

**FACTORS AFFECTING THE STUDENTS' ACHIEVEMENT IN
MATHEMATICS: A CASE STUDY**

**A
THESIS
BY
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**FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
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LETTER OF CERTIFICATE

This is to certify Mr. **Roshan Rana**, a student of the academic year **2018/2019 AD** with thesis number **1667**, Exam Roll No. **7428309**, Campus Roll No. **83**, and T. U Regd. No. **9-2-278-963-2012** has completed his thesis under my supervision during the prescribed by the rules and regulations of T. U Nepal. The thesis entitled “**Factors Affecting the Students' Achievement in Mathematics: A Case Study**” embodies the result of his investigation conducted from **2020/2021** at the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward that his thesis is submitted for evaluation to award the Degree of Master of Education.

.....

Prof. Dr. Bed Raj Acharya

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Date: 21 September 2021



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LETTER OF APPROVAL

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By

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“Factors Affecting the Students' Achievement in Mathematics: A Case Study”
has been approved in partial fulfillment of the requirements of the Degree of Master
of Education.

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RECOMMENDATION FOR ACCEPTANCE

This is to certify that Mr. **Roshan Rana** has completed his M. Ed. thesis entitled “**Factors Affecting the Students' Achievement in Mathematics: A Case Study**” under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize the final viva-voce.

.....
Mr. Krishna Prasad Adhikari

(Supervisor)

Date: 21 September 2021

DEDICATION

This thesis is dedicated to my father **Mr. Purna Kumar Rana**, my mother **Mrs. Dharma Kumari Rana** and my brother **Mr. Kedar Rana** whose love, support, and encouragement have enriched my soul and inspired me to purpose and completed this research.

DECLARATION

This thesis contains no material which has been accepted for the award of another degree in any institution. To the best of my knowledge and belief, this dissertation contains no material previously published by any authors except due acknowledgment has been made.

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21 September 2021

Date

Roshan Rana

ABSTRACT

The main concern or area of this study was “Factors that affecting the students’ achievement in mathematics: A case study”. The objectives of the study were to analyze the school related factors and out of school factors that affect in learning mathematics of students and also to identify the strategies taken by the school administration in improving mathematics achievement at secondary level. The descriptive case study approach was adopted to conduct the study under the qualitative research design. This study was bounded only in Khotang district and also this study was based only on Shree Radha Krishna Secondary School, Shakela Gaupalika, Khotang. In-depth interview, classroom observation, document reviews were used as tools for data collection. This study was conducted with the sample of six mathematics students as case study and also head teacher, two mathematics teacher and student's parents as respondents. The researcher observed classroom for ten days and interviewed with related students, head teacher, mathematics teacher and parents. Collected information were analyzed and interpreted with the help of conceptual framework and linking with theoretical construction.

This study found that, lack of peer group interaction in mathematics classroom, lack of suitable textbook, lack of classroom management, lack of teacher's competency, having a large number of students in mathematics classroom, lack of teaching method and materials in the classroom, lack of teacher's teaching technique are the main school related factors that affects in students' mathematics achievement. And also, lack of interest of learner, lack of students' home environment, lack of parents' educational status, lack of pre knowledge, lack of students' anxiety in mathematics contents are the out of school related factors that affects the students' mathematics achievement. Also, 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, and also there was poor economical home environment of the students which was the factors that affects the students' achievement in mathematics.

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LIST OF ABBREVIATION

T.U = Tribhuvan University

ZPD = Zone of Proximal Development

S.L.C = School Leaving Certificate

B. Ed = Bachelor of Education

M. Ed = Master of Education

SS = Secondary School

B.S = Bikram Sambat

HSEB = Higher Secondary Education Board

ICT = Information and Communication Technology

Chapter I

Introduction

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

My house is in Khotang district. I am from a Magar community. I like to do extracurricular activities more than just studying. Most of the time when I was studying in class X, I was well supported by my family in my studies, but because of my lack of interest in learning, I used to spend more time with my friends rather than in studies. Even though I got good support from my family, my achievement in mathematics was not very good as I did not have my own interest in learning mathematics. But when I started studying my studies from class XI/XII with good time, then I realized that my learning was influenced by other external things. As I matured, I also had to take care of my home responsibilities. Then I could not continue my studies effectively and my achievement towards the subject of mathematics became less and less. Similarly, in the school area, the teachers did not understand my home environment and because I was weak, the teachers did not give me the opportunity to learn. In this way, my schooling and my family did not support me well in learning, so my achievement in mathematics became less and less.

In the paragraph mentioned above, the reasons for my low math achievement and some of the reasons that affected my math learning are mentioned. Low level of student learning achievement has been an issue and core concern of school reform and development in Nepal (Khanal & Poudel, 2017). The studies generated important time sequence data on learning outcomes at the selected grade X levels. The studies showed that enhancing learning achievement levels are rather very challenging. Nonetheless, the studies also revealed that there are some cases where schools have succeeded in ensuring higher levels of achievements and many cases of failures to ensure reasonable levels. Some crucial factors contributing to higher or lower level achievements identified. However, questions arise - why improvement in learning achievement remained rather an inhibiting challenge for most of the schools? Whether the research-based knowledge, critical understanding, and also recommendations have

brought some implications in school conditions for teaching and learning? What factors inhibit or motivate and support the schools in taking initiatives for improving teaching-learning ensuring better student learning achievements? This study proposes to seek answers to these questions and bring to light the problems, issues and challenges that inhibit actions for improvements. It analyzes school practices, provisions, and support system and also identify school level efforts, innovations and good practices towards ensuring better learning and achievements.

The factor, which affect achievement level of students of grade ten in mathematics are changeable in time and space (Khanal, 2017). 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). Mathematics directly deals with human life. Mathematics was created 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. 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. Mathematics is the central part of school curriculum (Acharya, 2017). In Nepal the present curriculum system has introduced mathematics as one of the core subjects 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. 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. 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 is 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 (Ghimire, 2016). Mathematics has been in a core curriculum (compulsory subject) in our secondary schools, this has made students to be studying it by force even when they are not interested as one cannot further studies in higher institution in any course without at least a pass in mathematics (Khanal & Poudel, 2017).

According to Ghimire (2016) 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 was 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. Mathematics education effect in private school better than public school because the achievement in mathematics is better than in public school (Nepali, 2019). 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. But in the present time teachers are skilled, modern technology can be used in learning, learning materials are available in sufficient quantity but why the level of achievement of students in mathematics is not good? What are the reasons for students' lack of math achievement? Which aspect has influenced the student's achievement towards mathematics subject the most? What are the reasons why so

many students fail in mathematics? My study progressed by dealing with such questions. Therefore, I am interested in study this area dealing with these questions.

Statement of the Problem

In my experiences, by the time I was in grade ten, I had not to study mathematics well because of my own lack of interest in math subjects, poor home environment, lack of opportunities to learn in school, not enough books for learning, home responsibilities. As a result, my achievement in mathematics could not come well. Now in the present time many questions have come to my mind. What are the factors that affect a student's math learning? How to increase students' math achievement? Are the home environment and the school environment the only factors that affect a student's math achievement? How does a student's lack of self-interest affect math achievement? Therefore, I chose this area/title because these kinds of questions came to my mind and since I am also a mathematics related student, therefore it is necessary for me to find out the which factors that affecting the student's mathematics learning at secondary level. So, this topic becomes a problem for me and I got to connected with this problem and I selected this topic. SEE achievement level is low in 2075 & 2076 BS rather than other years (Khanal, 2017; as cited in Poudel, 2019). That is why, the result of SEE in 2076 was not so good in public schools. The private schools have been somehow successful in effective teaching learning activities and getting good result of their students in SEE examination with higher scores. It is due to the case of learning process? Or is it there no effective teaching? There may be some factors which affect the learning process of students. Therefore, I am interested for study in this area about which factors that affecting the students' mathematics learning at secondary level. So, I selected this topic.

In my experiences, in the past, there was a shortage of qualified teachers for teaching mathematics, there were not enough educational materials available, technology was not well developed, so it was natural for the level of achievement of students in mathematics to be low. But in the present time teachers are skilled, modern technology can be used in learning, learning materials are available in sufficient quantity but why the level of achievement of students in mathematics is not good? What are the reasons for students' lack of math achievement? Which aspect has influenced the student's achievement towards mathematics subject the most? What are

the reasons why so many students fail in mathematics? Since these types of questions are bothering me, so I have chosen this topic because I feel that I should do research related to this field.

Objectives of the Study

The objectives of this study were follows;

1. To explore the school related factors and out of school factors that affect in student's mathematics achievement at secondary level.
2. To identify the strategies taken by the school administration in improving mathematics achievement.

Research Questions

1. What are the school related factors that affect in students' learning mathematics?
2. What are the out of school related factors that affects in students' mathematics learning?
3. What types of strategies could be adopted by the school for improve the low achiever score of students?

Justification of the Study

As far as possible, researcher 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 would be fruitful for me as well as also productive for others. This study is helpful to the students who are teaching optional mathematics. This study is helpful for the author of optional mathematic who will write text of mathematics. Also, it is beneficial how the optional mathematical content will be associated in the curriculum. It is fruitful for the stakeholder and agencies to step further. In short, this study is helpful as follows;

- It is helpful to find the way to decrease the failure rate of the students.
- It helps to guide the instruction on the basis of the individual difference.
- It is helpful the curriculum planners, textbook writer, police maker equally.
- It is helpful the government to adopt globally for the education level.

- It is beneficial to the math teacher and parents.

Delimitation of the Study

This study was delimited as follows;

- This study was focused only secondary level student of Khotang district.
- This study was delimited on Shree Radha Krishna Secondary School, Shakela Gaupalika-1, Khotang.
- This study was delimited to secondary level mathematics.
- This research was based on the response of mathematics teacher, students and their parents.
- This study was based on qualitative analysis.

Definition of the Related Term

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

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 behaviors. 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.

Chapter- II

Review of Related Literatures

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

Research in any sector of skill wants a suitable studied with the works in which there many have many researches 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.

Review of Empirical Literature

I had collected some books, journal, thesis, articles which are related to difficulty in learning mathematics. After the review of different literature, I have divided my topic into different themes. Here I have explained about some theme which I had generated for my review, these are;

Factors affecting students' mathematics learning. I reviewed the literature of Acharya (2017) conducted the research article in International Journal of Elementary Education entitled “factor affecting difficulties in learning mathematics by mathematics learner”. The main purpose of this study was to explore the causes of

difficulties in learning mathematics. This study was based on a case study research design under the qualitative research approach. Classroom observation of three schools in Arghakhanchi district and interview were taken to the research tools for achieving the research objective. The researcher was concluded that, teachers lack of linkage between new mathematical concept and previously learned mathematics structures, mathematics anxiety, negative feeling of mathematics, economic condition and their educational backgrounds, school management system, lack of infrastructure of school and lack of regular assessment system of school are main causes of difficulties in learning mathematics.

Ghimire (2016), studied on 'A study on factors affecting teaching/ learning mathematics at secondary level' with the object to explore the factors that affect in learning mathematics at school level'. The researcher was used ethnography approach under qualitative research method. And he was selected Shree Janata Secondary School from Arghakhanchi district as tool for data collection. He selected eight students from sampled school by systematic sampling. The tools for the study were interview and classroom observation. And at last he was found that, environment of school in both rural and urban areas affects equally but the boys are more affected those girls, 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.

Subedi (2005), studied on "Factors Affecting Failure in Mathematics in SLC examination" with the objectives to explore the factors that affect failure in learning mathematics. The researcher was used ethnography approach under qualitative research method. And he was selected Shree Mahendra Secondary School from Kavre district as tool for data collection. He was selected eight students from sampled school by systematic sampling. The tools for the study was interview and classroom observation. The major findings of the study were 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 and the physical interest of the learner has low positive effect on mathematics achievement.

Acharya (2013) carried out a research entitled “Problem Encountered in Teaching-Learning Mathematics in Multicultural Classroom”. The main objective of this study was to explore the problems faced by students in learning mathematics in multicultural classroom at secondary level and to explore the challenges faced by the teachers in teaching mathematics in multicultural classroom. The researcher was used qualitative research approach and ethnography research design. The researcher was selected a one public school of Kavre district and also, he was selected 3 mathematics teacher, 5 mathematics students & 2 parents by using purposive sampling for the population. The research tools were interview and observation. The researcher found that the school environment was not suitable for the mathematics learning for culturally diverse students. Also, he found that there was a communication problem between teachers & students and also teachers' hegemony may have to creating problems in mathematics teaching/learning activities in the classrooms. I also concluded that, It is need to present mathematics curriculum should be revised. It should be better to include the contextualize problem in our mathematics curriculum. The knowledge of learners is not given priority in our mathematics curriculum and the lessons are not contextualized. So, we need to change the education system of Nepal.

Students' achievement in mathematics. 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-four schools were selected. Z-test was applied to conclude that Morang district surpassed Dhankuta district students in every aspect male, female, rural and urban. He concluded that the achievement level of fifth grade students in mathematics of was 44.16% and there was significant difference in the achievement among the rural schools' students and urban schools' students in mathematics.

Pokhrel (2019) 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. And also, he concluded the important factors related to student's 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.

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. He concluded that, 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, 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.

Yadav (2008) did a survey type research work on "Causes of low achievement student in mathematics" with the objectives to find out the mathematics learning environment of Musahar students at home and to find the causes of low achievement of Musahar students at primary level. The researcher was used case study approach under qualitative research method. And he was selected Shree Krishna Secondary School from Banke district as tool for data collection. He was selected six students from sampled school by systematic sampling. The tools for the study was interview and classroom observation. And the researcher found 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.

Mathematics learning strategies. Bhattarai (2007) identity the factors that "Affect the use of instructional materials in teaching mathematics at primary level" with aims to study the existing condition of availability and use of instructional materials. The researcher was intended the research question as 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 was found that 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.

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 effects on the mathematics achievement as compared to traditional method. He collected the data through pretest and post-test in class one on addition and subtraction. Two equivalent groups were established on the basis of pretest 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, he found that the achievement of students taught by play way method was significantly different than the achievement of the students taught by traditional method.

Poudel (2017) did a research work on "A study on the effectiveness of class work while teaching geometry at the secondary level" with aim to investigate of 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 was used to conclude that experimental group did better than control group. The classroom observation form was also developed to record the classroom situation and activities. T-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.

Research gap. Above literature mainly focused on the causes of failure and low rate of achievement in mathematics. 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 am interested to find the affecting factors of learning mathematics. Still the researcher is unable to address the factors affecting mathematics at secondary level. The previous researcher had addressed only comparison of public schools and private school's marks result. By comparing that the researcher has 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 Framework

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.

Constructivism theory. Basically, constructivism views that knowledge is not fixed object, it is constructed by an individual through his/her own experience (Acharya, 2017; as cited in Khanal, 2017). 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. According to Acharya (2017) 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, 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 (Pandit, 2015).

Constructivism transforms the students from a passive receipting of information to active participation in the learning process (Poudel, 2017). Always guided by teacher, students construct their knowledge actively rather than just mechanically investing knowledge from the teacher or the text book. Students become engaged by applying their existing knowledge and real-world experience, ultimately drawing conclusions from their finding. According to Acharya, (2015; as cited in Khadka, 2017) constructivism stands on its three axioms that are as follows:

- Learners learn knowledge from their active participation
- Learners gain knowledge while reflecting on their own action and
- Learners gain knowledge when they try to convey their solution to other.

Social constructivism theory. Social constructivism is focused much on learning through cooperative group learning and it emphasizes the importance of culture and context in understanding what occurs in society and constructing knowledge based on this understanding (Acharya, 2015; as cited in Khadka, 2017). 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. According to socio-cultural theory, knowledge is the best constructed when learners collaborate together (Acharya, 2015). Students supports one another and encourages new ways to form, construct and reflect on new materials. Social interactions and participations of group members play a key role in developing knowledge (Khadka, 2017). Vygotsky believed that parents, relatives, peers and society all have an important role in forming higher level of functioning. Vygotsky's socio- cultural theory of human learning describes learning as a social process and the origination of human intelligence in society or culture. The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition (Piter, 2001; as cited in Dhakal, 2019).

Walberg model theory. 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 (Pokhrel, 2018). 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) (Welberg, 1981 as cited in Dhakal, 2019). Walberg's theory requires optimization of nine factors to increase student's achievement of cognitive and affective outcomes. These nine productive factors are

Ability or prior achievement, Age, Motivation of self-concept; the instructional variables, Quantity of instructions, Quality of instructional experiences; and educationally stimulated psychological aspects, Home environment, Classroom or school environment, the peer group environment and at last the mass media". Also, these factors were classified into three general groups as Personal variables such as prior achievement age and motivation of self-concept, Instructional variables such as amount or instruction and Environmental variables related to the home teacher classroom peers and media exposure (Wilkins, et al. 2002).

And also, in this study the implication of this constructivism learning theory (1960) and Walberg model theory (1981) as used; the collected data has been explained related to how the mathematical contents can be taught effectively by connecting to our culture, our social activities, and students' daily life problems. And also using these theories the collected data have been explain with related to how to minimalize these factors that affecting in students' mathematics learning at secondary level using effecting teaching method in mathematics classroom. And also my second research objective was to identify the strategies taken by the school administration in improving mathematics achievement. So for achieving this objective I have used these theories in my study as implication of theory.

Conceptual Framework

The conceptual framework is the pictorial description that is based on theoretical concepts and shows the interrelationships between the concepts and the variables related to the research (Khanal, 2019). My research study was based on the following conceptual framework.

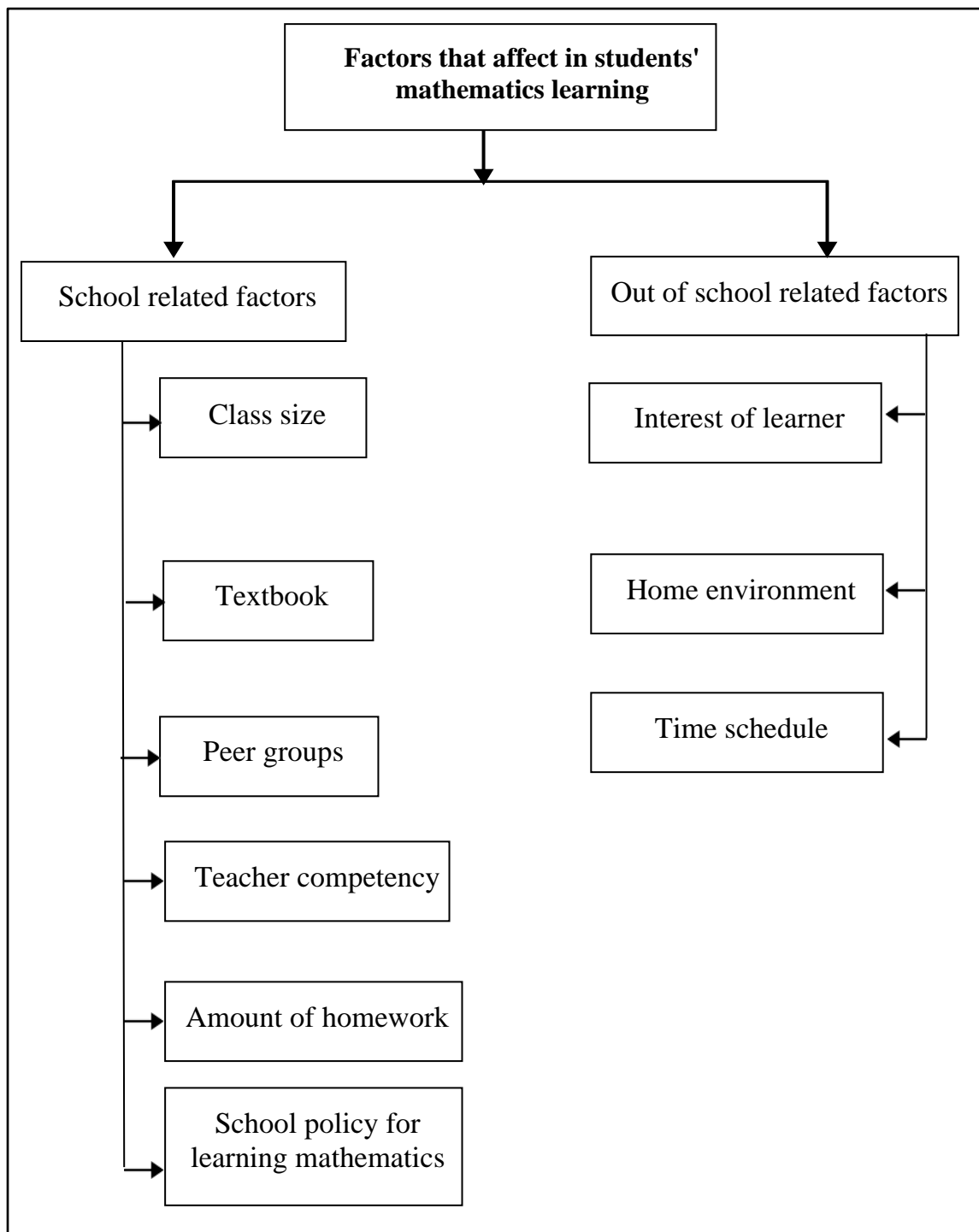


Figure 2.1: Conceptual Framework

From the above table, it is found that there are many sorts 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. After collection the data I analyzed and interpreted this factor with connection the related to above theoretical framework

Chapter - III

Methods and Procedures

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. The chapter explained the plan and method of study which helped to achieve the objectives of the study. 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 had chosen this qualitative research method for my study.

Design of the Study

Qualitative research emphasis on inductive analysis of data that proceeds to find theory to explain the data (Acharya, 2017). One of the important things in qualitative research is that the researcher has to perform a role of human tool of data collection that needs relevant and appropriate knowledge and skills about it. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Sharma, 2011, p.18).

In case study, a real-time phenomenon is explored within its naturally occurring context, with the consideration that context will create a difference (Peter & Kaarbo, 1999). According to Creswell (2007) in case study approach data is collected through by direct observation in natural setting and the actual incident on the spot. In this study I used case study approach under qualitative method. I used this approach in my study according to my research objective because for school and out of school related to factors that affecting the students learning mathematics. In learning 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 mathematics in public schools. Therefore, I used case study approach under qualitative design as well as in descriptive nature.

Area of the Study

Every study needs study area, I had chosen one public secondary school of Khotang district. I selected Shree Radha Krishna Secondary School Shakela Gaupalika -1, Khotang for the area of my research. The area of this study was based

on secondary level students under the one public school of Khotang district. And also, for study area I had selected only secondary level students under studying mathematics.

Selection of Respondents

For participants, I had selected Shree Radha Krishna Secondary School from Khotang district using purposive sampling technique (based on my convenience). From there I was taken one public school by convenience sampling. And also, I had taken six mathematics students, their parents, one head-teachers and one mathematics teacher as respondent according to convenience of researcher. Base on the school previous result, I had selected medium and low abilities students whose previous mathematics result achievement level is poor/low.

Data Collection Tools and Techniques

The study intended to find the affecting factors behind the optional mathematics learning in governmental school in SEE 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. Observation note used to identify the students' activities, teachers' activities, interaction between students-students and students-teachers, classroom management and physical environment of the classroom while teaching/learning mathematics

In-depth interview. In-depth interview was 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 was taken periodically in different settings, and different circumstances of the respondents but the settings all the time in natural. It was administered to know head-teachers, mathematics teacher, parents and students view about the factors affect learning optional mathematics. 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 (Shrestha, 2016). In qualitative research the interview is a form of discourse.

Data Collection Procedure

The school record was studied such as mark ledger of students, teachers, profile, physical facilities and other relevant documents. I recorded the behavior and activities both teachers and students during teaching learning activities. I had 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 Khotang district. For the research interview was conducted to parents, head teachers, teachers and students to collect required facts. I had organized interview schedule in which parents, teachers, students and guardians for the teacher's knowledge in subject matter. After collecting the data, I interpreted and analyzed the data then the finding and conclusion will be drawn.

Data Analysis Procedure

First of all, I organized and edited to the collected information from interview and classroom observation then I generated the difference code according to the response of participants. I gathered those codes according their similarities and I had given the title for them which are known as theme. At last, I analyzed and interpreted those themes by using the related theory of my theoretical framework and conceptual framework which I have developed in literature review. The researcher was collected data through interview head teacher, teachers, students and parents. School records of students was helped 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.

Quality Standards

Developing standards of quality Lincoln and Guba's classic work shed light on how to assess truth in a qualitative report offered four alternate tests of quality that reflect the assumptions of the qualitative paradigm (Khanal, 2019)

Conformability. Conformability refers to the quality of the results produced by an inquiry in terms of how well they are supported by informants who are involved in the study and by events that are independent of the inquiry.

Credibility. Credibility refers to accuracy Description must be plausible and recognized by participants credibility is enhanced by, prolonged time in the field repeatedly observing and interacting with participants, using different data sources, methods, data type, conducting member checks, involving other investigators in the study.

Transferability. Transferability refers to the generalizability of the study findings to other settings, populations, and contexts, report must provide sufficient detail so that readers can assess this, Lack of transferability is viewed as a weakness of qualitative methods

Dependability. Dependability refers to the stability and track ability of the changes in data over time and conditions; want to determine the extent to which another researcher with similar training and rapport with participants would make the same observations, this is determined by an audit trail, involves auditing research process, documenting all the raw data generated, and assessing method of data analysis.

Ethical Consideration

In the research work, a number of ethical issues was considered to make data collection more standardization and conformity in writing the report of the study. I had consider the some ethical issues such as; after the permission from the school principals and institutions where the survey was going to be conducted, the researcher had inform the participant if there was necessary for recording filming or photographs, the researcher was not use the name of the institution without its permission, and also I had used comfortable language in the data collection process that is easily understandable to the participants and report writing.

Chapter IV

Analysis and Interpretation

This chapter deals with the analysis and interpretation of collected information of the study. The data collected from the different sources were analyzed and interpreted to explore the affecting factors of girls' achievement in mathematics at secondary level. The researcher observed the classes regularly for two weeks. 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. They were able to expresses freely whatever they have in their mind.

First of all, I collected the data using data collection tools then the collected information categorized according to the similarity responses of the respondent and then different themes were given in the text of interview of the observation note. These themes were considered as code and the similar code versions of respondents were collected together and explained in their respective. The base of this study was focused on family related factors, school related factors, and society related factors and personal related factors. Direct observation was used by classroom behavior was carefully observed and noted of the given result. The obtained data were analyzed and interpreted under the following heading:

- Introduction of case respondent
- Classroom observation episode
- School and out of school related factors that affect in students' learning.
 - a) School related factors
 - b) Out of school related factors
- Strategies for improve the students' mathematics achievement.

Introduction of the Case Students

Respondent A. The respondent A was a boy student of grade nine. He is 15 years old. He has been in this school since six classes. His aim is to be a cricketer. He likes mathematics subject most. He has 8 members in his family having one brother and four sisters. He is a smallest brother. His parents are uneducated. His father is mason and mother is a housewife. His family economic condition is medium. He always sits at second bench. He is regular student. His performance in mathematics is good. His favorite subject was mathematics but did not much practice due to lack of time. His parent did not have any awareness to teach the children.

From classroom observation, I found that there was no anxiety about their children's education. He did not want to male friendship with naughty children who didn't read carefully and dropping out the school. According to the school register, he was often being absent. He said, " A teacher behavior towards me is equality with other Non-Dalit student." I study only one hour in the evening, so that he has enough time to do more mathematics practices at home. Due to the household work he had no time to study at home. When the researcher observed the class, the researcher found most of the places fully captured by the upper caste student. He said that discrimination of untouchable prevails more in society and also in school. In society, upper caste children were not given chance to meet, play, eat and sit together with the lower castes by their parents.

Respondent B. The respondent B was girl student of grade IX. She is 17 years old. She has been studying at this school since one class. Her future aim is to be a teacher. Nepali is her favorite subject. Her parents are uneducated. Her family economic status is low. Her father works as mason and mother is a housewife. She lives with one elder sister and 2 small brothers along with their parents. She always sits with her girl's friends. She feels mathematics is a hard subject. The researcher also found that she regularly participated in extracurricular activity in the school and most of time she owns the first prize. The research also found that she was regular in taking class. However, sometimes, she missed the class because of her household works. She was also punctual in taking class. She wanted to try to do mathematics homework but she rarely completed mathematics problems because she did not have enough time to do homework.

Respondent C. The respondent C is a boy student of grade nine. He is 14 years old. He has been studying at this school since seven classes. His future aim is to be a doctor. He likes science most. He sits on the first bench. He is one of a discipline and regular student of classroom. He is the talent student in the classroom. He has elder brother and one small sister. His parents are educated. His father is work in office and mother is housewife. He has good relationship with boys and girls as well as teacher in the classroom. His parents always support in his study.

Respondent D. The respondent E is a boy student of grade nine. He is 16 years old. He admitted in this school one class. His future's aim is to be a business man. Economic is a favorite subject. He attends school regularly. He is silent nature student. His performance in mathematics is good. His father works as mechanic in workshop and mother is a housewife. His parents are uneducated. He has one elder sister who is studying in xii. He consults with his sister if he faced problems in mathematics. His family economic condition is good.

Respondent E. The respondent F is a boy student of grade nine. He is 15 years old from middle class family. He has been studying in this school since six classes. He has one younger brother and two small sisters. His parents are educated. His father works as a salesman in departmental store and mother is a housewife. His future aim is to be a good teacher. He likes science and mathematics. His performance in mathematics is good. He is an active, regular and discipline student in the classroom. He gets good environment at home to study. He is more familiar with boys than girls.

Respondent F. Respondent F was thirteen years old girl studying in class 8. She has six family members in her family. In her family she is elder child of their parents. When researcher observed her house and family, he found that their economic condition to be very poor. The researcher found that as she is the elder child of her family, she always engaged herself in household works. So, she did not enough time to do mathematics practices at home. Her family's main source of income comes from the labor of factory. She was interested in study but she was not the time to mathematics practices. She said, "our economic condition is very poor." She was laborious and curious student. She could not speak Nepali language fluently. She said, "I feel difficulty while writing and speaking Nepali language at school." She does home work every day and attends the class regularly. She said, "I understand

mathematics at class but I couldn't remember for a long time." She said," Dalit student feel mathematics as a difficult subject due to various reasons such as lack of tuition opportunity, poor economic problems, lack of educated people at home, due to the traditional culture and poor language."

Overall, from the above case studies, researcher had made same conclusions, like as poverty and uneducated are playing crucial role to less girl's participation in optional mathematics learning. The main occupation of the girl's parents was farming and parents are uneducated. Researcher observed the classroom activities such as classwork performance and participation, class test performance, homework completion and attendance from the school record of the girl's student. It was found that low performance and participation of girl's student in optional mathematics with compared to boy's student. According to the optional mathematics teacher shows the low participation of girl's students with compared to boys' students.

Classroom Observation

Episode one

The teacher had entered in class with a text book and marker only. He hadn't any kinds of teaching materials to be showed to the students or to be displayed in the classrooms. He wrote the topic 'limit and continuity' on the white board and started to teach. He didn't review previous lesson. He had done two questions on the white board and go to the office. After some time, he come to the class and ask the student whether they understood one of the students said that he couldn't understand completely. The teacher become angry and warned him- "if u say again like this u will be punished, u must be serious to learn and understand the lesson from my teaching." Most of the students didn't seemed afraid with the teacher and class in very noisy but them afraid and heisted to ask the questions to the teacher. Students couldn't raise their hand to ask any question to the teacher. In addition, teacher did not try to understand them properly whether they comprehend the lesson or not. Teacher even did not go up to the back benchers. He just made the students remind the formulas and ask them to resent at any rate. One of the students ask the teacher if there is a example to be comprehended the formula easily. He didn't care much her but he told her to see the text book and find herself. The teacher said the students to do remaining exercise as the homework assignment and he said the class was over.

The above response shows that the class room is teacher dominated and students'-oriented class was totally deductive. The co-operative between teacher and student could not be established. Social constructivism theory emphasis on the teacher should help the learner to get to him or her own understanding off the content, teacher should previous guidelines and creates the environment for the learner to arrive at his or her own conclusions. But incase school it could not found. Thus, it is a concluded that there is known proper interaction between teacher and students. The interaction in mathematics class room teacher and students may be whole class presentation and practicing problem solving investigation or projects etc., any of these approaches couldn't be seen in the observed class room. Thus, obviously that is one factor creating the difficulties to achieve the desired expectation or achievements of mathematics from the mathematics class room.

Episode two

"During second day class observation, the mathematics teacher entered into the classroom with the daily using and other limited teaching materials which were related to the topics. Teacher left the teaching materials in front of the students' desk and reviewed the previous lesson. He wrote the topic of that day 'area and volume of triangular prism'. He described about prism (both triangular and square prism) with solid figures. He just wrote the formulae of lateral surface area, total surface area and volume with geometrical figures. Then he let the students to solve the related problems by using given formulae. Students were asking about how the formulae can be developed but teacher replied 'formula is formula so you have to recite.' Then he checked students' copies and guided to their mistakes. Finally, he summarized the topic and gave homework."

From this observation, it is seen that trained teachers were also not implementing their skills in the real classroom appropriately. In the observed school, there were some paper made materials related to the topic but the teacher did not use it. If he used those materials then it would be easier to make students clear about lateral surface area, total surface area, and volume of prism. The place of placing presentation and summarization skill of instructional materials gained in training session were not also found to be transferred in the real classroom.

Overall, from the above classroom observation and case respondents it is found that, all the teachers were found to have in favor of supervision of the classroom teaching, however their supervision was limited to know whether the teachers were in classroom or not and course would be completed in time or not. And also, it was found that the school supervisors were used to come in their school for sometimes only and especially talked to the head teacher but they did not observe the classes regularly. supervision is an essential part of classroom teaching that aware and gives feedback to the teachers for transfer of training in classroom teaching. The head teacher, resource person and the school supervisor are especially responsible for supervising the class.

School and Out of School related Factors that Affect in Students' Learning

Interaction is a social activity. Interaction may be within person or a group. It depends upon the person intellectual capacity. Inter-individual interaction refers to the sharing, adjustment, and cooperation. First of all, I organized and edited the collected information from interviews and classroom observation then I have analyzed and interpreted those themes by using the theoretical framework and conceptual framework.

School Related Factors

Teaching learning process is the major factor in learning mathematics. Teacher's education, experiences and expertise determine the teachers' qualification. Mathematics is a practical subject. It can be solved by different process and techniques. Some views of teachers and students on school related factors are presented as follows which I have analyzed and interpreted according to the similarities of respondents on the following sub-heading.

Textbook. A textbook is a manual of instruction in any branch of study (Pandit, 2015). 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. Private publications have published different references books. Textbook is important because it is the reservoir of knowledge. It sharpens the minds of students. It helps 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 is 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. 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 their potentiality themselves, unit test and class test were done according to teacher's interest.

From, the constructivist approach in 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 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 (Rana, 2019). According to Khanal (2019) teacher's teaching becomes successful and effective only when his/her students feel confident of the contents they are taught.

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 is likely to influence the person's belief and behaviors. Peer group is both a social group and a primary group of students who have similar age, background, interest and behaviors. In other words, peer is groups of students in similar types in their age,

class, feelings, behavior 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 economic background so we cannot 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 economic background. It helps to learn properly and effectively. 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 groups 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. Student were not regular in classroom.

From the perspective of Walberg (1981) teachers should follow the various teaching techniques focusing more on individual and group presentations, discussions, tests, debates, and student decisions, and the application of mathematical models for solving the problems (Poudel, 2017). And also from constructivist approach students need to interaction to each other from students-students, students-teacher for effective mathematics teaching in the classroom (Acharya, 2017; as cited in Dhakal, 2019).

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 talent, 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 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 talent 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 cooperating to each other in their behavior. They are bounded with politics. Teacher were capable in academically but they were not using ICT. They were teaching traditionally. Some young teachers were using less ICT. Teachers were not following the teaching methods.

In this regards Walberg (1981, as cited in Dhakal, 2019) voice that the child's understanding of how knowledge develops requires an understanding of social and historical origins of knowledge and of changes in that knowledge. In this matter Acharya (2015), also argues that human knowledge originates in socially meaningful

activity and is shaped by language mathematics knowledge can be a creation by social interaction and teacher/student must be active in their learning.

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 may 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 student's 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 asks 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 like 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 gets 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 too much homework. We have made the strict rule. Talent students solve easily but poor student doesn'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 numbers of

questions to solve. It was not sufficient to practice the taught lesson. Also, classroom activities were not provided to students. Also teachers were not caring their homework. Few students had done the homework. Teacher checked two and three copies of homework and started to solve exercises.

In social constructivist views, mathematics is conceived as a cultural product, which has developed as a result of various activities (Bishop, 1988, as cited in Shrestha, 2016). In point, mathematical knowledge can be a creation by social interaction, co-operative, and discussion with each other students (Acharya, 2017). Thus, the learners can build mathematical knowledge from their cultural context and own understanding.

Out of School Related Factors

Language is the most of essential affecting factor for failure of students in mathematics. It is the great medium of human civilization which sets them apart from the other living beings. Language is a system of communication medium for thought. It is the measure component for learning. Irregularly is one of the main problems of students in learning mathematics. They are compelled to attend their school after the completion of their household works.

Home environment. Home environment is the such components which describes about the reading room, parents and other education related behaviors. 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 economic 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 surroundings."

[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 helps to learn everyone. 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 numbers of room, poor economic 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 they're in boarding school. Home environment was not good. They had not separate room to study. They used to sit together. They had poor economic 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.

From the perspective of Vygotsky's (1978) constructivism theory, learners can build mathematical knowledge by participating in a variety of social activities, interacting with others, and debating with others. In point, new knowledge can be built from pre-existing knowledge, own experience, learning requires an emphasis on mental processes and thinking (Acharya, 2017). Thus, the learner must be active in learning, and also the learner can build mathematics knowledge by discovering and exploring.

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; calendar. Calendar where the person making the schedule cannot 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 are 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 every day for optional mathematics. We have divided 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 economic 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 subjects." [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 was 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 was 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.

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 stubborn. They are out of our control." [Parents]

"Class books are not tied up with junior graded books. It is haphazardly edited and formulated. Exercise is 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 depending 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.

Based on constructivist perspectives on learning, Students should be active in their learning (Acharya, 2017). According to this learning principle, the learner must build knowledge for himself, and also the teacher should use a student-centered teaching method in teaching/learning mathematics in the classroom (Pandit, 2017 as cited in Dhakal, 2019). This theory focuses on real-life learning environment, social interaction and the use of complex ideas share with another outside of the classroom.

Strategies for Improve the Students' Achievement in Mathematics

. The school is in peaceful area near the forest to there is no noise from outside the school. In the school, there is big and small playing ground, computer class, library, storeroom, enough playing area, sufficient drinking water supply, materials, magazine toilet. School conducts different types of physical and mental extra musical activities that help to pupil to build up their career. All the activities conducted in the school, lies within the school environment for examples: playing with their friends, studying, respect to the teacher, obeying the rules and regulation conducted by school. Active participation of students in all activities by school play vital role in the life of students. So, students should obey the rules and regulation to build up their career. School is compounded with brick, stone and beautiful gate area. It keeps school from unnecessary person and domestic animals. All the teacher and students should enter the school on timely manner in uniform otherwise they should give clarification of being late with the at school's administration. Students are obedient, disciplined and they respect the teachers.

Provide learning opportunities. In regards to the way of engagement of the students in mathematics learning at home, the environment of the home play a vital role. The home environment is directly related to their culture, social class, economic status of the family, educational background, etc. I concluded that, to teach mathematical problems in connection with student's daily life is a way to improve the interest of students in learning mathematics. Therefore, to motivate the girls to learn mathematics, teachers need to linkage mathematical problems in our daily life while teaching in the classroom. Salvin and Cooper (1999; as cited in Andersen, 2009) reviewed the research regarding the eight most popular forms of cooperative learning and found that all eight types promoted positive race relations in classrooms. They found that student in traditional classrooms usually made friends of the same race.

Use cooperative learning method. Cooperative learning is described by Slavin (1984; as cited in Andersen, 2009), one of the learning developers of cooperative learning as, a set of instructional methods in which students are encouraged and required to work together on academic tasks. Cooperative learning methods may be as simple as having students sit together to discuss or help one another with classroom tasks, or they may be quite complex. They may use group rewards, as in group contingencies, or may not do so. Salvin (1987; as cited in Andersen, 2009) reviewed so different studies that compared the achievement of

students taught in cooperative learning classrooms to the achievement of students taught in traditionally organized classrooms. He reported that 89% of the students in 50 different studies earned higher scores on achievement tests when they had participated in cooperative learning. Cooperative learning helps to improve racial relations in school.

School's policies for mathematics learning. 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 relation 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 day to come.

At last from above overall mentioned study, I concluded that mathematical communications can play an important role in learning mathematics. Exchange of knowledge one another is the basis of cooperative learning in mathematics. Cooperative learning strategies is the effective culturally responsive pedagogy in mathematics. When communicating mathematically, students enhance their understanding of mathematics, establish shared understanding of mathematics, become more active learners, learn in a comfortable environment, and assist the teacher in gaining insight into their thinking. Teaching is most effective when the teacher and learner have a healthy relationship.

Chapter V

Findings, Conclusions and Implications

This chapter includes that a summary of the whole study. It also includes findings and conclusions derived from the analysis and interpretation of the previous chapter and finally recommends how these findings can be used in the academic field. This chapter concerns in the following sections;

- Findings of the study
- Conclusions of the study
- Implications of the study

Findings

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

- This study found that, lack of students' time management for mathematics learning, lack of teacher competency, lack of school policy, lack of peer group interaction in mathematics classroom, lack of text book in this school, lack of students' own interest in mathematics subject are the major factors that affect in students' mathematics achievement at secondary level.
- This study found that, school policy hasn't concerned about mathematics achievement. There weren't extra classes of mathematics for low achiever students. There was no library and sufficient learning materials in school which effect student's achievement.
- This study found that, students do not have enough time for learning mathematics at home because of their household workload and some students were doing job in another times.
- Some teachers were teaching traditionally using lecture method. Some young teachers were using less ICT which is the factors that affect in students' mathematics achievement.
- There was big size classroom but students were sitting tightly. Benches and desk were not suitable for different level of students. Teacher was focusing only talented students' proper benches and desk were there which is the factors that affect in students' mathematics achievement.

- This study found that, there was not suitable textbook, effective practice book so that student could develop their potentiality themselves, unit test and class test were done according to teacher's interest which is the factors that affect in students' mathematics achievement.
- This study found that, home environment was not good. They had not separate room to study. They used to sit together. They had poor economic background. They used to help their parents in their corn field. So, they could not get proper time to study in their home which is the factors that affect in students' mathematics achievement.
- School had provided hostel facilities but cost was not high. But students were not in hostel because of their poor economic background. Unit test and class test were not running according to rules and regulations. Management committee will not look after any exam to begin regularly as not.
- 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.
- This study found that, there was not group coordination between and among students in mathematics classroom. Some students felt themselves superior some other were poor and also some students were not regular in classroom which is the factors that affect in students' mathematics achievement.

Conclusions

From the above finding of this research it was conducted that there are many aspects of school and out of school related factors that affect in students' mathematics learning. Management committee was not looked after any exam to be taken regularly as not. Students are not regular in classroom. They are absent no regularity of the student's 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 was not followed the required teaching methods. The teaching

materials were not well prepared or used in class room. The environment of classroom was affected the economic condition of the school. Due to the poverty there were many lacks 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.

In the context of Nepal, many students have low learning in mathematics and the trend is still continuing. The teacher behavior and family background are also having some positive and some negative effects on mathematics achievement of students. In this study, I concluded that there are the main factors which are affecting in learning mathematics achievement in secondary level students such as 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.

Implications of the Study

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

- This study helps to find out the way to decrease the failure rate of the students.
- It helps to guide the instruction on the basis of the individual difference.

- This study helps for students to be aware of the main problems of the mathematics to adopted required strategies for the improvement.
- It is helpful the government to adopt globally for the education level.
- It is helpful for mathematics teachers, students, researchers, curriculum planners, textbook writers, educationists, and students themselves.

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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:

- Physical environment of the classroom.
- Teaching learning activities.
 - i. Beginning of the class
 - ii. Setting the stage for learning.
 - iii. Acquisition of learning
 - iv. 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: