

Chapter-I

INTRODUCTION

Background of the Study

Mathematics is dynamic in nature and essential part of human life. It is etymologically derived from Greek word “Mathema” which means to learn. Mathematics has been developed through the human endeavors in different area has come to the height of development and will still be in the process of development forever.

The knowledge of mathematics is an essential for our society and it has been accepted as an important component of formal education. So, Mathematics has been considered as one of the most important core subject in a schools and colleges throughout the world than any other subject. The mathematics discipline is generally regarded as a difficult and tricky subject but is essential for everyday life and for higher studies especially in the field of science and technology. The mathematics involved in many fields. But the mathematics education explains about the application of theory in every field of human beings. It plays a very important role in building up modern civilization by perfecting all sciences.

Mathematics is also considered as an organized body of knowledge in which each proposition follows the logical consequences of proved proposition. Such mathematical structure is characterized by undefined terms, assumption and rules of logic. Mathematics is an art. As in other arts, mathematics is characterized by order and internal consistency. Mathematics is queen for all sciences. Thus we can say that mathematics is a body of knowledge in the area of sciences with its own symbolism, technology, contents, theorems and techniques.

Achievement of an individual is an outcome of his mental and physical potential. Beside this, experience has gained in the process of exploration and learning. In a study considering the causes of low achievement, it is possible to ignore those aspects in which individuals differ from one another. The starting point may be academic achievement itself where wide range of variations occurs from the point of non-performance to the point of outstanding achievement. If we consider a group of students, it is normal that a few students are found to be high achievers on the one hand, and a few are underachievers on the other, while a sizable number of students usually appear as moderate achievers. The question arises why such a difference in achievement appears when the schools provide more or less uniform instructional and environmental facilities? Is this difference due to certain psychological factors? Does this difference depend upon inherent qualities? Is there any single cause or host of causes, which account for all differences in scholastic achievement? These questions often appear in the minds of educators, educationists and the psychologists, but with hardly satisfactory answers. Various investigations have explored numerous causes which are found responsible for academic success and failure. It has been widely documented that the academic achievement of students is linked to a number of socio-cultural variables. Among the socio-cultural variables associated with academic achievement are the educational and occupational attainment levels of parents, family income and composition, ethnic and language minority status, and the absence of learning material in the home (Arias, 1986; Rumberger, 1983, Steinberge, Blinde, Chan, 1984).

There are several factors that are responsible for the achievement in mathematics of the students. Those factors may be teacher's education, teacher's personality, home environment, instructional materials, individual difference, peer

group, parent's attitudes and socio-economic status etc. The achievement of child depends not only in teacher's part but also in parent's awareness, student interest, previous knowledge, teacher training, revising curriculum textbook, developing resource materials, improving supervision system, improving physical facilities etc. have been made to uplift the achievement and performance level to students.

In the context of Nepal, the achievement in mathematics is very poor in the comparison to the other subjects from junior level to university level. The achievement in mathematics in Secondary Education Examination of 2072 is presented below:

Table: 1.1

Subjects	Grades								
	A ⁺	A	B ⁺	B	C ⁺	C	D ⁺	D	E
C. English	12552	40085	32676	35297	31943	56121	71125	86060	71124
C. Nepali	63	7583	33822	65154	86252	98306	79274	43633	23846
C. Mathematics	23334	23717	24553	29256	33318	44154	53261	58629	146935
C. Science	6827	20970	23208	32849	34353	55842	67081	85615	110274
C. Social Studies	217	6339	23826	45143	64197	89296	96122	65108	46928
C. E.P.H.	4341	40191	52233	79638	78084	86614	52027	28606	14702

Source: Secondary Education Examination report 2072

From the above table, we can see that most of the students got low grades in mathematics. It shows that very less students want to read it.

The school achievement of regular students in compulsory Mathematics in different three years of Bhaktapur district is presented below:

Table:1.2

Subject Year	English	Nepali	Mathematics	Science	Social	HPE
2070	51%	66.66%	31.24%	41.11%	44.68%	71%
2071	48.85%	70.32%	33.12%	40.23%	46.05%	72.65%
2072	49%	69%	32%	40%	49%	68.12%

Source: District Education Office, Bhaktapur.

The above table shows the result of grade IX students on different subjects of past three years on three different schools of Bhaktapur district. This shows that maximum numbers of students are poor in Mathematics and Science. The researcher found that maximum number of students had low achievement in Mathematics and Science mainly. Being a student of Mathematics, researcher thought that there are problems and decided to find out them. Hence, the researchers choose three schools of Bhaktapur district and try to find the reasons.

Secondary level education is very important level in Nepal. In this level, grade IX is the first step. The achievement in mathematics in this level is very poor. So, it is needed to study the causes of low achievement in mathematics. Thus this study is proposed to determine the causes of low achievement in mathematics at grade IX at Bhaktapur district.

Statement of the Problem

Mathematics is a very useful subject in human life. Mathematics is considered as very important subject in secondary level and hence at grade IX. Although the achievement in grade IX students seen to be very weak (32.12% in average). The

great deal of the time, money, effort and manpower of the nation goes into the education system and to improve it. The educationist and professionals are facing the challenges with the low achievement in mathematics and it seems that it is affected by various factors like home and school environment, physical facilities, attitude towards peer group, teaching learning process, materials used in teaching mathematics etc.

The main purpose of this study was to find out the causes of low achievement in mathematics at Secondary level of Public School. The following questions mimic the problems of my study:

- What are the probable causes of low achievement of students in mathematics at grade IX?
- How can we improve the student's achievement in mathematics at grade IX?

Objectives of the Study

The general objective of this study is to analyze the causes of low achievement of grade IX students in mathematics. The specific objectives of this study are stated as follows:

- To find out the causes of low achievement of grade IX students in mathematics in Bhaktapur district.
- To provide the suggestive measures for the improvement of achievement in mathematics.

Significance of the Study

Mathematics is one the most important subject of school education. It has been taught for all students as a compulsory subject in the school level. This study is expected to be significant for the reason that it would help to determine the causes of low achievement in mathematics which can use to improve the mathematics

teaching/learning process and to reduce the failure rate in mathematics. This study provides the appropriate information about the difficulties of students in learning mathematics. This study also expected to open the door for further research in the field of learning problems of students. Significance of this study can be listed as follows:

- This study intended to find the causes of low achievement in mathematics which may be valuable for teachers, curriculum designer and other stakeholder related to education.
- This study would be useful for the various NGO, INGO and related committee.
- This study would help the curriculum designer.
- This study would help the government to improve the policy in the field of education.

Delimitation of the Study

This study is delimited with the following aspects:

- The result of this study cannot be generalizable for all secondary level students of public schools.
- This study was conducted in Bhaktapur district of Nepal only.
- Only three schools were selected for the study.
- The study focused to find the causes of low achievement of students of grade IX in public school only.

Definition of Related Terms

Achievement: The term achievement in this study is defined as the marks obtained by the students in the final examination of grade IX in 2070, 2071 and 2072 below 35%.

Motivation: Motivation is related to teachers' activities in classroom, where teacher's strategies, fantastic, romanticism and use different activities.

Physical facilities: Physical facilities in this study refers well-furnished classroom, manageable library, availability of references books.

Prior knowledge: The knowledge already learned by the students in his study area is mentioned as the prior knowledge in the study.

Public School: Public school refers to a school which is funded and operated by the government.

Chapter-II

REVIEW OF RELATED LITERATURE

Review of related literature is very difficult task. It explores the deep insight and clear perspective of the overall field. The main purpose of review of related literature is to find out what works have been done in the area of the research problem under study and what has not been done in the field of study being under taken. The review of related literature helps to make the concepts clear for the study and also directed to analyzed and interpret the data. There are some study related to achievement of mathematics is review for this study. Few related literature are given below:

Empirical Literature

Lamichhane (2001) did a research on “A comparative study of mathematics achievements of primary level students”. The objectives of this study was to compare the mathematics achievements of the children under grade teaching and subject teaching and to find the attitude of grade teachers towards grade teaching and its relationship with students’ achievements in mathematics. The conclusions were: The mean scores of the students under the grade teaching were higher than the mean score of the students under subject teaching. There were a positive attitude of grade teachers towards grade teaching and the correlation between attitudes of grade teachers with the students’ achievement was found to be 0.73 and it was found significant at 0.05 levels.

Rahman (2003) did his Ph.D. research work on “A study of achievement in mathematics of grade V students of different ethnic group of Nepal” from institute of advanced studies in education, university of Lukhnow, India with the aims to compare the mathematics achievement of grade V students if difference ethnic groups,

Tamang, Magar, Tharu and Sarki to find out the difference in achievement of different ethnic group in different subject areas arithmetic, algebra and geometry. He did get other objectives to find out the difference in achievement if different ethnic group in different domain, knowledge, skills, comprehension and application. A survey methods was adopted the sample was selected by stratifies random sampling techniques and means, S.D., t-test, f-test, parson coefficient of correlation were used to make conclusion of the study.

Bhatta (2010) studied "Causes of failures in mathematics in the SLC examination in an ineffective school of Sindhupalchok" with the objective to identify causes of failure in SLC examination from ineffective school in Sindhupalchok district and find out the effect of causing variables and low performance of students on effective school of Sindhupalchok district. This research was descriptive and quantitative in nature. So the researcher has used qualitative and quantitative data only. The failure students from ineffective school were selected as sample of this study according to gender and previous academic background. Among them 20 exempted candidates were selected to collect primary and secondary data for this case study. The interview, class observation from and school document were used as the tools for this study to validate the tools. Students and teacher both have devotion and labor towards mathematics learning and teaching strategy technique like motivation seemed less in teachers that increases failure.

Janwali (2007) studied on the topic "Causes that affect mathematics achievement of girl's students" and determine the correlation between affecting factor 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 20 sample students from different school of

rural and urban area. Researcher visited each of the sample school. In this study, one set of questionnaire was developed and three point Likert Scale for the response of the respondent were developed for the collection of needed information which was used for student. Two school were selected from Kathmandu valley to implement procedure to testing the ability and validity. The collected data from the informants were analyzed and interpreted to identify the effort of school related factors and out of the school factors. From this, the teachers and parents were equally responsible for the girls' student low achievement. To improve this, he suggested that the environment of home and school should be good.

Sapkota (2011) studied on "Causes of failure in mathematics at public school in Lalitpur district". The objectives of this research were to find the cause of failure in mathematics as 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 respondents of the cause study were students, corresponding parent, teacher and head teacher. From the case schools six low achiever students including three boys and three girls were selected according to differ family background and performance in mathematics examination. To collect the primary and secondary data school documents, observation note and interview guideline were used. This research concluded that classroom practice, home environment, parent's guidance and the teaching learning activities were the causes of low achievement. Achievement of students is always affected by different variable such as schools learning environment facilities at home, classroom environment school policies, mathematics instruction and assessment of classroom.

Panta (2014) conducted a research study on the topic "Causes of low achievement in mathematics of girls students". The main objectives of this study was

to identify the causes of low achievement of girl students in mathematics as secondary level and to find out the ways of using materials, strategies and procedures for mathematics learning. The study is design as the case study, related to causes of low achievement in mathematics of girl's student, which is qualitative and descriptive in nature. Girl students have not enough time for home study and to do exercise practice of mathematics as home because of household woks and domestic problems. Because of uneducated parents culture of the home is also not good for study. And concluded that lack of student oriented teaching learning process, bad school environment and home environment, negative attitude towards mathematics of girls, no interaction with teacher, no per group discussion, no discussion with senior, no homework checked, no class work is given, no library and instruction materials provided for students are the major factors of causes of low achievement.

Theoretical Literature

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 perspectives and multiple intelligence and so on. There are so many theories which can be used to understand the learning. 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 interoperate the data of mathematics of resolve the problems. 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". 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.

Socio- Cultural Theory

Socio- cultural theory grew from the work of seminal psychologist Lev Vygotsky (1978), for the development of higher order who believed that parents, caregivers, peers and the culture at large were responsible for the development of higher order functions. According to Vygotsky, “Every function in the Child’s cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter psychological) and then inside the child (intra psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher function originates as actual relationships between individuals.”

Vygotsky was a contemporary of other great thinkers such as Freud, Skinner, and Piaget, but his early death at age of 38 and suppression of his work in Stalinist Russia left him in relative obscurity until fairly recently. As his work became more widely published, his ideas have grown increasingly influential in areas including child development, cognitive psychology and education. Socio-cultural theory focuses not only how adults and peers influence individual learning, but also on how cultural beliefs and attitudes impact how instruction and learning take place.

Constructivism

Constructivism becomes related to educational theory to deal with the problems of mathematics. It resolves the problem of low achiever in mathematics. It is a theory based on observation and scientific study to deal the problem of learning. It asserts on forming the understanding and knowledge of the world through experiencing things. When we encounter something, our mind perceives the things

and reconcile with previous ideas which has already existed or reconciled 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 encourages the student to involve themselves actively and use techniques of learner centered, group work discussion, learning by doing, use outside tools to be more practical and gain high achievement in mathematics rather than classroom it focus on real life learning environment, social interaction and use of complex idea share with others outside of classroom easily. Constructivism transforms the students from passive receipting of information to active participant in teaching process. Constructivism based on three axioms that are as follows.

- Learners learn 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 three terms action, reflection and scaffolding to describe three broad aspects of constructivism, psychological aspect, philosophical aspect and sociological aspect. Piaget stresses on the key word "action" through which he advocates 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 Glasserfeid who also advocates social constructivism leaded by Vygotsky, who states that knowledge is socially constructed.

Conceptual Framework

This study is related to the causes of low achievement of mathematics at grade IX students. This study is mainly based on the theory of social constructivism of mathematics learning which is advocated by Vygotsky.

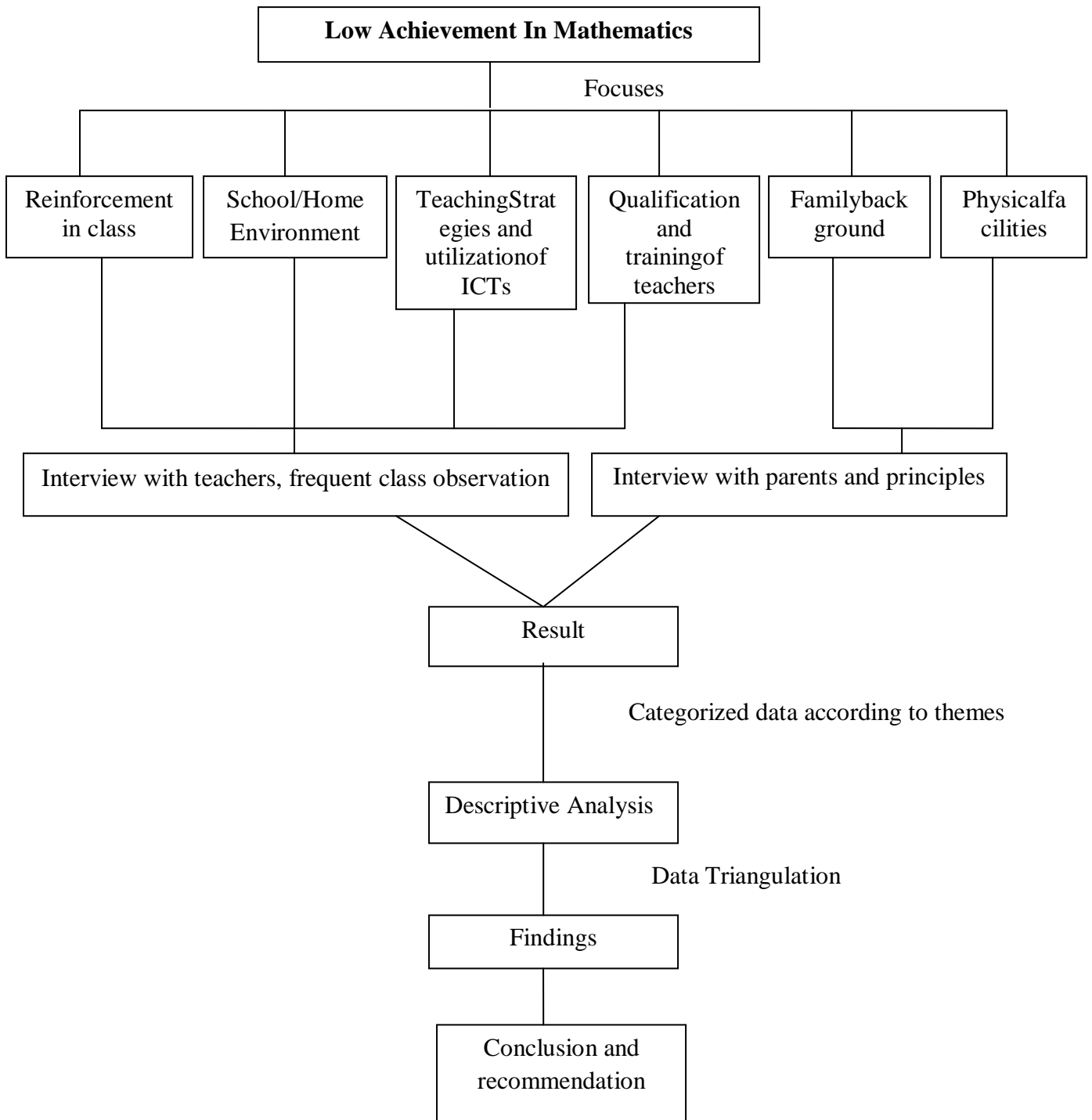


Fig: Causes of Low Achievement in Mathematics in Secondary Level.

There may be various causes which result low achievement in mathematics.

From the above literature, the researcher found that there are so many causes which results low achievement in mathematics. Among them, the researcher picked up some major causes to analyze the students' achievement, which are; reinforcement in class, family background, teacher's training and qualification, school and home environment, physical facilities in school, teaching strategies and use of ICT in mathematics. The major concern of this study was to find out the contribution of those causes on low achievement in mathematics.

Chapter-III

METHODS AND PROCEDURE

This chapter deals with the procedure of the study. It determines how the research becomes complete and systematic. The method applied in this study as discussed in the following sections: research design, population of the study, sample of the study, source of data, tools/instruments, data collection procedure, scoring procedure and data analysis procedure.

Research Design

Research design is the conceptual structure, strategy of the logical, systematic plan and direction of research. It is a way through which the researcher to reach the goal of research to collect data, interpret and analyze it. This is a case study, to find the causes of low achievement of students in mathematics at grade IX. Hence this study is qualitative and descriptive in nature.

Population and Sample

A research population is also known as a well-defined collection of individuals or objects that is the main focus of scientific query. There are 87 public secondary schools in Bhaktapur district, out of them three schools (Medha Secondary school, Mahendra Shanti Seondary School and Janapremi Secondary School) with one students from each schools were selected as sample by purposive sampling

Research Tools

Anything that becomes a means of collecting information for the study is called a research tool or research instrument (Gall, 2003). Constructing a research tool is the first practical step in carrying out the research process. A researcher will need to decide how he/she will collect the data then should construct a research instruments for this. School documents, interview guideline, class observation forms are the key

tools to collect the data. The research tools may vary according to the nature of the study. There is different research tools used in qualitative and descriptive research.

Out of them the following tools were adopted in this study:

Classroom observation form

For classroom observation, the researcher used the classroom observation form provided by Department of Education, adding some more points. The researcher took several class observations to collect the data and then categorized them according to the themes.

Interview guidelines

Guidelines were used to take interview from students, head teacher, math teacher and parents which was prepared on the basis of theoretical literature related to this study and objectives.

School Documents

Teacher profiles, record of students, mark ledger, attendance, additional supports provided to students and other related documents were studied.

Reliability and Validity of Tools

Reliability is the degree to which an assessment tool produces stable and consistent results. Validity refers to how well a test measures what it is purported to measure. Reliability and validity of the research tools was determined with the help of related theory and suggestion of subject expert. Further Cross match had been adopted to maintain the trust of the study. The frequent class observation was done to check the consistency of methods and procedures used in classroom. Also the researcher tried to ensure the internal validity by observing the same data on the basis of theoretical framework developed by the researcher in previous section.

Sources of Data

Both primary and secondary data were used in this study. Secondary data were collected from school records and primary data were collected from the interview, classroom observation and oral and written exam.

Data Collection Procedures

Data and information were collected by using interview schedule and classroom observation. The schools records were studied such as mark ledger of school, student teachers profile, physical facilities and other relevant documents. The classroom was observed with the participation of math teacher and students of grade IX of case school for a week in three different schools (1 week for each school). The researcher recorded the behavior and activities of both teacher and students during teaching learning activities using tape recorder, camera and video camera. Head teacher, subject teacher and sampled students as well as their parents were interviewed. All answers were noted and recorded during the course of interview, focus point of interview on achievement in mathematics of students, schools facilities, vision of school towards low achiever students, policies that were adopted by school for low achiever students and so on were conducted.

Data Analysis Procedures

In qualitative research, information is also synthesized through different form of theories and literatures, Denzin and Lincoln (2005) see the qualitative research is a process in which variety of levels are occurred, including theory, analysis, ontology, epistemology and methodology. They further state that data analysis includes creation of field text consisting of field notes and document from the field recreate research text, product working interpretative documents and finally public text. In this manner, data analysis consist of examine, categorizing, tabulating, or otherwise recombining

the evidence to address the initial proposition of a study. While the researcher started to analyze the field information, the researcher tried to understand the whole information in the form of the themes. First the researcher tried to put the information into number of categories. While developing the themes, the researcher searched for number of theories, articles, research report and other relevant mater.

The collected data in this study were analyzed in qualitative procedure and based on descriptive analysis. The information was collected from the observation and interview by questioning the present status of school facilities, student teacher activities, and closure of lesson, used methodology and materials in classroom teaching. The collected information from classroom observation, interview guideline and school documents first categorize according to the category of the respondents and then different themes were taken. These themes consider as similar code version according to the response of respondents and explain in their perspectives. In qualitative research design, data are gained and analyzed by descriptive and interpretative method. Primary data was organized according to individual respondents on interview, observation, documents analysis.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the analysis and interpretation of the collected information. The researcher minutely studied the school's documents such as teacher profiles, mark ledgers, attendance as well as the records of the sampled students. Also, the researcher had observed mathematics class of grade IX being participant with math teacher regularly for some days 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 and teacher were carefully observed and noted. The direct interview was taken to the students, math teacher, head teacher and parents. The responses of the respondents during face to face interview were carefully noted. There was no limitation for respondents for responses. They were able to express freely whatever they have in their mind. The data were analyzed with the help of collected information from observation interview and school record.

Background of the Case School

Bhaktapur is also known as Bhadgaon or Khopa. It is an ancient Newar city in the east corner of Kathmandu Valley, Nepal, about 8 miles(13 km) from the capital city, Kathmandu. It lies in the state number 3 of Federal Republic of Nepal.

Bhaktapur was largest kingdom among them three Newar kingdoms of the Kathmandu Valley. It was the capital of Nepal during the great 'Malla Kingdom' until the second half of the 15th century.

The climate and geographical structure of this place is good. In this district, there are 87 public secondary schools. Among them, I had chosen three secondary schools, whose brief descriptions were as follows:

Medha Secondary School

Medha Secondary School, which is one of the oldest educational institutions of Bhaktapur. It is located at ward no. 16 of Bhaktapur Municipality. This school was established on 2004 B.S.

The number of passed and failed students in mathematics of grade IX of Medha Secondary School was as follows:

Table: 1.3

Grade IX result of past three years of Medha Secondary School

Year	No. of students appeared in an exam	No. of passed students	No of failed students	No of failed in mathematics
2071	40	23	17	15
2072	36	23	13	11
2073	39	20	19	16

(Source: School administration)

From the above table, 40% students were failed; among them 85.71% students were failed in mathematics. It showed that most of the students were failed in mathematics which increases the rate of failed students.

MahendraShanti Secondary School

Another school that I had chosen was Mahendra Shanti Secondary School which is located at Balkot, Suryabinayak Municipality-1, Bhaktapur.

The figure of passed and failed students in mathematics of grade IX from last three years of Mahendra Shanti Secondary school was as follows:

Table: 1.4**Grade IX result of past three years of Mahendra Shanti Secondary School**

Year	No. of students appeared in an exam	No. of passed students	No of failed students	No of failed in mathematics
2070	35	18	17	12
2071	30	20	10	8
2072	32	18	14	10

(Source: School administration)

Above table showed that 42.27% students were failed; among them 73.17% students were failed in mathematics. This showed that the mathematics' result increased the failed percent.

Janapremi Secondary School

And, third school was Janapremi Secondary School, located at Gaththaghar, Madhyapur Thimi Municipality-4, Bhaktapur.

The figure of passed and failed students in mathematics of Janapremi Secondary School was as follows:

Table: 1.5**Grade IX result of past three years of Janapremi Secondary School**

Year	No. of students appeared in an exam	No. of passed students	No of failed students	No of failed in mathematics
2070	25	10	15	9
2071	30	20	10	8
2072	28	18	10	7

(Source: School administration)

From the above tables, we can analyze that 68.57% students were failed in mathematics out of 42.17% failed students from last three years.

The surrounding places of the schools were rich in diversities of different ethnic groups, of different economic groups. Usually, people migrated from Ramechhap, Kavre, Sindhupalchok etc. and also people from different parts of the nation were found easily including the different indigenous groups, the brahmins, dalits etc. Especially, Newar. the local residence of this area. Many parents of the students were mostly found in job, business, abroad and very few were engaged in agriculture.

Reinforcement in Classroom

Reinforcement is tools which encourage students to learn and increase the rate of learning by their personal experiences. It helps to the students to construct the knowledge by their activities. Students cannot construct knowledge just by passively receiving, acquiring or accepting. Students need to be involved, participating, constructing and cooperating. For this, students should be encouraged and facilitated by the teacher. There are two types of reinforcement such as positive and negative reinforcement. Reward, encouragement and money etc. are the positive reinforcement. It is observed that the teacher encourages sometime to the students by emphasizing academic task with class work. Teacher also provides feedback by guiding the students along the objectives of the lesson.

Episode 1

I observed grade 9 of Mahendra Shanti Secondary School. The time was 11:15 a.m. The beginning of the class was respectable as usual. There were 22 students in class. The classroom environment was peaceful.

The teacher started the class with recall the previous knowledge about the 'Profit and loss'. He wrote the some formulae and started the lesson. He chose the some problem from exercise and solved them which were copied by students. He explained again that solution and asked to the students for any confusion. Then he gave classwork which was solved by 4 students. He checked them and says 'Good' to students. Rest of the students couldn't solve. Teacher called one of the talent students to solve that problem in the whiteboard and the student solved that. Teacher was thankful to her. After that teacher gave some hints for remaining problem and told them that was homework. At last he gave threaten to the students that if they didn't do their homework then he will give punished. Lastly, teacher existed from classroom.

Above observation shows, there was poor motivation and reinforcement in the classroom teaching. The researcher observed the class regularly for a week and the environment of the class were similar as above. The researcher didn't see such an incorrigible conversation with students. Teacher just forced to do homework but the teacher didn't check every day properly. Students didn't share their problem freely, so they were feeling weak in mathematics every day. Teacher was not using student center approach for effective learning. Teacher did not have any plan for weak students. Further, no any teaching materials were used. This shows that there were lacks of reinforcement for students.

Episode II

I observed another class at Medha Secondary School. It was first period and was of optional mathematics. The beginning of the class was peaceful and respectable. Then teacher started the class with revising the previous lesson. The teacher derived some formulae and explained. Then students copied those and teacher asked to the students if there were any confusion or not. After that, teacher solved a problem and gave classwork to the students. Five students solved the given problem and rests of the students were unable to solve that. Teacher said good and very good to the students who solved the problem. Then teacher gave hints and moved to next problem. Teacher followed the same activities as before. Teachers gave some more problems and gave homework and leave the class. The researcher didn't see any reinforcement given by the teacher to the students.

From this observation, the researcher found that the teaching learning process was still teacher centered and the condition of reinforcement was very poor. Students were passive, which shows that they were just listening or receiving the knowledge from the teacher rather than constructing the knowledge themselves. The researcher did not see any environment where they had the opportunity to construct knowledge. Students were copying and solving the problems following the methods that teacher told. The encouragement to the students to learn mathematics was almost zero. So, students always felt that the mathematics subject is a hard subject and most of the students didn't take seriously.

Episode III

Similarly I visited another school, Janapremi Secondary School. The class was started from 1:10 p.m. the mathematics teacher and the researcher interred together in the class and the environment was respectful to the teacher. The teacher wrote the topic of lesson 'Surds'.

Teacher revised the meaning of surds and the rules of surds and teacher solved one problem and explained it later. Students copied that and a student asked a question about his confusion. Teacher reacted negatively and yelling to him and later he explained again. After that, the teacher gave a classwork. 5 students solved that and showed to the teacher. He gave suggestion on the students' mistakes and said very good who did write. He did not give any attention to the weak students and he moved to the next questions. He solved one more problem and described that later. After that, he gave homework to the students and existed from the class.

In this observation, the researcher found that the reinforcement in that class was very poor. Furthermore, he didn't do any activities to the weak students. He didn't focus those weak students. So, students were not encouraged to study mathematics and they felt that the mathematics is a hard subject.

Some representative responses of the student and teacher about reinforcement were:

"I reinforced the students by saying something interesting and providing curiosities cooperation etc."

(Mathematics Teachers' view of Medha Secondary School)

"School sometime provide us reward like copy, pen diary etc. When, we get the best position in the class in field of the school evaluation."

(Students' view of Mahendra Shanti Secondary School)

"Teacher never encourages us by providing the guidance about learning for our golden future. He didn't focus that we should labor hard for better position in math"

(Students' view of Mahendra Shanti Secondary School)

The above views foster that teacher never provides the feedback for better position of students. Various kinds of reward can provided for holistic development of students in any field of evaluation system. This is the progressive behavior of the school for better performance of students. So, above opportunity provided by the school did not sufficient to encourage the students in learning process.

When one of the absent student asked about the previous class problems then teacher replied;" It was taught yesterday, why did you absent? Ask with your friends". After the class observation time, researcher asked to the students "Why youare not questioning to the teacher about subject matter? " They replied we were suffering from fear of the teacher, he is strict teacher.

Social constructivism theory explain that motivation is the key component for learning which makes classroom more interesting and encouraging. Teacher should a facilitator in the classroom and should provide positive reinforcement. The positive reinforcement is always emphasizing in good learning.

Thus, there is lack of encouragement, motivation, various extra activities and feedback as reinforcement in mathematics learning. So, this is the responsible causes of low achievement in mathematics.

School/Home Environment

School's environment has very important role to delivered knowledge to the students. Students can construct the knowledge if the school environment is peaceful and student friendly. Disturbance of vehicles, poor physical structure, dust etc. hampers the learning environment. Being a researcher, I visited the school and home of respective students⁷. At that time, I found the following environment:

In Medha secondary School, the class was running as usual formal activities from both teacher and students. The desk and benches were kept in two columns and sufficient for students. Boys were in one column and girls were in another column. The classroom was clean and well swept. It was well ventilated but there were no fans. The whiteboard was clean and in front of students. But I found that there was sound pollution due to the vehicles in the road. There were 35 students out of them 6 students were absent on that day. Also, I visited the A students' home. I told all things to his parents about my research and I started to ask them some questions about their home environment. I found that they lived in rent and they had two rooms. One room is for children where three brothers and sisters stayed together. And another room was for their parents and kitchen. The buildings had three flats and had 4 rooms on each flat. Almost all rooms of that building were in rent and four families were lived there. There was not learning environment due to the sound pollution and congested space.

Also, the researcher visited student B's School; Mahendra Shanti Secondary School and home. The school was in the Balkot Chok and it had two buildings with 15 rooms. Classrooms were well managed. But the surrounding's environment was polluted by the dust and sound from road. Even though, school's environment was good. And then I visited home of student B. She lived in her own home. Her parents were farmer

and they were uneducated. Student had to help their parents. Student had to manage her time and learning environment herself. So, she didn't have such a good learning environment.

In Janapremi Secondary School was in the side of highway, Gathghar, Bhaktapur. The class was running as usual formal activities from both teacher and students. The arrangement of desk and benches were good. Boys were in one column and girls were in another column. The classroom was clean and well swept. The whiteboard was clean and in front of students. But I found that there was sound pollution due to the vehicles in the road. Also, I visited the A students' home. I found that they lived in rent and they lived in a flat. His parents were educated and both of them were job holder in private company. They were busy on their work and they said that they couldn't give enough time for their children.

From the above research, researcher collected some views of Head teacher, teacher, students and parents about the environment of school and home. Some of the representative views were as follows:

"We managed school environment well as we can. In our school, the students are from different districts having different cultural backgrounds, caste and socio-economic status. Mainly, students from middle and low socio-economic status are studying here."

(Head teacher of Janapremi Secondary School)

"In grade nine, the students with different cognitive level could be found easily. Many of the students always fail in mathematics."

(Math teacher of Janapremmi Secondary School)

"Our class is well facilitated. Many of friends are getting under poverty, so they do not have necessary materials with them and they make some noise in the class." (Student A)

The researcher found that there were different categories of families from different districts. Also, the management of the classroom was good but not sufficient for the learners. The learning environments were affected by the vehicle's sound and the dust from the road. Thus the school environment was the main cause to have low achievement in mathematics.

Family Background

Most of the time, students spend their time in home. Their culture shaped their mental abilities. How they spent their time in home is very important for their academic achievement. If student doesn't get time to study at home because of the household work or other activities then it hamper in the study. Some of the representative responses of students, teacher and their parents about their home environment are as follows:

"My father and mother both are engaged in their work. So i don't get time to study at home."

(Student A)

"The children do help in the household work because we are busy in our work. We cannot give time for our child."

(Parent of student C)

"Parents are busy on their works; they just say study well to their child. They focus only on their work and they are not aware of the children's study."

(Teacher of Medha Secondary School)

From the above fact it was found that most of the students don't get sufficient time at home to do homework due to household work. To do practice in mathematics, students didn't get sufficient time at home and they were not focusing on this at home. Most of the student's home environment was not good for learning. The economic situation was weak and environment was not appropriate while they stayed at home, they passed their time in house by doing household work and by watching television. Most of the student's didn't get opportunity of study at home and so they were likely to be weak in mathematics. The following response was obtained when asked "How does social tradition affect the children achievements.

"The society has the conventional belief that education for low caste is of little use".

(Parent of Student B)

"It is better for the children to learn the traditional occupation followed by their father instead of wasting time in obtaining education."

(Parent of Student C)

From the above response there is psychological domination facing in their daily life which prevents them from building up their confidence which ultimately affects their performance level in Math. They hesitate to show their exposure values regarding education.

The responses of teachers' on "How does socio-economic status affect the learning of the students"? were as follows:

Because of weak economic status they can't afford in education.

(Teacher of Medha Secondary School)

Majority of the students are from poor family so, they are reeling throughout the academic year.

(Teacher of Mahendra Shanti Secondary School)

"More crises lead them to leave the school".

(Teacher of Janapremi Secondary School)

It is concluded that most of the parents were from poor family. To meet their demands, they have to do work in home that makes irregular in the school. Poor economic condition create crisis in home with the family members. So it hampers their performance level in mathematics. Those students were from poor economic condition they were not adjusted with other friends and they seemed to be nervous all the day.

Similarly, the researcher asked students; "How is the parents' influence in your study". The Responses were:

"My father did not complete the school education, so I don't get any academic support."

(Student A)

"My father is illiterate."

(Student B)

From the above views shows that most of the parents are uneducated or just literate and they have not any idea that hinders the performance in mathematics. Students spend their most of the time in home than in school, but they did not have such student friendly environment in home. So, most of the students spend their time by playing game or watching television or sleeping or any like this. Thus, family members' education plays important role in students' learning environment.

Illiterate family cannot guide their child properly. They enforce children to engage in

household work so that the achievement of student achievement is obviously decreased. It shows that they did not have good environment at home and they were not free to study. They had not enough time to practice at home because of household problems. Hence, it is concluded that family background is one of the main cause to have low achievement in mathematics of students.

Teaching Strategies and use of ICT

It plays great role in the students' achievement. It includes all the functions that are used inside classroom to achieve the goal of lesson. While observing the classes, Researcher found that teachers were using the teacher center methods rather than student centered teaching methods. Teacher did not use any relevant teaching materials during teaching learning activities. Teacher was try to participate all students in discussion but only limited numbers of students were participating on discussion. The teacher was always using questioning techniques to every student to find out the level of understanding of students. He was trying to encourage low achiever students in discussion and help to engage on tasks. There were not any provision for ICTs and the use of ICTs in mathematics seemed to be zero. Teachers were not giving any idea to use ICTs for students. Some responses of respondents on using ICTs were as follows:

We have no idea how to use ICTs in mathematics teaching.

(Teachers' view)

Our school has poor economic condition so we cannot manage ICTs.

Government hasn't given such materials till now.

(Head teachers' view)

Our teacher never used ICTs while teaching mathematics.

(Students' view)

From above view, the researcher found that the uses of ICTs were almost zero and the mathematics' classes were held almost traditionally.

Motivation is the key component for learning which makes classroom more interesting and encouraging the students. Teacher should be a facilitator in the classroom and should provide positive reinforcement. The positive reinforcement always emphasize good learning environment. Thus, it is concluded that teaching learning process and use of ICTs are the major aspect of school for the betterment of student achievement. School administration should manage for the ICTs and also, teacher should pay attention to improve the teaching-learning environment otherwise students' progress tends to zero. Thus, teaching strategies and utilization of ICT are also the causes for low achievement in mathematics.

Qualification and Training of the Teacher

This study intends to find the causes of low achievement of student in mathematics. In teaching-learning process, not only the knowledge of particular subject matter but also need to have pedagogical knowledge. Teachers' competencies should closely link to students' thinking, understanding and learning mathematics.

Recurrent teacher training has been adopted as a major strategy for enhancing the quality of student achievement. It is assumed that opportunities for professional development through recurrent training lead to improve professionalism, dedication and motivation, which positively contribute in students' achievements.

The views of mathematics teacher about teacher competency in mathematics education were:

"School hasn't provided any refreshment training for new knowledge and betterment of our teaching even though I am trained teacher. School doesn't have sufficient teaching materials, ICT's and reference book, training and

qualifications are the most important factor in the development of teacher competency."

(Teacher of Medha Secondary School)

The above responses of teacher indicated that there is a lack of teacher competency in math education. There isn't any refreshing and need base training. So the case school should improve this problem for betterment result. The views of head teacher about qualification and training of the teacher as mentioned below.

"We aren't able to provide refreshment training for the teacher and to collect sufficient materials because of lack of economic sources; we have not any permanent economic source".

(Head Teacher of Medha Secondary School)

The above views of head teacher claims that various problems related to qualification and teacher training due to the lack of economic condition. There were also lacks of reference book. Hence we can't expect better result without improving the economic condition of the school.

Hence from the above views of math teacher and head teacher the researcher claim that various problems are created because of poor economic condition of the school. So, this problem should be improved timely for betterment. Therefore qualification and training of teachers are also the causes of low achievement in mathematics.

Physical Facilities

Physical facilities are the most important factor in teaching learning activities. Teaching learning environment of school depends upon it. Without this, teaching learning activities cannot hold properly. So, it plays vital role in the student's achievement. According to the collected data, each school had enough buildings and

classroom. They have enough desk-bench, toilets and playground but very poor arrangement. Physical comfort and environment of school consider as essential part of school environment. Thus, the role of Physical facilities plays significant role in the better performance of school. So without managing good physical and instructional facilities in school, students can't get peaceful environment and hence they can't learn effectively. The classroom is considered as a heart and the school in the educational system. Therefore it is also the responsible factor for causes of low achievement in mathematics. The condition of physical status of research schools were as follows:

Medha Secondary School is located within the area of 1.5 ropani. The school's building was surrounded by walls. They have separate buildings with enough rooms which were large, painted as well as ventilated well. There was a library room but not adequate books and reference materials. The school also had science lab. There were 257 students and 23 staffs.

Mahendra Shanti School is located within 2 ropani. This School has 2 building with 15 classroom, 3 toilets, 2 staff's room, a canteen, a playground and a science lab. There were 235 students and 21 staffs.

Janapremi Secondary School had 215 students and 24 staffs. The schools had two buildings. There were enough classrooms, desk bench but no library room as well as mathematics lab. They had playground but not enough for 215 students. There were toilets and drinking water facilities.

The representative response of head teachers, teachers and students about school condition were:

"The school hasn't sufficient teaching materials for mathematics, science laboratory, Computer and Library but the school is planning to manage those required materials for better education.

(Head Teacher of Mahendra Shanti School)

"Our school has a library which is small in size so we cannot get sufficient reading materials other than newspaper"

(Student A of Medha Secondary School)

"The School has no any reference books related to mathematics. Only textbook is read. It has no provision of enough library room. I encourage them to study references books from different places".

(Math teacher of Mahendra Shanti Secondary School)

From the above facts it was concluded that lack of physical facility and entire infrastructure of school has affected in the mathematics achievements of the students. As social constructivism states that individual creates meaning through their interaction with each other and with the environment they live in. So the physical facility and infrastructure definitely affected the mathematics achievement.

Evaluation Process

Teaching is considered as both science and art. A well trained teacher only can use different instructional techniques in the classroom to address for all cognitive level students. Before going to classroom, systematic plan is necessary to achieve the goal. The plan about objectives of lesson, activities to be performed at classroom, techniques of student's engagement in cooperative tasks and assessment techniques to be applied in and outside classroom are very important.

Assessment of students in to the classroom had usually been implemented and measured using limited forms of tasks generally referred as "pencil and paper test" emphasizing logical process of calculation, deduction and organization skills. Also, the teacher had adopted the questioning techniques during assessment of students.

The researcher asked the question about the assessment system to the Head teacher, math teacher, students and their respective parents. The received versions by the researcher are following:

"The school conducts examinations three times a year to assess and measure the achievement of students. But other forms of tests like unit test depend upon the subject teachers."

(Head Teacher of Janapremi Secondary School)

"I planned to take unit tests regularly."

(Math Teacher of Janapremi Secondary School)

"Teacher gives homework daily but did not check regularly."

(Student C)

"We always complete math homework because we are afraid with math teacher."

(Student A)

"The teacher checks homework after a long time and he doesn't provide necessary feedback so we cannot correct it which is wrong."

(StudentB)

The researcher found that the mathematics teacher had not taken the unit test continuously. Also, he did not check the homework and class work every day or completing the exercise. So, all students did not do the homework regularly.

The expressions of head teacher, math teacher and students showed that there was lack of regular assessment system in school. There was lack of continuous reinforcement and encouragement. The teacher only punishes so the students has negative attitude toward the mathematics teacher.

"We provide student progress card to the parents at the end of the year but interested parents can see their student's progress with consulting the class teacher at any time".

(Head Teacher of Medha Secondary School)

"The class teacher announces the marks obtained in examinations after one week of the examination."

(Student A)

"Very few of the parents meet me and consult about their child's mathematics learning."

(Math Teacher of Janapremi Secondary School)

"When we visit the school, we use to go to the office and consult with the head teacher about our children's performances and after that we meet to the subject teacher."

"They always used to say that everything is good, but performance of our children in exam is very low."

(Parents of Student A)

"I always encourage the parents to care more at home."

(Head Teacher of Mahendra Shanti Secondary School)

"The teacher gives us useful information about how to encourage of the children at home."

(Parents of Student C)

From the above information, it was found that the school takes the terminal examination in time but that was less effective. Students and their parents were not serious to the students' achievement. So, every plan of school administration got fail. Few students were serious for their study which did not make any sense for the

achievement of all students. Most of the parents do not consult teachers regularly about their children's progress and school didn't make another effective plan to organize parents-teacher interaction program while previous plan got failed. Few numbers of parents came at school to consult about their children and most of the parents were not taking seriously about it. The school administrations were unable to make regular contact to the parents. Thus, the evaluation process and the overall activities of school were the main causes of low achievement in mathematics.

Chapter V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

The main purpose of any research study is to pose a problem, finding the cause and effects of problem and analyzing them to show the findings. Thus this chapter deals with the findings and conclusion of my study. This chapter deals with the summary of the research, major findings of the research, conclusion and recommendations for further study. The first section levels the summary, the next sections lists the major findings and conclusion derived on the basis of research analysis and finally presents recommendation for further study.

Summary

A range of source shows that school mathematics failure is a problem not only in Nepal but also in the world. Low achievement in mathematics is creating difficulties in teaching learning activities at school. On the one hand, there is a slogan “All can learn mathematics” but on the other hand achievement in mathematics shows that the condition is miserable. In this case study I have tried to find causes of low achievement. Providing individual right to education and managing classroom with different cognitive level to bring out common educational outcome is a matter of problems to the school administrators. They are also challenging to the curriculum designers. The achievement of a student is not only affected by a single variable and there is no single answer for the question "Why do many students fail in Mathematics?"

This case study has been done to find the causes of low achievement in mathematics. The researcher had selected three schools from Bhaktapur district on the basis of the achievement in mathematics. After constructing the tools of data

collection such as observation form and interview schedule, the research participated at school and studied relevant documents related to sample students to find the causes of low achievement in mathematics. How student learns mathematics is concerned with their opportunities to learn and the discussion he/she take part in. The level to which student learn mathematic depends of their engagement, use of ICTs in mathematics and experiences in classroom activities. As we know each child has innate potential sets of abilities so he/she needs opportunities to display that individual potential. Thus, the creation of safe learning environment is necessary for students. In this research, the research has analyzed the school's physical and psychological environment, school policies, teaching learning strategies, use of ICTs, assessment techniques, facilities at home, home environment, and relationship among teachers, students, parents and communities and their cultures as well as individual factors to find out the causes of low achievement in mathematics.

Findings

From the above research, the researcher find following causes of low achievement in mathematics which are listed below:

- Students have negative attitude towards the mathematics learning such as, it is very hard subject, and Mathematics has no meaning in our life. This subject in tedious so, I do not study regularly etc.
- Teaching-learning activities were traditional and were not effective. Such as the teacher did not start the lesson by connecting the previous lesson, did not motivate the students, did not use modern technologies, did not check the understanding level of the students and teacher directed practice etc.

- Most of the students were migrated from other districts and they did not have good financial conditions. They can't afford them in their further education in mathematics.
- Parents were illiterate, busy on their own work or were in abroad, So, there is lack of encourages to study mathematics from parents.
- School environment and classroom management never encouraged the student in mathematics teaching.
- Teacher do not revised the lesson and they provided very poor feedback.
- There is no regular evaluation process. Terminal exams are only the assessment used by school to measure the student progress on academic task.
- There is not good plan to make the parents aware about the mathematics examination result.
- Evaluation is most important component of instructional procedure. Thus at the end of the lesson we must check the student performance with the proper evaluation tools. Similarly feedback should be given immediately for the correctness of learner.
- This is the age of science and technology; different innovative technologies are invented to teach. So far in case of mathematics interactive software have been developed. Thus teacher must be updated with modern innovative technology.
- To use ICTs, the classroom should be technology friendly, which should managed from school administration.
- We know that, today's world is technologies world but our parents have still negative feeling on using ICTs. So, they must change their misperception on using ICTs and should encourage ICT in learning mathematics properly.

Conclusion

Teaching-learning activities are mainly guided by curriculum. Achievement of students is always affected by different variables such as school's learning environment, facilities at home and so on. Because of the low achievement in mathematics, new beliefs, practices and learning theories were emerged last decade. The main concern of newly practices in classroom is to increase the understanding mathematical concepts rather than memories and facts. It also focuses to link the mathematical knowledge in their daily life. These reforms aimed to shift traditional role of practices towards newly born ICT based mathematical concepts.

Teacher's beliefs about the nature and purposes of mathematics and how students learn have a powerful effect on the practice of teaching. Although the school seems to have sufficient physical infrastructure and qualified and trained teachers but the teacher seemed to be unable to maintaining individual differences and promote low achiever students in teaching learning activities. Teaching-learning activities are based on the traditional methods, which cannot attract the students. Classroom practice and environment of home and school were the main causes of low achievement in mathematics. New policies of school seems to have better educational attainment if the total school family cooperate each other and support from own area.

Recommendations

From the above findings and conclusion, the researchers would like to suggest some recommendations for the improvement in mathematics achievements of the school. In the context of Nepal, many students fail in mathematics and the trend is still in continuing. Usually, number of public schools is higher than other schools. Also, qualified, trained and experiences teachers are working at public schools.

Continuous assessment system, implementation of operational mechanism and its continuous analysis focus to student's outcomes.

This was a case study of three students of three different schools, so, the results cannot be generalized in all situations. It is due to lack of time and resources. Thus, similar researches should be done in large number of school district wise. Here are some recommendations suggested by the researcher:

Recommendation for Educational Implication

- School may be applied practical based activities which can promote their previous learning.
- Student center teaching method and other new techniques should be emphasizing.
- The school should manage the physical facilities to improve the quality of education.
- Teacher should provide the mathematical concept according to their pre-knowledge.
- Teacher should apply the recent techniques and innovator of mathematics.
- Government should provide sufficient materials or fund to manage the ICT based classroom.
- School and teacher should encourage students to use ICTs while learning mathematics.
- School should manage extra-class for low achiever students.
- Non-testing devices of evaluation should be used in student evaluation from national level.

Recommendation for further study

- Effects of ICTs in learning mathematics.
- Student's psychology in learning mathematics.
- Role of families' economy in the students' achievement in mathematics.
- Students' culture and its' effect in the achievement of mathematics.

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Appendix-A
Class Observation Form

Name of the teacher:

Gender: a) Male: b) Female:

Grade: Period: Subject: Title:

.....

School:

.....

...

Date: Time:

.....

1. Initiation of the lesson		Yes	No	Remarks
	a) Was the lesson objective clear to students?			
	b) Was the lesson based on the previous one?			
	c) Were the students ready to learn?			
	d) Was the start of the lesson interesting?			

2. Appearance in the classroom		Good	Tolerable	Poor	Remarks
	a) Clean				
	b) Self-Confident				
	c) Punctual				
	d) Pleasing				

3. Development of the lesson		Yes	No	Remarks
I.	Subject matter and sequence			
a)	The Relevant to curriculum			
b)	Relevant to the text book			
c)	Relevant to the students' level and interest			
d)	Teachers command over subject matter			

II. Instructional materials		Good	Tolerable	Poor	Remarks
	Size and clarity				
	Appropriateness to the lesson				
	Pleasant				

III. Utilization of ICTs		Effective	Poor	Remarks
a)	Computer			
b)	Projector			

IV. Students participation		Frequently	Sometimes	Seldom	Remarks
a)	Listen attentively				
b)	Ask question relatively				
c)	Answer teachers question				
d)	Participate in discussion				
e)	Follow directions				
f)	Experiment				
g)	Any other activity				

V. Teacher's activities		Frequently	Sometimes	seldom	Remarks
a)	Lecture				
b)	Question				
c)	Answer the students				
d)	Encourage students				
e)	Discourage students				
f)	Discuss with the students				
g)	Listen to students' opinions				

VI. Reinforcement in class		Effective	Poor	Remarks
a)	Verbally			
b)	Prize			

4. Closing the lesson		Yes	No	Remarks
a)	Was the lesson summarized?			
b)	Were the objectives achieved?			
c)	Was the lesson evaluated?			
d)	If yes, was it oral?			
e)	Was it written?			

f)	Was evaluation outcome satisfactory?			
g)	Was assignment given?			

Observer's Name: Date:

Appendix-B
Interview Guidelines for Selected Students

Name:..... **Gender:**.....**Age:**.....

Address:.....**Religion:**.....

- Interested subject, hobbies and aim
- Supervision and guidance by parents
- Time given for study at home
- Regular practice
- Physical facilities at home
- Extra materials used for mathematics
- Family problem
- School environment
- Combine study with friends and visit with teachers
- Satisfaction with teaching methods
- Use of ICTs

Appendix C
Interview Guidelines for Mathematics Teacher

Name:..... **Gender:** **Age:**.....
School:.....**Qualification:**.....
Teaching Experience:.....

- Student's regularity
- Satisfaction with student's activities
- Student's participation in teaching learning activities
- Use of ICTs
- Training
- Reinforcement in class
- Participation of student in group discussion
- Assessment for students
- Teaching strategies
- School environment
- Extra activities for low achiever students

Appendix D
Interview Guidelines for the Parent

Name: **Gender:** **Age:**

Address: **Religion:**

Occupation:

- Academic qualification
- Yearly income
- Student's behavior at home
- Parent's support
- Feedback to the children
- Regularity in school
- Satisfaction with their children's achievement
- Involvement in household works and in your business/occupation
- Use of computer or any electronic device while learning

Appendix E
Interview Guidelines for the Head Teacher

Name:.....**Gender:**.....**Age:**.....

School:.....

- Overall achievement of school
- Special efforts to improve student's achievement in mathematics
- Encourage of students on learning
- Physical facilities and available of teaching materials
- Available of mathematics lab
- Classroom management/physical facilities
- Available of ICTs
- Plan to improve the student's achievement
- Seminar for mathematics teachers

Appendix F

Guidelines for Interview Schedule with Students

Name: Age: Sex:

School Name:

The interview schedule with students was taken on the basis of following main topic.

Socio-economic Status of Family

- Home Environment of the Students: Task, Help, facility, parents, family members
- Opportunity to learn at home
- Parents' education

Classroom Environment

- Teaching learning activities starting situation, methods, response, management, question, evaluation system, summarize
- School environment of class room management

Physical Facilities

- Instructional materials
- Nature of materials, effectiveness etc.
- Relation between teacher and students
- Class behavior towards students
- Pure drinking water
- Mathematics Lab
- Causes of the low mathematics achievement.

Appendix-G
Physical facilities

Medha Secondary School

S.N.	Description	Quantity	Remarks
1	Play ground	No	
2	Toilets	7	Separate toilets for boys, girls and staffs
3	Drinking water	1	It was managed by water jaar
4	Library	1	Combine with Staff room
5	Math lab	No	
6	Building	2	
7	Room	17	
8	Desk and bench	105	
9	Chairs/ table	26	Simple

Instructional Materials

S.N	Description	Quantity	Remark
1	White board	13	
2	Reference books	13	All subject
3	Practice book	16	Not all subject
4	Teacher guide and curriculum	55	Not all subject
6	Another chart	75	

Mahendra Shanti Secondary School

S.N.	Description	Quantity	Remarks
1	Play ground	1	Not sufficient
2	Toilets	3	Separate toilets for boys, girls and staffs
3	Drinking water	1	It was managed by water jaar
4	Library	-	Not managed separately but some books were kept in staff room
5	Math lab	No	
6	Building	2	
7	Room	17	
8	Desk and bench	101	
9	Chairs/ table	21	

Instructional Materials

S.N	Description	Quantity	Remark
1	White board	15	
2	Reference books	11	Not all subject
3	Practice book	16	Not all subject
4	Teacher guide and curriculum	29	Not all subject
6	Another chart	41	

Janapremi Secondary School

S.N.	Description	Quantity	Remarks
1	Play ground	No	
2	Toilets	5	Separate toilets for boys, girls and staffs
3	Drinking water	-	Not managed
4	Library	-	
5	Math lab	No	
6	Building	2	
7	Room	17	
8	Desk and bench	97	
9	Chairs/ table	21	Simple

Instructional Materials

S.N	Description	Quantity	Remark
1	White board	15	
2	Reference books	5	Not all subject
3	Practice book	20	Not all subject
4	Teacher guide and curriculum	40	Not all subject
6	Another chart	50	