses for respondents. They were able to expresses freely whatever they have in their mind. To analyze the data, first collected information categorized according to different themes given in the text of interview. The observation note and themes were considered as code and the similar code version of the respondents were collected and explained in their perspectives.

There are 85 secondary schools in Saptari district according to district education office in Saptari Raj Devi Thaku Devi Jogender Bhagat Secondary School was selected for the study of the factors affecting learning in mathematics. This school lies in the middle of the Saptari district. The surrounding places of the school's area also have such types of diversities.

The Brahmin, Chhetri, Tamang, Magar, Chaudhary, Dalit etc. are the local residents of this area. Mostly, the parents of the students are engaged in agriculture as well as labour. Economically, some people of this area are weak, some even have difficulty to join land and mouth. Initially, at the time of beginning, Raj Devi Thaku Devi Jogender Bhagat Secondary School had a L-shaped building but now the school has an story building and another trust building. There are 50 teachers and 1200 students in school in which 650 boys and 550 girls. There are 35 teachers and 800 students.

Saptari district, a part of province no. 2 is one of the seventy-five district of Nepal. The district with Rajbiraj as its headquarter, cover an area of 1363sq. km and has a population of 639,284 which makes 10th populated district of Nepal. It includes Brahmit, Chhetri, Thakur, Musharar, Muslim, Tharu, Caste, etc. Saptari district is neighbouring to Siraha, Sunsari, Udapur. It is famous for tourism because there are many historical places like Chhinnamasta temple, Syombhunath temple, Bageshwori temple. Saptari district has 5 municipality, Rajbiraj municipality, Kanchanpur municipality, Syombhunath municipality, Saptakoshi & Hanumanngar.

There are some important rivers Koshi, Khanro khola which irrigate Saptari. Chandranahar is important irrigation dam for Saptari district. The famous Chhinamasta Hindu temple also believed by locals in clothing in Nepal in India is one of the Sakti peeths and Kankalini temple are also located in Saptari district. The district can develop as a religious and tourist hub if its infrastructure is created and government seeks development.

School Related Factors

- **Textbook**

A textbook is a manual of instruction in any branch of study. Textbook are produced according to curriculum. Most of the textbooks are only published in printed format many books now are available as online electronic books. The textbook has been crucial role for learning any subject. But the researcher

had pointed over the especially the optional mathematics textbook. C.D.C. has made the syllabus and textbook. Private publications have published different references books. Textbook is important because it is the reservoir of knowledge. It sharps the minds of students. It help to supply the reflection of society, nation and international and university. The researcher asked the question about the textbook, to the head teacher, math teacher, students and parents. The received version in their own word as below :

> "The government has made the syllabus satisfactory. But the linkage of the one chapter to another chapter is different. So it should be more satisfactory if it is reorganized systematically."
>
> [Head teacher]

> "Syllabus is outdated. It should be reformulated. New topics, essential chapters should be added and not essential chapter should be removed."
>
> [Math teacher]

> "We don't know about the syllabus. We are uneducated so we don't know the quality of textbook. So we are unaware about the syllabus. "
>
> [Parents]

> "But somewhere answer are wrong so the wrong answers make a confusion so it should be reedited or revised date to date."
>
> [Students]

I found that the different voices such as satisfactory, reformulated, uneducated. But according to students view, it is found that they were neglecting textbook.

After observing we found that the book followed by school unique publication Pvt. Ltd. as reference book. In this book exercise are lengthy, unnecessary, answer's mistake. Textbook was not concise. The binding of book was not good. Papers were not quality. But the main book which was followed by school, published by CDC, Bhaktpur. It is concise in size. It has few questions in exercise group to solve for students.

There was not suitable textbook, effective practice book so that student could develop there potentiality themself, unit test and class test were done according to teachers interest.

- **Peer Group**

A peer group is both a social and a primary group of people who have similar interest, age, background or social status. The member of this group are likely to influences the person belief and behaviors. Peer group is both a social group and a primary group of students who have similar age , background, interest and behaviours. In other words peer is groups of students in similar types in their age, class, feelings, behaviour etc. Does peer group affect the learning is the desirable questions. For this I made questions and asked the same group and noted their respected voices.

> "Talented students have their own group. They will be busy on their group. But other students are from poor economical background so we can not make discipline tight. So they are not serious in their study."
>
> [Head teacher]

> "Yes definitely, I have made group of talented students. I give them task to solve. Talented students solve easily but poor students are careless."
>
> [Math teacher]

> "Peer group helps the students to learn properly, learn effectively, learn enthusiastically. It helps to students to minimize their problem."
>
> [Parents]

> "We have all students friendship. We have group of talented students. They cooperate us in our study. They are helpful but few students are jealous."
>
> [Students]

I found that the different voices such they are from poor economical background. It helps to learn properly and effectively. They have their group.

After observing we found that students were not busy in solving problems. They were copying from the talented students. They were not looking serious on solving. Girls were sitting according to their group. They had 5 or 6 number of group with classroom. They help their belonging group and neglect the other group.

There was not group coordination between and among students. Some students felt themselves superior some other were poor. One or two students were very good with helping behavior. Student were not regular in classroom.

- **Teacher competency**

Teacher competence refers to "the right way of conveying units of knowledge, application and skills to students." Competence is understood as excellent capability. It includes knowledge, skills, attitudes and experiences, which has to be target category of profession of educator. Competency is the talency, ability to do something. Here teacher competency is to compete with knowledge, course and supply the mathematical knowledge among the students. It is the strongest component according to Walberg (1981). Researcher felt about teacher competency to know from the side of head teacher, math teacher, parents and students view. For this he asked the some question and noted as answers in their respected voices.

> "Here in our school mathematics teacher are qualified, talented. So they can teach the students very effectively but they did not give proper support to the students and give proper time ."
>
> [Head teacher]

> "We accept the competency and tallency of the teacher. In our school all most teacher are BED and MED, MSC, MA passed. Also we are given training by the government."
>
> [Mathematics teacher]

"Nepali teacher is most talented. Math teacher is also talented. Teacher are engaged in politics therefore they are not careful about their students."

[Parents]

"Teacher competency is primary, essential, so that they can pass their knowledge to us very effectively other noise it will be worthless."

[Students]

I found that from the different voices as qualified, talented, effectively, competency is very necessary and important part of learning. It is primary, essential part of learning.

After observing we found that teacher started directly the exercise and started solving he was not democratic teacher. He was roughly presented in the classroom. But sometimes he made crake jokes. He was old traditional teacher in his teaching methods. He was traditional in his methods. He was not using ICT in his classroom. They are not cooperate to each other in their behaviour. They are bounded with politics.

Teacher were capable in academically but they were not using ICT. They were teaching traditionally. Some young teacher were using less ICT. Teachers were not following the teaching methods.

- **Class size**

Class size refers to the number of students in a given course or classroom specifically either the number of students being taught by individual teachers in a course or classroom or the average number of students being taught by teachers in a school district, or education system. The term may also extend to the number of students participating in learning experiences that my not take place in traditional classroom. Class size indicates the number of enrolled students in a classroom. It is the important components. In foreign developed countries has adopted the small class size. But in Nepalese context it

is hard to apply. Researcher willing reaches to optimum level to gather the real information from head teacher, math teacher, parents and students level.

For this he raised questions to them and noted as below :

"We have many students in the classroom. Rooms are full, tight. So we can't give proper time to each students."

[Head teacher]

"It is very difficult to handle the students. We can't give especial focus to the poor students. Talented student ask in the classroom. Poor students sit in the middle and last bench."

[Math teacher]

"We don't know how they sit in the classroom. Teacher should focus all the students equally. They should focus the poor students more than talented students.

[Parents]

"Sir cannot teach soundly. Most of the students busy in out topic discussion. Also they focus to the talented students. They will not care poor student."

[Students]

I found that from above statement as very difficult in Nepalese context, difficult to handle the large size, teacher give must time to talented students etc. From this researcher concluded that it is also very important aspect which affect learning. From the literature review and theoretical understanding, I found that it is the important component. They advised for limited class size. But in the context of Nepal it is not found. Therefore, I suggested the class size should be limited for effective learning.

After observing we found that class size was too big students were tightly sitting. There were almost 60 students in the classroom. Classroom was

noisy. Most of students were busy in making gossip, front line students were only serious in their study. Class had two column and each 8 rows consist 8 benches. Class looked liked hall.

There was big size classroom but students were sitting tightly. No of boys were more than girls. Benches and desk were not suitable for different level of students. Teacher was focusing only talented students proper benches and desk were there.

- **Amount of Homework**

It helps elementary students develop proper study skills which, in turn, influence grades. The national education association along with the national PTA suggests adding 10 minute of homework per night incrementally with each grade level, as a general rule of thumb. Thus a first grader get a total of 10 minutes, a second grader 20 minutes, a third grader 30 minutes, and so on, not to exceed two hour per night total in high school. More than 30 minutes of homework per class may be on exercise in futility because the student can feel overwhelmed by the quantity of work, get distracted or bored and end up giving it a halfhearted effort just to get it done.

Homework is the such task which makes the students busy at home about their classroom task. They search the materials, read the book, write the answer, solve the problem, … etc. Researcher made question related to this. He noted them as their respected voice.

> "We give them to much homework. We have made the strict rule. Talent students solve easily but poor student don't solve because most of time they will be busy in their cornfield."
>
> [Head teacher]

> "Homework make them busy in their classroom. They will solve which will shape their learning. So we focus to give homework."
>
> [Math teachers]

"All the time they say we don't have homework. Therefore they go to play football with their field. Some of them go to cornfield to help their parents."

[Parents]

"Homework is not necessary to give. Teacher will not check our solving even classroom. So they are all time wasn't to be free, out of checking their class work, homework copies."

[Students]

I found that from the respected voices as they are given amount of homework which is necessary. They made them busy in classroom. But students voices are different. It is not necessary.

After observing we found that the teacher gave few number of questions to solve. It was not sufficient to practice the taught lesson. Also classroom activities was not provided to students. Also teach were not caring their homework. Few students had done the homework. Teacher checked two and three copies of homework and started to solve exercise.

Teacher provided too much homework to the students. But teacher did not cheek regularly. So students were careless about their homework.

- **School's Policies for Learning Mathematics**

School's policies play great role in the learning process. A critical study of all aspects such as administration, commodity, relations, students' performance, staff's relations etc. and development of operational policies can reduce all the problems that can be observed at school. The following are some of the representative responses of head teacher, math teacher, parents and students in respective question for school's policies for learning mathematics in the days to come.

"We have started semi-hostel and full hostel facilities at minimum cost for SLC appearing students from this year aiming to 100 percent with

the help of teachers. Recently, we have managed one extra math teacher and started extra classes for grade ten." [Head teacher]

"Students are called for weekly test but they will not come. They say that we have to go our corn field to support our parent."

[Math teacher]

"We have sent our children for extra classes in time but what they do ? Where they do ? We don't. They come to home at evening. But some parent can't send their children for extra class because of their poor economical background."

[Parents]

"The school has provided extra class in the morning at minimum cost but the number of students are some as previous class, so the school should manage us at least two sections by observing the level of students."

[Students]

Especially, the school provided the extra class to support for learning mathematics. So the students are getting happy to pass the SLC exam. For this, the parents are sending their children in time at school and supporting by financially. The above views indicate that a lot of improvements will be done from this year and the process of improvements are still continuing. The result as well as learning of mathematics cannot be no more analyzed due to the beginning of the implementation, but the visions of school are clearly mentioned by head teacher, teacher and parents.

After observing we found that school was running itself without any discipline. There were policies between among teacher. Head teacher was not so tight because he was also the member of political party. School was big in size, with physical facilities. But no regulation was there. But few teacher were conscious about school. They were angry with school's rules and regulation.

School had provided hostel facilities but cost was not high. But students were not in hostel because of their poor economical background. There was not any punishment system for teacher who were engaged in politics, not reward system for regular teachers. Unit test and class test were not running according to rules and regulations. Management committee will not look after any exam to began regularly as not.

Out of School Related Factors

- **Home Environment**

Home environment is the such components which describes about the reading room, parents and other education related behaviours. It is crucial component which is directly associated with learning of students. Some parents are educated while other are not. So they could not make the home environment according to will of students. Because they are poor.

I asked the question to head teacher, math teacher, parents and students and noted them as below.

> "But home environment is very essential part of learning. Most of the students are from poor economical background so that they don't have safe and good home environment. "
>
> [Head teacher]

> "Home environment is crucial part of learning so that it helps to boost up their learning. They are busy with their field in their surrounding."
>
> [Math teacher]

> "We have few rooms in our home. So we can't make concentration our children to their study. So we can't give the home environment to our children."
>
> [Parents]

"We sit together with our family members. We don't have proper home environment in our home. We can't concentrate our mind to study. So we cannot solve all homework properly.."

[Students]

I found from the above statement that environment is essential part of learning. It help to learn every one. But some students were worried about their home environment. Due to poor economical home environment they couldn't learn.

After observing we found that students passed their 2 or 3 hrs in the playground which was near to school. Also home environment was not good. They had small house, few number of room, poor economical background. So they could not get the good home environment to their children. Parents weren't educated, they earned money working in others cornfield. So they had miserable life. But few of parents were educated. They used to send their in boarding school.

Home environment was not good. They had not separate room to study. They used to sit together. They had poor economical background. They used to help their parents in their corn field. So they could not get proper time to study in their home. Most of the parents were engaged in agriculture.

- **Interest of Learner**

Student interest in a topic holds so much power. Factoring for student interests works well with instructional planning based on readiness and learning profiles. One example is student watching videos, listening to speakers, and journaling to make comparisons between social injustices from the past and forms a bullying that occur in today's schools and communities.

First step to differentiate for interests is to find out what student care about and like to do student surveys and learning profile cards are two method for collecting data. Parents and students providing these details send the

message that their experiences matter. That is powerful message to start off the school year or semester.

Interest is associated with the success and failure of life and achievement. Here interest of learner indicates the willingness of students toward subject, behaving with optional mathematics. Researcher has asked the question and noted them in their respected voices as below :

> "Interest of learner plays vital role in learning. So make the classroom effective. But most of the students are not interested in their study because of their home environment."
>
> [Head teacher]

> "We try to make the classroom effectively learning environment. Talent students are interested towards their study but poor students are not focused to their study."
>
> [Math teacher]

> "They are not interested in their study. They go to bed fast not get up in the morning. They are stuborn. They are out of our control."
>
> [Parents]

> "Class books are not tied up with juniour grated books. It is haphazardly edited and formulated. Exercise are not proper. We are not interested to solve because we don't understand teaching."
>
> [Students]

I found from the above statement that interest of learner is the essential part of learning. It helps to gain knowledge. It is depend on the competency of students. Talent students are focused to their learning but poor students neglect study.

After observing we found that there was not extra time to students from teacher side. Students only finish their homework but they did not work seriously and practice extra exercises. There were not motivating activities to

students. Students were not curious to solve homework but not class work. They were coping from talented students. They had no interest in learning.

Students were not interested in mathematics subject. There was traditional teaching strategy therefore students felt bore in their study. Textbook was referred to the government book which was not suitable and enough for practice.

- **Time schedule**

The scheduled time of any crew is the time, calculated at the beginning of the vent, that they should arrive at any given control, which is fixed from the start of the event. A schedule or a timetable, as a basic time management tool, consist of a list of times at which possible tasks, events, or actions are intended to take place, or of a sequence of events in the chronological order in which such things are intended to take place. For ex; calender. Calendar where the person making the schedule can not the dates and times at which various events are planned to occur.

For the mystery of success and failure. There is "invisible hand" which is directly associated. That important components is time schedule. Researcher feels the important components. He asked the question related to this and noted them in their respected voices.

> "We have allocated 40 minutes everyday for optional mathematics. We have divide equal time to equally to all subject."
>
> [Head teacher]

> "Students don't give proper time to the difficult subject. They don't give enough time to their mathematics subject."
>
> [Math teacher]

> "They are lazy. They don't give time to their study. We are from poor economical background. So that we can't make them free all time. They also support in our corn field."
>
> [Parents]

"We don't have proper time to read and give time to all subjects equally. So that we are weak in those subject."

[Students]

I found from the above statement that allocation of time is very important for learning. It should be focused equally on all prioritized. But the students being lazy they don't give proper attention toward study.

After observing we found that teacher was late to classroom. School had allocated 40 minutes time per period. But teacher were not serious about time schedule. They were careless. Some were very serious, they were young teacher. There was 45 minutes break time at 1 pm to 1:45 pm. School had allocated enough time but teacher were not in time. They were 5 minutes late to class every day.

School has allocated equal time to the all subjects. But mathematics and science teacher were late to classroom. Also they were not regular to the classroom.

Chapter - V

FINDINGS, CONCLUSIONS AND IMPLICATION

Chapter Overview

This chapter deals with the major findings of the research and conclusions and implication for further study. The first section revels the summary, the next sections lists the major findings and conclusions derived on the basis of research analysis and finally presents recommendation for further study.

Findings

The following points were observed while conducting this study which are the major findings of the research.

- There was not suitable textbook, effective practice book so that student could develop there potentiality themself, unit test and class test were done according to teachers interest.

- There was not group coordination between and among students. Some students felt themselves superior some other were poor. One or two students were very good with helping behavior. Student were not regular in classroom.

- Teacher were capable in academically but they were not using ICT. They were teaching traditionally. Some young teacher were using less ICT. Teachers were not following the modern teaching methods.

- There was big size classroom but students were sitting tightly. No of boys were more than girls. Benches and desk were not suitable for different level of students. Teacher was focusing only talented students proper benches and desk were there.

- Teacher provided too much homework to the students. But teacher did not cheek regularly. So students were careless about their homework.

- School had provided hostel facilities but cost was not high. But students were not in hostel because of their poor economical background. There was not any punishment system for teacher who were engaged in politics, not reward system for regular teachers. Unit test and class test were not running according to rules and regulations. Management committee will not look after any exam to began regularly as not.

- Home environment was not good. They had not separate room to study. They used to sit together. They had poor economical background. They used to help their parents in their corn field. So they could not get proper time to study in their home. Most of the parents were engaged in agriculture.

- Students were not interested in mathematics subject. There was traditional teaching strategy therefore students felt bore in their study. Textbook was referred to the government book which was not suitable and enough for practice.

- School has allocated equal time to the all subjects. But mathematics and science teacher were late to classroom. Also they were not regular to the classroom.

Conclusions

The following conclusion have been made by this research work.

Unit test and class test is done according to the teachers interest. It is not conducted according to the rules and regulations of school. Management committee will not look after any exam to be taken regularly as not. Students are not regular in classroom. They are absent no regularity of the students attendance. The main occupation of parents is agriculture. Thus, it is difficult to

earn money therefore their income is used for their basic needs. Parents do not have extra money to pay for extra class and hostel. The inter personal relationship between the teachers and students were not maintained properly Teacher biased the students.

The teacher will not follow the required teaching methods. The teaching materials were not well prepared or used in class room. The environment of classroom were effected the economical condition of the school. Due to the poverty there were many lack of facilities. The teacher, students, parents must join hands together to uplift the educational system. The school must provide refresh training to the teacher time and again. Lack of teaching materials and adequate instructional materials were caused of being weak in mathematics learn in school must manage new policies for improvement of teaching learning process.

There are the main factors which are affecting in learning mathematics achievement in secondary level students.

- Educational policies
- Educational system
- Educational environment
- Physical availability at school
- Poor trained teachers in mathematics
- Traditional curriculum
- Paper and pencil test
- Uneducated family background
- Poor management
- Interest of learner, textbook, teacher competency, peer group and time schedule etc.

Implication

From the above findings and conclusions, the researchers would like to suggest some implication for the improvement of mathematics learning of the mathematics.

In the context of Nepal, many students have low learning in mathematics and the trend is still continuing. Only the researcher has researched about factors which affect learning . Although qualified, trained and experiences teachers are working at public schools. Continuous assessment system, implementation of operational mechanism and its continuous analysis, a change from syllabus focus to students outcomes as well as a move form teacher directed classrooms to students centered learning is necessary to maintain quality education at school.

This was the case of one schools so the results cannot be generalized an all situations. It is due to lack of time and resources. Thus, similar researches should be done in large schools district wise. Government should researcher about this problem. Government and policies maker should make good mechanisms so that school can adopt to promote mathematics learning.

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Appendix- A

Classroom Observation Note

The classroom observation note prepared on the basis of following indicators being participant with mathematics teacher during teaching learning activities.

Teacher's Name :

Topic :

Grade : **No. of students :**

1. Physical environment of the classroom.

2. Teaching learning activities.
   i. Beginning of the class
      - Creates and maintains a physical setting that promotes learning.

   ii. Setting the stage for learning.
      - Communicates objectives appropriately.
      - Reviews and relates new learning to previous learning.
      - Raises level of interest in the lesson.

   iii. Acquisition of learning
      - Combines auditory explanation with visual references and student involvement.
      - Checks students' understanding of objectives.
      - Uses motivational techniques to maintain interest and involvement of student.
      - Provides guided for practice.

- Encourages relevant discussion.
- Utilizes flexible grouping for practices.
- Uses a variety of strategies such as discussion, cooperative, peer teaching, project work, class work.
- Checks for individual understanding.
- Communicates the methods of the increasing the ability of thinking topic, formulae, etc.
- Utilizes questioning techniques.
- Provides corrective feedback.
- Provides independent practice.

iv. Integration of teaching materials

- Applies the materials truth.
- Sources of the teaching materials: hand-made, local or bought.
- Student's attractive materials.

v. Closure of lesson

- Relates lesson to objectives.
- Allows for student involvement.
- Reviews the learning of the day to set the stage for the next learning.
- Checks the understanding of students.
- Encourage students to reflect on and take responsibility for their learning.
- Provides assignments/homework/project work relevant to the learning that has been practiced with guidance.

Appendix- B

Guidelines for Interviewing Head teacher

The interview with head teacher took on the basis of following topics.

Name :

Qualification :

Teaching Experience :

- School facilities :

- Classroom management :

- Relation with parents/guardians :

- Opinion towards mathematics learning in classroom :

- Opinion towards low learning in classroom :

- Policies for low learning in classroom :

Appendix- C

Guidelines for Interviewing Mathematics Teacher

The interview with mathematics teacher took on the basis of following topics.

Name :

Qualification :

Teaching Experience :

- School facilities :

- Classroom management :

- Relation with staffs and students:

- Relation with parents/guardians of the students.

- Opinion towards mathematics learning in classroom :

- Opinion towards low learning in classroom :

- Policies for low learning in classroom:

Appendix- D

Guidelines for Interviewing Students

Name :

Roll No.:

Sex :

Place of Residence :

- Opinion on facilities of the school :

- Opinion towards mathematics teaching and learning :

- Opinion towards mathematics learning in classroom:

- Opinion towards mathematics teacher :

- Classroom practice

- Opinion towards causes of low learning in classroom :

- Opinion towards school policy for low learning in classroom:

Appendix- E

Guidelines for Interviewing Parents/Guardians

Name :

Sex :

Qualification :

Occupation :

Family Size :

Annual Income (Approximately) :

Teaching Experience :

- Opinion towards child's educational learning :

- Activities of the child at home :

- Opinion towards schools facilities and policies :

- Relation among school staffs :

- Role at School :