

**INFLUENCE OF PARENT'S EDUCATION LEVEL ON STUDENTS'
MATHEMATICS ACHIEVEMENT**

A

THESIS

BY

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Letter of Certificate

This is certify that **Mr. Raghu Nath Lamichhane**, a student of academic year **2070/71** with Campus Roll Number **516**, Thesis Number **1319**, Exam Roll Number **280486** and TU Registration Number **9-2-246-182-2009** has completed this thesis for the period prescribed by the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. This thesis entitled **Influence of Parent's Education Level on Students' Mathematics Achievement** has been prepared based on the results of his investigation. I hereby recommended and forward that his thesis be submitted for the evaluation as the partial requirements to award the degree of Master of Education.

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Letter of Approval

This thesis entitled **Influence of Parent's Education Level on Students' Mathematics Achievement** submitted by **Mr. Raghu Nath Lamichhane** in partial fulfillment of the requirements for the Master's Degree in Education has been approved.

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Declaration

This thesis contains no material which has been accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

.....

(Raghu Nath Lamichhane)

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Dedication

To My respected parents:

Ram Prasad Lamichhane and Gita Devi Lamichhane

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.....

(Raghu Nath Lamichhane)

Abstract

The purpose of this study was to identify the Influence of parents' education level on students' mathematics achievement of grade X. The study was based on descriptive survey research design and quantitative technique was applied to analyze the data. To complete the objective of this study, four schools were selected randomly from Nuwakot district. The total sample were 125 students and their 125 parents'. The researcher divided the students' in three groups according to their parents' education level. The researcher collected the data by using mathematics achievement test from students and questionnaire related to five point Likert scale from parents'. The mathematics achievement test was constructed based on the prescribed text book and curriculum of grade X mathematics, by researcher. The achievement score of student was analyzed by using mean, standard deviation, one tailed t-test at 0.05 level of significance. Similarly one way ANOVA at 0.05 level of significance was used to find whether the achievement of each group of students were significance or not. The parents' questionnaire was analyzed by percentage and mean.

The results indicated that there was a significance difference among three groups of students according to the parental educational groups. Additionally, a set of questionnaire related to Likert scale was used to explore the parents' view on parental involvement in students' education. The result of questionnaire showed that parents have positive feedback or view about parental involvement in students' education.

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Abbreviations

SEE: Secondary Education Examination

ZPD: Zone of Proximal Development

ANOVA: Analysis of Variance

MAT: Mathematics Achievement Test

i.e.: That is

d.f.: Degree of freedom

P: Difficulty level

D: Discrimination index

F: F-distribution

t: t-distribution

r: Reliability of coefficient

r_{xy} : Pearson's correlation coefficient

α : Level of significance

%: Percentage

Chapter I

INTRODUCTION

Background of the Study

In the context of today's changing world, achievement of students' is affected by many factors. Parents, society, school, community, inheritance etc. are factors that determines students' progress level. Among them parental factor is taken as the most responsible factor for students' result. Parental education is one of the aspect of the family background that influences children educational achievement which is an important one. Grissmer (2003), submitted that parents' level of education is the most important factor affecting students' academic achievement. Parents' educational background influence the academic achievement of students (Taiwo, 1993). We can find many researches that blames that parent occupation, education level and socio economic status as main causes for students' low achievement. In this context one question arises which is whether parents education really affects students' progress? This contextual question has no satisfying answers.

Mathematics is considered as one of the most important segment of the personal, social, economic, political, geographical, scientific and technological aspect of social life. Many capable students permanently restrict their educational and employment desire due to poor result in math subject. Moreover, according to SEE result, we can find out that many student fails in math but student who does well in SEE are found to have maximum score in math itself. So the main question is, why is there such a variations in math's result? Among the student of SEE, what is the key factor behind this? Is this variation

due to their illiterate or highly educated parent or motivational highly educated parents'? If so then by which degree of relation among the students' differs due to parent education level? These are the major question among us.

An individual's achievement in academics is influenced by many factors. For example, there is a relationship between school successes and how much time and effort an individual spends on homework each night, but the school success is also related to the type of home and from where the individual comes. Some studies emphasize the idea that higher level of education of parents and parental involvement both have impacts on an individual's academic success. However, regardless of the parents' education level, the more involved the parents are in their child's schooling, the better the students perform academically and reaches a higher level of achievement in high school.

There are many researches on parent's education and students' achievement in mathematics. Parent's education supports and has great influence on students' achievement in mathematics. Every child spend more time at home than at school. The home environment of child obviously affects the children's learning. So, every parent provide good environment for learning facility of their child that affects the school performance and higher performance in achievement. Parents' involvement outside of the home environment, such as in extra curriculum activities related to mathematics knowledge, general knowledge which also helps their children in learning.

Parent's involvement means involvement in school education, helping their children, improving their school work by providing encouragement If family members are highly educated, then they can develop their child to have their own thinking

strategies and other less educated parents' are unable to do this. Higher level of education of the family highly affects to their children's learning than that of others Parents can play effective role in students' mathematics learning by following ways:-

- Parent as friend
- Parent as teacher
- Parent as guide
- Parent as observer
- Parent as motivator
- Parent as facilitator
- Parent as role model

Family background is key to a students' life and out of school, it has the most important influence on students learning and, includes factors such as socio-economic status, parenting practices, maternal characters, and family size. Well-educated parents participate in the school's education process and encourages their children to learn. Researchers have indicated that family's socio-economic status is based on parents' income, education and occupation. Musgrave (2000), states that a child that comes from an educated home would like to follow the steps of his/her family and by this, work actively in his/her studies.

According to Nannyonjo (2007), pupils with parents who did not finish primary or just finished primary, and pupils with parents who finished senior school or university performed considerably better. The highest increase in test scores was for pupils whose fathers had a university degree. These results possibly reflect the ability of parents to support the pupils' school work, and likely interactions of literate parents with their

children in school related or literacy nurturing activities as well as their ability to support their children with homework or help with difficult homework questions.

The strong correlation between parental income and students' scholarly achievements is one of the major findings in the literature on the determinants of children's attainments. However, the fact that children of parents with high levels of schooling or income perform better than those from less advantageous family backgrounds does not necessarily imply that the former exert relatively more effort. Consequently, the significance of education attainments and academic performance are related in most African countries. This is because, how well an individual performs in primary and secondary school largely determines the individual's final post-secondary educational destination (Charles, 2003).

Mullis (2002), notes that parents can take many positive steps to help their children, including the following: they can encourage students to pursue advanced course work, to invest significant amount of time in their homework and to devote more time to reading than to television. An interest in reading and learning can be fostered by reading aloud to children; holding family discussions about reading materials, school work and current events and encouraging frequent trips to the library to gather more information about interesting topics. High academic attainment of a mother and father not only significantly reduces chances of primary school dropout but also improve the performance (Okumu et al. (2008). Also educated mothers are more effective in helping their children in academic work. In doing so, they are also able to monitor and supervise their children's academic progress. While for fathers it's attributed to the fact that

educated fathers are also interested in their children thus they would be willing to spend more time in helping their children in academic problems.

The strong relationship was found between mathematics achievement and having study aids in the home which are also positively related to the parental education and income levels. Fraser (1994) found that two variables with the highest correlated with educational achievement are encouragement and parental education. In a home where parents are fairly or highly educated, there is a tendency that they would aspire to see their children better than they are educationally. This inspiration will force them to motivate their children by providing for their basic needs in education hence their performance in their academic work in school will improve.

The active family involvement is necessary for a good academic performance of a child. The family is obviously a major socializing agent and therefore important in determining the child's motivation to academic success. David (2007) stated that students from illiterate parents lack assistance because of parents' illiteracy and ignorance such as parents fail to motivate, reinforce, give reward or punish their children on their academic performance which might have forced them to be serious in learning. On the other hand, literate parents have interest in their children's academic performance. They struggle to provide them with needed materials and give adequate encouragement. Having known the importance of education, they draw a reading time-table for their children and also arrange for part-time teachers to teach their children and check their workbooks from time to time. Taking care of children and making provision for their needs, especially educational needs, are very important in determining the academic performance of children.

A considerable number of studies have investigated the role that parents play in their children's mathematical learning. Previous research results suggest that parental involvement has a significant impact on students' mathematics achievement and attitudes towards mathematics. Parental aspirations and parents' attitudes towards mathematics have been identified as having a significant impact on students' participation in advanced level mathematics and students' achievement in mathematics.

Statement of the Problem

Mathematics is considered one of the most important segment of the personal, social, economic, political, geographical, scientific and technological aspect of social life. Mathematics is an essential component of school and higher education. The degree of achievement level in mathematics of students' depend on many internal and external factors. Many study shows that the parent's education and their involvement in students study plays vital role on achievement of students.

Many capable students permanently restrict their educational and employment desire due to poor result in math subject. Moreover, according to SEE result, we can find out that many student fails in math but student who does well in SEE are found to have maximum score in math itself. So the main purpose of this research is to find out the reason of such variation in math's result, the key factor behind this among the student of SEE, whether the variation is due to their illiterate or highly educated parent or motivational highly educated parents' and the degree of relation among the students' due to parent education level.

In the context of other countries, there are many researches on parent's education, involvement and students' achievement in mathematics. Despite the vast research on parental education and involvement on students in learning mathematics, there is scarcity of such types of research in the Nepalese context. Therefore to address above problems, the study was intended to answer the following questions:

- Does the father's education level have any influence on the achievement of students' in mathematics?
- Does the mother's education level have any influence on the achievement of students' in mathematics?
- What is the effect of parental involvement on students' mathematics achievement?

Objectives of the Study

The purpose of the study was to find out the relation between parent's education status and their children's mathematics achievements. The study intended to accomplish the following specific objectives:

- To identify the influence of father's education level on their children's achievement in mathematics.
- To identify the influence of mother's education level on their children's achievement in mathematics.
- To identify the effect of parental involvement on students mathematics achievement.

Hypothesis of the Study

The two types hypotheses were formulated in this study, they are as follows:

Research hypothesis. To formulate the research hypothesis, the fathers and mothers are divided into three groups, according to their education level. The illiterate fathers and mothers are included in group A and A₁ respectively, moderately educated (class 1-12) fathers and mothers are included in B and B₁ respectively; and highly educated (12-above) fathers and mothers are included in C and C₁ respectively.

1. Among parents' three educational groups

- **Null hypotheses:** There is no significance difference between achievements of three educational groups.
- **Alternative hypotheses:** There is significance difference between achievements of three educational groups.

2. Among parents' two educational groups

- **Null hypotheses:** There is no significance difference between achievements of two educational groups.
- **Alternative hypotheses:** There is significance difference between achievements of two educational groups.

Statistical hypothesis. The hypothesis formulated for this study are:

$$H_0: \mu_1 = \mu_2 = \mu_3$$

$$H_1: \mu_1 \neq \mu_2 \neq \mu_3$$

Where μ_1 , μ_2 and μ_3 are the parametric mean of achievement of the children of the fathers of group A, B and group C respectively.

$$H_0: \mu_4 = \mu_5 = \mu_6$$

$$H_1: \mu_4 \neq \mu_5 \neq \mu_6$$

Where μ_4 , μ_5 and μ_6 are the parametric mean of achievement of the children of the mothers of group A₁, B₁ and group C₁ respectively.

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 < \mu_2$$

Where μ_1 and μ_2 are the parametric mean of achievement of the children of the fathers of group A and group B respectively.

$$H_0: \mu_1 = \mu_3$$

$$H_1: \mu_1 < \mu_3$$

Where μ_1 and μ_3 are the parametric mean of achievement of the children of the fathers of group A and group C respectively.

$$H_0: \mu_2 = \mu_3$$

$$H_1: \mu_2 < \mu_3$$

Where μ_2 and μ_3 are the parametric mean of achievement of the children of the fathers of group B and group C respectively.

$$H_0: \mu_4 = \mu_5$$

$$H_1: \mu_4 < \mu_5$$

Where μ_4 and μ_5 are the parametric mean of achievement of the children of mothers of group A₁ and group B₁ respectively.

$$H_0: \mu_4 = \mu_6$$

$$H_1: \mu_4 < \mu_6$$

Where μ_4 and μ_6 are the parametric mean of achievement of the children of the mothers of group A₁ and group C₁ respectively.

$$H_0: \mu_5 = \mu_6$$

$$H_1: \mu_5 < \mu_6$$

Where μ_5 and μ_6 are parametric mean of the achievement of the children of the mothers of group B₁ and group C₁ respectively.

Significance of the Study

A considerable number of studies have investigated the impact of the education level of parents in their children's mathematical learning. Previous research results suggest that parental involvement has a significant impact on students' mathematics achievement and attitudes towards mathematic. Parental aspirations and parents' attitudes towards mathematics have been identified as significant impact on students' participation in advanced level mathematics and students' achievement in mathematics.

Although the various researches were conducted in Nepalese context but the maximum parents in rural part of Nepal has low education level. They are not aware of their responsibilities towards the education of their children. This study helped those parents, teachers, administrators, curriculum planner and policy maker for better achievement of children's in mathematics. The main significance is pointed below:

- This study helped to provide the information about the influence of parent's education level on students' mathematics achievement.

- This study helped the concerned agencies to find out level wise relation between parents education and their children's achievement in mathematics.
- This study helped to make the parents' aware to provide academic support to their child for better achievement in mathematics.
- This study helped the parents to encourage and better involvement on their children at home.
- This study helped the curriculum designer to address "parental involvement" issues in mathematics education.

Delimitation of the Study

The delimitation of the study were as follows:

- The study was delimited to grade X students of 2 community schools and 2 institutional schools in Nuwakot district.
- The study was delimited to mathematics subject only.
- The study was limited to 125 and their parents' students from different school.
- The study was based on quantitative analysis.
- Mathematics achievement test and questionnaire were tools to collect the data.
- Tests were made by researcher himself with help of subject teacher, expert, and supervisor.

Operational Definition of the Key Terms

The key terms of this study were defined as below:

Students: The student, who are studying at grade X in Nuwakot district.

Parents: Father or Mother of concerned child.

Family: A group consisting of blood related people including those adopted to the group.

Achievement: Scored by the students in the mathematics achievement test.

Community school: School run through the government and government provide the grants for salary and other purpose.

Institutional school: School run through private sector or government not provide grants for salary and other purpose.

Socio-Economic status: Family's economically and social prestige in society.

Parents' educational groups: Parents' (father and mother) are divided into three groups, according to their education level, i.e. illiterate parents', moderately educated parents' and highly educated parents'.

Illiterate parents: The parents' who didn't get formal education.

Moderately educated parents: The parents' who has passed up to Intermediate or +2 level.

Highly educated parents: The parents' who has passed Bachelor level or above.

Chapter II

REVIEW OF THE RELATED LITRATURE

A literature review is a written summary of journal article, books, and other document that describes the past and current state of information on the topic of research study. With so much information available, searching and locating good literature on the topic of research study can be challenging (Creswell, 2012). It provides evidence that the researcher is familiar with what is already known and what is still unknown and unstated. Because effective research is based on past knowledge, this step helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestion for significant investigation. The review of related literature brings clarity and focus on research problem, improves our methodology. The previous studies cannot be ignored because they provide the information to the present study. So, this chapter presents the empirical literature and theoretical as well as conceptual framework.

Review of Empirical Literature

The researcher reviewed some national and international thesis journal and article as empirical literature which are presented below:

Chaudhary (2000), conducted Master thesis on the topic 'A Comparative Study of Achievement in Mathematics of Primary level Students Related to The Parents Education Status' focus on the effect of parents' education status on the achievement of grade V students of Saptari district. Out of 290 Primary schools, 15 schools were selected randomly. Including 10 student in his research from each school he held achievement test

paper. The Mean and Standard Deviations were calculated. The t-test with one-tailed test, level of significance 0.05 was used. The finding of the study showed that the mathematics achievement of educated parent's children were higher than literate and illiterate parents children.

Adhikari (2001), conducted a study on the topic 'A Comparative Study of the Achievement on Mathematics of Primary Level Students Related to Parent's income'. His main target was to compare the achievement of the primary level students in relation to their parent's income and orient to helping at home. He used descriptive survey design, as well as quantitative research taking 88 primary level students as sample in Nirmalpokhari V.D.C. in Kaski district. Before administering the real test he has taken pilot test among 15 students of Jana Jyoti Primary School, Panga. The reliability coefficient was 0.87. For the data he visited chosen school and administered the test. The ANOVA test was used for the analysis procedure. He showed that high income students achievement significantly higher than middle income and lower income students.

Dhungana (2015), conducted the study entitled with 'Parent's Mathematics Literacy and Their Children Achievement in Mathematics' is intended to find out the relation between parent's mathematics literacy and their children achievement of grade VIII students. To fulfill the objectives of this study, the researcher used questionnaire for student and teacher. For the design of survey research six different school were selected randomly from two different V.D.C. The total sample student 60 and their 60 parents for such the 10 students were selected randomly from each sample school and their parents. The parent's mathematics literacy score and mathematics achievement test score of students were divided into six different groups according to the division way of literacy

score of parent's. This score was compared by using the Karl Pearson correlation. The major finding of his study was, there was positive relation between mathematics achievement score of students and their parent's mathematics literacy score. Also research found that, the mathematics score of students is affected by parent's mathematics literacy and their supports.

Neupane (2006), did the study on the topic 'Effect of Socio-Economics Status on Mathematics Achievement' which focused to find the correlation between socio-economic status and mathematics achievement. He used descriptive survey design as well as quantitative research. The total sample of the study was 84 students of grade III of Dura and Gurung community from class V public school in Lamjung district. Mainly two tools, student achievement test and parent's questionnaire were used. The Mean and Standard Deviation and correlation, multiple regression were used for analysis of the data. He concludes that mathematics achievement of Gurung student found to positively correlated with father education. But the other variable was negatively correlated with mathematics achievement. Similarly, mathematics achievement of Dura student positively correlated to father education. But the other variable was negatively correlated with mathematics achievement.

Neupane (2009), conducted a study on the topic 'Effect of Parental Cooperation on Mathematics Achievement of Primary Students' which focuses to find the parental cooperation on primary level taking the sample of 100 children and their parents from five schools of Tanahunh district. A multi-stage stratified random sampling procedure was followed in selection of schools. Selected school were located in rural, remote and urban areas of the district which had at least 20 children in grade five. Students' data were

collected by MAT questionnaire and parents by interview. The collected data were analyzed by beta coefficients, coefficients of correlation and multiple correlation. In the conclusion of research he found that parent's involvement in home activities with their children is more beneficial to the children's school learning.

Khan, Iqbal & Tasneem (2015), did research entitled with 'The influence of Parents Educational level on Secondary School Students Academic achievements in District Rajanpur' which was conducted to focus the influence and impact of parent educational level on student academic achievement at secondary level of education. The study utilizes the student results of the 9th class in secondary school certificate examination taken by the Board of Intermediate & Secondary Education Dera Ghazi Khan. Oral interview, observation and a questionnaire were used for this study. This article tries to find out the impact of parental education status at student academic achievements of secondary school level. Research population was the students of different public and private high schools of District Rajanpur, South Punjab. 200 students of Grade 10th were taken as a sample randomly. Null hypothesis was formulated and tested using independent Z-test analysis. Descriptive study based on empirical data was tested to correlate the described variables. After analysis of the data the research finds significant positive relationship between parent education level and academic achievements of students.

Muthoni K.L. (2013), conducted the study on 'Relationship between Family Background and Academic Performance of Secondary Schools Students'. The study focused on the influences of; parental marital status, family financial status, parents' education level and family size on the academic performance of students in Siakago

Division, Mbeere North District. The study employed a descriptive research design. The target population under study was 1,081 students in Siakago Division and 1,081 parents. The study used a sample 338 students and parents which were selected by use of a proportionate stratified random sampling method. Data was collected by use of questionnaire for parents and interview schedule for students. The data was analyzed quantitatively and qualitatively and presented using frequencies, regression coefficient and Pearson's coefficient correlation. Statistical Package for Social Sciences version 21 was used to aid in generating a summary of results which were represented in tabular form. The findings of the study, showed that parental marital status, family size, parents' education level and family financial status had a positive relationship with academic performance of students. The findings also showed that only 7% of students' academic performance would be explained by the parents' education level.

Dekar Y. (2016), studied on 'The Influence of Parents' Educational Background on the Academic Achievement of the Government High School Students in Thimphu' with the objective to examine the influence and impact of parents' educational level on students' academic achievement at secondary level of education. A quantitative research method was employed for this study with class 12 students of government high schools in Thimphu being randomly selected. This study attempted to survey both the students and their parents by distributing two sets of questionnaires. The rationale behind this was to triangulate the data in order to provide more insight on this topic and to ensure validity while complementing similar data. In the pursuit of finding the correlation between educational qualification of the parents and children's success, the researcher found out vividly that the former variable is not the only determinant for the latter one. After

analysis of the data the research finds moderate positive relationship between parents' education level and academic achievements of students.

Ugwuja O.G. (2010), did a research on 'Influence of Family Background on the Academic Achievement of Senior Secondary School Students'. This study was aimed at investigating the family background factors that can influence students' academic achievement in Senior Secondary School in Nsukka Education Zone in Enugu State. The design adopted for this study was Ex-post Facto design. The 53 secondary schools in the zone have a population of 7945 senior secondary students. Out of the 53 schools, 12 schools were sampled using proportionate random sampling technique. In the twelve schools, all SSII students numbering 816 were used as the subject of the study. The research instrument was questionnaire on family background influence (FBI), designed by the researcher and validated by experts. The data collected were analyzed using mean and standard deviation while t-test statistics was used to test the hypotheses at 0.05 level of significance. The instrument was pilot tested in Obollo Afor Education Zone, using 30 students. The reliability coefficient was 0.69. The finding of the study revealed that: Students from educated parents achieve more than those from uneducated parents in academics; parental level of motivation also influenced students' academic achievement because motivation and reward served as a form of reinforcement for children's learning at school.

Among above empirical literature, the study by R. Chaudhary (2000), Neupane (2006), Khan, Iqbal and Tasneem (2015) and Dekar (2016), concluded that there is significance positive relationship between parent education level and academic achievement of students'. Similarly another study by Adhikari (2001), showed that math

achievement of parents with high income is significantly higher than parents with middle income or lower income. A study by Dhungana (2015), found out that mathematics score of students' is affected by parent mathematics literacy and their support. A study by Neupane (2009), concluded that parents' involvement in home activities with their children is more beneficial to the students' school learning. Muthoni (2013), showed that parental marital status, family size, parents' education level and family financial status have a positive relationship with academic performance of students'. The research conducted by Ugwuja (2010), found that the parents' education level and parents' level of motivation has influence on students' academic achievement.

Most of the research on parental role focuses on their parents Occupation, Socio Economic Status, Involvement, Co-operation but some researches were found on parent's educational status. I found various studies which draw conclusion that parents' educational status influences the achievement of the students. But in the case of mathematics achievement in secondary level according to their parent education level, there is a less research in Nepalese context there. So the researcher has undertaken this study to find out the parent's education status under the certain criteria and to find their children's achievement in mathematics.

Theoretical Framework:

Zone of Proximal Development (ZPD) is main theory of social constructivism of Vygotsky. The zone of proximal development, often abbreviated as ZPD, is the difference between what a learner can do without help and what he or she can do with help. It is a concept introduced, yet not fully developed, by Soviet psychologist Lev

Vygotsky (1896–1934) during the last ten years of his life. Vygotsky himself never mentioned the term, scaffolding was first developed by Jerome Bruner. According to Vygotsky students the hardest tasks they can do with scaffolding will lead to the greatest learning gains. Vygotsky (1962) also used scaffolding in this theory to understand that children, learn more effectively when they have others to support them.

A framework containing six important factors with regards to parental involvement has been developed by Epstein and her co-workers at the Center on Family, School, and Community Partnership at John Hopkins University. This framework is based on findings from many studies of what factors are most effective when it comes to children's education (Epstein, 2009)

Zone of proximal development. Vygotsky stated that a child follows an adult's example and gradually develops the ability to do certain tasks without help. Vygotsky and some other educators believe that the role of education is to give children experiences that are within their zones of proximal development, thereby encouraging and advancing their individual learning.

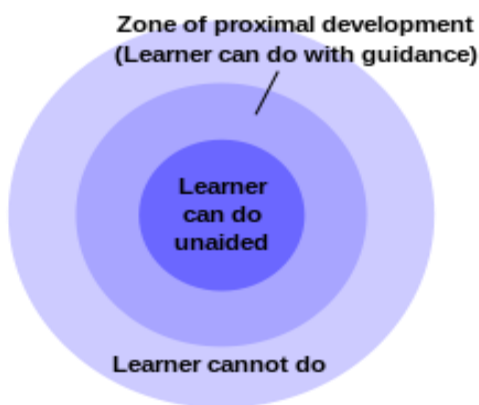


Figure 2.1: Zone of Proximal Development adopted from: L. Vygotsky

Since Vygotsky's original conception, the person learning the skill set cannot complete it without the assistance of the adult or peer. Vygotsky stated that learning occurs within a Zone of Proximal Development which is the distance between learner's actual development and his/her potential development with guidance from "a capable other" or collaboration with "more capable peers". According to him, the social learning process enables children who are exposed to their thinking process through joint interactions with adults and more capable others, with regard to ZPD, he mentions that each child is likely to perform better, when working together, on a given task at a slightly higher cognitive level, exactly within the child's proximal development.

Vygotsky noted that children grasp language concepts quite naturally, but that mathematics and writing do not come naturally, that these are concepts taught in schools and tend to come along with some difficulty. He said that development is a spontaneous process that is initiated and completed by the children, stemming from their own efforts. He believed that children would not advance very far if they were left to discover everything on their own. He noted cultural experiences where children are greatly helped by knowledge and tools handed down from previous generations. Vygotsky argued that, rather than examining what a student knows to determine intelligence, it is better to examine his or her ability to solve problems independently and his or her ability to solve problems with an adult's help.

The previously mentioned idea of Zone of Proximal Development is central to Vygotsky's view on how learning takes place. He described this zone as "the distance between the actual development levels as determined by independent problem solving and the level of potential development as determined through problem solving under

adult guidance or in collaboration with more capable peers. Vygotsky mentioned that learning occurs just above the students' current level of competence. It follows then, that the copying student will have a higher performance when working with more capable students.

Scaffolding. The ZPD concept is seen as a scaffolding, a structure of "support points" for performing an action. This refers to the help or guidance received from an adult or more competent peer to permit the child to work within the ZPD. Scaffolding is an assisted learning process that supports the ZPD or getting to the next level of understanding, of each student form assistance of teacher, peers or other adults. According to Vygotsky cooperative learning is integral part of creating a deeper understanding. It is the part of creating a deeper understanding.

Scaffolding is a process through which an adult or a more competent peer helps the student in his or her ZPD as necessary and tapers off this aid as it becomes unnecessary, much as a scaffold is removed from a building after construction is completed. "Scaffolding is the way the adult guides the child's learning via focused questions and positive interactions. Several instructional programs were developed based on this interpretation of the ZPD, including reciprocal teaching and dynamic assessment. In order for scaffolding to work and have an effect, one must start at the child's level of knowledge and build from there.

The ZPD works in conjunction with the use of scaffolding. Scaffolding is a six-step approach to assisting learning and development of individuals within their ZPD. Knowledge, skills and prior experiences, which come from an individual's general

knowledge, create the foundation of scaffolding for potential development. In mathematics, proximal development uses mathematical exercises for which students have seen one or more worked examples. In secondary school some scaffolding is provided, and generally much less at the tertiary level. Ultimately students must find library resources or a tutor when presented with challenges beyond the zone. At this stage, students interact with adults and/or peers to accomplish a task which could possibly not be completed independently. The use of language and shared experience is essential to successfully implementing scaffolding as a learning tool.

Epstein's framework. The six factors of parental involvement are parenting, communicating, volunteering, learning at home, decision-making and collaborating with the community. 'Parenting' pertains to helping all families understand the development of both the child and the adolescent. It also helps establishing a supportive home environment for children as students. 'Communicating' refers to how best to design and conduct an effective two-way communication, which is school-to-home and home-to-school, about school programs and their children's progress. 'Volunteering' applies to recruiting and organizing help and support from parents for school programs and students' activities. 'Learning at home' pertains to providing ideas and information to parents about how they can best assist their children with homework and curricular related decisions and activities. 'Decision-making' refers to including parents in school decisions and to developing parent leaders and representatives. 'Collaborating with the community' pertains to identifying and integrating communities' services and resources to support and strengthen schools, students, and their families.

Each of these factors can lead to various results for students, parents, teaching practices and the school climate. In addition, each factor includes many different practices of partnership. Lastly, each factor poses challenges to involve all families and those challenges must be met. That is why Epstein (2009), considers it to be important for each school to choose what factors are believed to be most likely to assist the school in reaching its goals for academic success, and to develop a climate of alliance between homes and the school.

Even though the main focus of these six factors is to promote academic achievements, they also contribute to various results for both parents and teachers (Epstein, 2009). For instance, it may be presumed that parents will gain more self-confidence in their role as parents, they will show leadership with decision-making, and they will have more effective and productive communication with their children with regards to school work, and will have more communication with other parents at the school. Parents also gain a more positive attitude towards the school and its staff, and gain more confidence in assisting their children with homework, by being involved with their education. In addition, they are more likely to gather support for the school and its programs in the community and become more active community members.

Conceptual Framework

This conceptual framework mainly based on three concepts; prominent aspects of parental involvement enacted at home and school by Valerie J. Shute et.al, conceptual framework by Dekar (2016), and six types of parental involvement of Joyce Epstein.

Figure 2.2: Conceptual framework

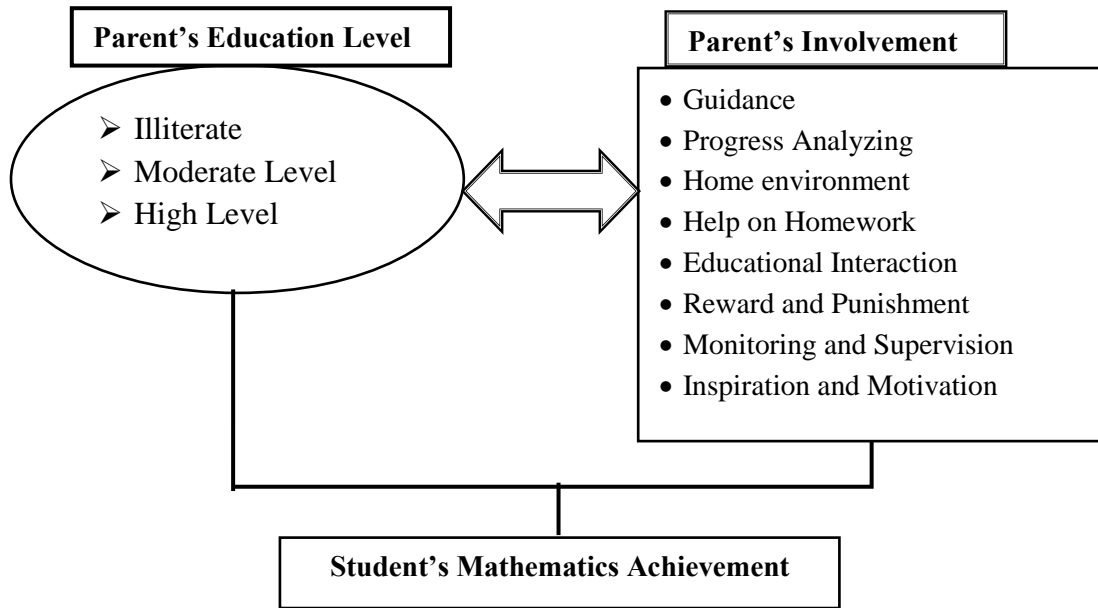


Fig 2.2 displays the conceptual framework between influence of parents' education level and involvement of the parents with different education level in students' mathematical achievement. The parents' education level is divided into illiterate, moderate level and high level. Whereas parents' involvement is considered in terms of guidance, progress analyzing, home environment, help on homework, educational Interaction, Reward and Punishment, Monitoring and Supervision, Inspiration and Motivation. The fig conceptual framework shows how illiterate, moderately educated and highly educated parents with their involvement such as progress analyzing, Home environment, Help on Homework, Educational Interaction, Reward and Punishment, Monitoring and Supervision, Inspiration and Motivation has individually influences on students' mathematics achievement.

Chapter III

METHODS AND PROCEDURES

Research methodology is the most important aspect of research work. It is a bridge to achieve the objectives of the study in systematic way. Simply it means way to gather information. Authenticity and reliability of any research depends upon the tools and methods used for data collection. As methods and procedure are the root of the research, the researcher should be clear about the research designs, nature and source of data, selection of case school, selection of respondent, tools, data collection procedures and data analysis and interpretation.

Research Design

Research design is the design of path about how does the research was conduct. It is the detail path of the investigation. Thus, research design comprises the overall strategy followed in collecting and analyzing data (Gay et al., 2012).

This study entitled 'Influence of Parent's Education Level on Students' Mathematics Achievement' at Nuwakot district is based on descriptive survey design. Survey research is a popular design in education. Survey research designs are procedures in quantitative research in which investigators administer a survey to a sample or to the entire population of people to describe the attitudes, opinions, behaviors, or characteristics of the population. (Creswell, 2012). The plan of study involved the use of questionnaire to collect the data in order to test the hypothesis generated in the study.

Population of the Study

A population is a group of individuals who have the same characteristic. A research population is also known as a well-defined collection of individuals or objects known to have similar characteristics (Creswell, 2012). However, due to the large sizes of populations, researchers often cannot test every individual in the population because it is too expensive and time-consuming. This is the reason why researchers rely on sampling techniques.

The population of the study will include the grade X students of Nuwakot district. The researcher had the sound access to the village to perform different tasks and fulfill the objectives of the study. Due to time and cost limit it is also essential to select this study area.

Sample of the Study

A sample is a subgroup of the target population that the researcher plans to study for generalizing about the target population. In an ideal situation, you can select a sample of individuals who are representative of the entire population (Creswell, 2012). The process of selecting the samples is called sampling. The idea of sampling is to select part of the population to represent the entire population.

In order to collect the data, first of all the district education office of Nuwakot was visited and a list of secondary schools will be taken. And community and institutional schools were divided into strata by stratified random sampling. Then two community and

two institutional schools were selected by simple random sampling (See Appendix-9). After that all the students of grade X from each school will be selected for sampling.

Data Collection Tools

In order to find out the objective of the study it is necessary to use tools and instruments. To determine the answers of the research questions, researcher used achievement test and questionnaire as the tool for data collection.

Mathematics achievement test. For the fulfillment of first and second objective, achievement test was the main tool for this study. It was consisted of 30 multiple choice type objective questions, with weightage one marks for each correct answer (See Appendix – 1).

The achievement test was developed by the researcher himself with help of the specification chart from curriculum and text book of grade IX and X. The question was developed from three different cognitive domain. Pilot test was administered at Global Vidhya Mandir, Nuwakot. There were 34 questions in the beginning but among four questions were removed after item analysis (See Appendix – 8).

Questionnaire. For the fulfillment of the third objective, questionnaire was the main tool. The questionnaire related to five point Likert scale was used to analyze the parents' view on Parental Involvement. In this study, the set of questionnaire contained 13 statements using Likert scale of "1-Strongly disagree, 2-Disagree, 3-Undecided, 4-Agree and 5-Strongly agree" for positive statement and for negative statement the scoring process was reversed. See the questionnaire in Appendix - 6. This questionnaire was adapted on modified based on Dekar (2016).

Item Analysis of the Test

In item analysis, the difficulty level (P-Value) and discrimination index (D-Value) of the test was computed to check which item accept for achievement test and also to check quality of the test item.

The researcher conducted the pilot test among 16 students of Global Vidhya Mandir, Nuwakot. After collecting students' response, firstly the list of the students' was made in descending order according to the marks obtained. From the list 27% high scoring and 27% low scoring students were chosen. So, researcher took five from upper part of the list and five from the lower part of the list. The table of item analysis of test is given in Appendix-3.

The difficulty level of an item is the index of difficulty, which is the percent of examination of examines who correctly answered the item. So it takes the value from 0% to 100%. The criteria of analysis of item difficulty level are given in table.

Table 3.1: Item Difficulty Level (P Value)

Criteria	Item Evaluation	Remarks
0 – 39%	Very difficult	Removed
40 – 60%	General	Referred d - value
61 – 75%	Substantial	Referred d - value
76 – 90%	Easy	Referred d - value
91 – 100%	Very easy	Removed

Source: Harper and Harper; 1990:363

The index of discrimination is also known as item validity index. It is the number which differentiates strong and poor students. It takes the value ranging from -1 to +1. The index of discrimination of each item is calculated by using the formula. The criteria of analysis of item discrimination index are given in table.

Table 3.2: Item Discrimination Index (D Value)

Criteria	Item Evaluation	Remarks
-1 – 0.19	Negligible	Removed
0.20 – 0.29	General	Revised
0.30 – 0.39	Good	Accepted
0.40 – 1.00	Very good	Accepted

Source: Eble and Frisbie; 1991:232

By using criteria of above two table, item difficulty level and item discrimination index, 4 items were rejected from 34 objective questions and 30 item were accepted for the final test.

Validity and Reliability of the Tool

Validity of an assessment is the degree to which it measures what it is supposed to measure. Validity is also dependent on the measurement measuring what it was designed to measure, and not something else instead (Kramer et.al, 2009). The content validity of the questionnaire was established by subject teacher, expert and thesis supervisor.

Reliability means that scores from an instrument are stable and consistent. Scores should be nearly the same when researchers administer the instrument multiple times at different times. Also, scores need to be consistent. When an individual answers certain

questions one way, the individual should consistently answer closely related questions in the same way (Creswell, 2012).

For this purpose, every test items were piloted and reliability was checked before it was administered. In this study, the mathematics achievement test piloted, involving 16 students of grade X in Global Vidhya Mandir, Nuwakot. The response of the students was analyzed. The split-half method was employed to determine the reliability of the test. The reliability of the test was $r = 0.94$ (See Appendix - 4). It indicates that the mathematics achievement test was highly reliable.

Data Collection Procedure

First of all, the selected 2 community and 2 institutional schools (See Appendix- 9) will be visited to collect the data. The permission was taken from the school's administrative division for the data collection procedure. Entire students of class X were given brief information regarding this research. After this achievement test and questionnaire was conducted by following ways:-

Achievement Test:

- For this test, papers with 30 objective questions were distributed among the selected students.
- Then they were asked to tick the right answers of those 30 objective questions.

The time for the completion of those objective questions was 30 minutes.

Questionnaire:

- For the questionnaire section, papers with 13 Questionnaire questions were distributed among the selected entire students of grade X and they were provided a brief instruction about how to fill the questionnaire. Then they were asked to give it to their parents' to fill and bring back those questionnaire.
- After that those filled questionnaire were collected form students'.

Data Analysis Procedure

Data analysis procedures was based upon the data collection tools and techniques. Collected data was analyzed by using descriptive and inferential statistical analysis method. Descriptive statistical like: mean, variance, standard deviation, t-test were calculated with help of Microsoft Office Excel 2013.

To complete the first and second objectives of this study mathematics achievement test scores were analyzed using inferential statistics, i.e. one way ANOVA was used to compare achievement score of students between three groups of parents' according to level of education. Also t-test with one-tailed test at 0.05 level of significance value was used to compare achievement score of students between two groups of parents' (father and mother) according to level of education.

Additionally, to complete the third objectives of this study, analyzing the parents' view on parental involvement, the questionnaire related to five point Likert scale was used. And parents' response was calculated by percentage and mean by assigning "1 for strongly disagree, 2 for disagree, 3 for undecided, 4 for agree and 5 for strongly agree" for all positive statement and for negative statement the scoring process was reversed. Finally, data was analyzed and interpreted.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the analysis and interpretation of data. A quantitative research was done in concern to the topic 'Influence of parents' education level on students' mathematics achievement'. The objectives of the study were, to identify the influence of parents' education level on their students' mathematics achievement and analyzing the parents' view on Parental Involvement. A survey design was adopted for the purpose of the study. A Mathematics Achievement Test for the student, was the main tool used to fulfil the first objective of the study. And for the second objective of the study, questionnaires for parents', related to Likert scale were used. The score of the students were analyze using statistical method with help of Microsoft Office Excel 2013 for mean, variance, standard deviation, t-test and ANOVA. And the parents' view on Parental Involvement were analyze using Microsoft Office Excel 2013 for mean with based on Likert scale analysis. For fulfil our motto, the data are organized, tabulated, analyzed and interpreted under the following headings:

- Comparison of Mathematics Achievement of Students, according to Father's three Educational Groups by using ANOVA.
- Comparison of Mathematics Achievement of Students, according to Mother's three Educational Groups by using ANOVA.
- Comparison of Mean Achievement of Students' of Illiterate and Moderately Educated Father's.

- Comparison of Mean Achievement of Students' of Illiterate and Highly Educated Father's.
- Comparison of Mean Achievement of Students' of Moderately Educated and Highly Educated Father's.
- Comparison of Mean Achievement of Students' of Illiterate and Moderately Educated Mother's.
- Comparison of Mean Achievement of Students' of Illiterate and Highly Educated Mother's.
- Comparison of Mean Achievement of Students' of Moderately Educated and Highly Educated Mother's.

Comparison of Mathematics Achievement of Students According to Father's three Educational Groups by using ANOVA.

The following ANOVA summary table presents the sum of squares of between groups and within groups, degree of freedom, mean squares, calculated f-value and tabulated f-value.

Table 4.1: Comparison of Mathematics Achievement of Students According to Father's three Educational Groups

ANOVA SUMMARY					
Source of Variation	Sum of Square	Degree of freedom	Mean Square	Calculated f-value	Tabulated f-value
Between Groups	1360.33	2	680.16	119.28	3.07
Within Groups	695.63	122	5.70		
Total	2055.96	124			

The Table 4.1 shows that the sum of square of between and within three groups are 1360.33 and 695.63 respectively. Also mean square of between father's three educational groups is 680.16 and within three groups is 5.70. Table also shows that the calculated f-value 119.28 is greater than tabulated f-value 3.07 on the basis of $df_{(2, 122)}$ with 0.05 level of significance. On the condition, the null hypothesis was rejected. That means there is significance difference among father's three educational groups. This implies that the students' achievement in mathematics differ according father's education level.

Comparison of Mathematics Achievement of Students According to Mother's three Educational Groups by using ANOVA.

The following ANOVA summary table presents the sum of squares of between groups and within groups, degree of freedom, mean squares, calculated f-value and tabulated f-value.

Table 4.2: Comparison of Mathematics Achievement of Students According to Mother's three Educational Groups

ANOVA SUMMARY					
Source of Variation	Sum of Square	Degree of freedom	Mean Square	Calculated f-value	Tabulated f-value
Between Groups	983.47	2	491.73	55.94	3.07
Within Groups	1072.50	122	8.79		
Total	2055.97	124			

The Table 4.2 shows that the sum of square of between and within three groups are 983.47 and 1072.50 respectively. Also mean square of between mother's three

educational groups is 491.73 and within three groups is 8.79. Table also shows that the calculated f-value 55.94 is greater than tabulated f-value 3.07 on the basis of $df_{(2, 122)}$ with 0.05 level of significance. On the condition, the null hypothesis was rejected. That means there is significance difference among mother's three educational groups. This implies that the students' achievement in mathematics differ according mother's education level.

Comparison of Mean Achievement of Students of Illiterate and Moderately Educated Father's

The following table presents the average score of the group of the students' of illiterate and moderately educated father with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.3: Comparison of Mean Achievement of Students of Illiterate and Moderately Educated Father's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Illiterate Father's student	30	20.40	17.14	4.14	7.81	1.69
Moderately Educated Father's student	46	26.65	3.17	1.78		

The Table 4.3 shows that there are 30 and 46 students in illiterate and moderately educated father's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of illiterate and moderately educated father's group are 20.40 and 26.65 respectively as well as variance are 17.14 and

3.17 respectively. Also standard deviation of illiterate father's group is 4.14 and moderately educated father's group is 1.78. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 74 degree of freedom is 1.69. But calculated t-value is 7.81. Here $7.81 > 1.69$, so that H_0 was rejected and H_1 was accepted. Hence the mean achievement score of moderately educated father's group is higher than the illiterate father's group.

Comparison of Mean Achievement of Students of Illiterate and Highly Educated Father's

The following table presents the average score of the group of the students' of illiterate and highly educated father with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.4: Comparison of Mean Achievement of Students of Illiterate and Highly Educated Father's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Illiterate Father's student	30	20.40	17.14	4.14	10.96	1.70
Highly Educated Father's student	49	28.86	1.17	1.08		

The Table 4.4 shows that there are 30 and 49 students in illiterate and highly educated father's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of illiterate and highly educated

father's group are 20.40 and 28.86 respectively as well as variance are 17.14 and 1.17 respectively. Also standard deviation of illiterate father's group is 4.14 and highly educated father's group is 1.08. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 77 degree of freedom is 1.70. But calculated t-value is 10.96. Here $10.96 > 1.70$, so that H_0 was rejected and H_1 was accepted. Hence the mean achievement score of highly educated father's group is higher than the illiterate father's group.

Comparison of Mean Achievement of Students of Moderately Educated and Highly Educated Father's

The following table presents the average score of the group of the students' of moderately and highly educated father with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.5: Comparison of Mean Achievement of Students of Moderately Educated and Highly Educated Father's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Moderately Educated Father's student	46	26.65	3.17	1.78	7.25	1.67
Highly Educated Father's student	49	28.86	1.17	1.08		

The Table 4.5 shows that there are 46 and 49 students in moderately and highly educated father's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of moderately and highly educated

father's group are 26.65 and 28.86 respectively as well as variance are 3.17 and 1.17 resp. Also standard deviation of moderately educated father's group is 1.78 and highly educated father's group is 1.08. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 93 degree of freedom is 1.67. But calculated t-value is 7.25. Here $10.96 > 1.70$, so that H_0 was rejected and H_1 was accepted. Hence the mean score of highly educated father's group is higher than the moderately educated father's group.

Comparison of Mean Achievement of Students of Illiterate and Moderately Educated Mother's

The following table presents the average score of the group of the students' of illiterate and moderately educated mother with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.6: Comparison of Mean Achievement of Students of Illiterate and Moderately Educated Mother's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Illiterate Mother's student	37	21.92	18.85	4.34	6.14	1.67
Moderately Educated Mother's student	52	26.85	6.96	2.64		

The Table 4.6 shows that there are 37 and 52 students in illiterate and moderately educated mother's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of illiterate and moderately

educated mother's group are 21.92 and 26.85 respectively as well as variance are 18.85 and 6.96 respectively. Also standard deviation of illiterate mother's group is 4.34 and moderately educated mother's group is 1.67. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 87 degree of freedom is 1.67. But calculated t-value is 6.14. Here $6.14 > 1.67$, so that H_0 was rejected and H_1 was accepted. Hence the mean score of moderately educated mother's group is higher than the illiterate mother's group.

Comparison of Mean Achievement of Students of Illiterate and Highly Educated Mother's

The following table presents the average score of the group of the students' of illiterate and highly educated mother with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.7: Comparison of Mean Achievement of Students of Illiterate and Highly Educated Mother's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Illiterate Mother's student	37	21.92	18.85	4.34	9.67	1.68
Highly Educated Mother's student	36	29.03	1.11	1.06		

The Table 4.7 shows that there are 37 and 36 students in illiterate and highly educated mother's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of illiterate and highly educated

mother's group are 21.92 and 29.03 respectively as well as variance are 18.85 and 1.11 respectively. Also standard deviation of illiterate mother's group is 4.34 and highly educated mother's group is 1.06. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 71 degree of freedom is 1.68. But calculated t-value is 9.67. Here $9.67 > 1.68$, so that H_0 was rejected and H_1 was accepted. Hence the average achievement score of highly educated mother's group is higher than the illiterate mother's group.

Comparison of Mean Achievement of Students of Moderately Educated and Highly Educated Mother's

The following table presents the average score of the group of the students' of moderately and highly educated mother with the sample size, mean, standard deviation, variance, calculated and tabulated value of t.

Table 4.8: Comparison of Mean Achievement of Students of Moderately Educated and Highly Educated Mother's

Groups	Sample Size (N)	Mean (\bar{X})	Variance (S^2)	S.D. (S)	Calculated t-value	Tabulated t-value
Moderately Educated Mother's student	52	26.85	6.96	2.64	5.38	1.67
Highly Educated Mother's student	36	29.03	1.11	1.06		

The Table 4.8 shows that there are 52 and 36 students in moderately and highly educated mother's group respectively. In the students' questionnaire, 30 marks of mathematics achievement test was administrated (see test questions in Appendix-1 and test score of students in Appendix-5). The mean score of moderately and highly educated

mother's group are 26.85 and 29.03 respectively as well as variance are 6.96 and 1.11 respectively. Also standard deviation of moderately educated mother's group is 2.64 and highly educated mother's group is 1.06. Here tabulated t-value at $\alpha = 0.05$ level of significance for one tailed test with 86 degree of freedom is 1.67. But calculated t-value is 5.38. Here $5.38 > 1.67$, so that H_0 was rejected and H_1 was accepted. Hence the mean score of highly educated mother's group is higher than the moderately educated mother's group.

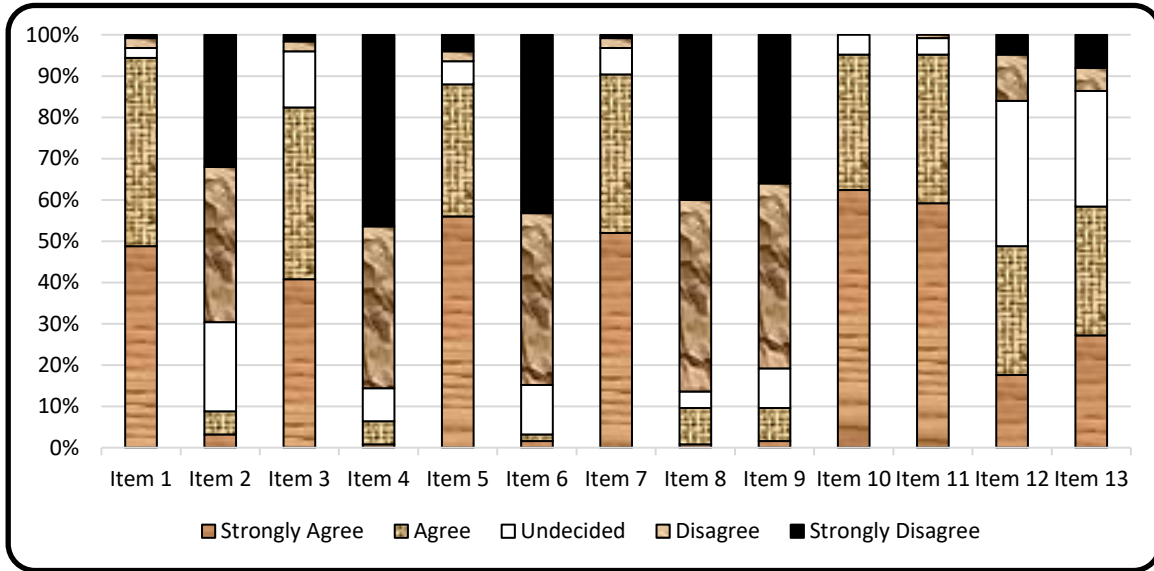
Parents' View on Parental Involvement

The following table presents the percentage and mean of parents' questionnaire related to five point Likert scale.

Table 4.9: Result of parents' view on Parental Involvement

Items	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree		Mean
	Fre.	%	Fre.	%	Fre.	%	Fre.	%	Fre.	%	
1.	61	49%	57	46%	3	2%	3	2%	1	1%	4.4
2.	4	3%	7	6%	27	22%	47	38%	40	32%	3.9
3.	51	41%	52	42%	17	14%	3	2%	2	2%	4.2
4.	1	1%	7	6%	10	8%	49	39%	58	46%	4.2
5.	70	56%	40	32%	7	6%	3	2%	5	4%	4.3
6.	2	2%	2	2%	15	12%	52	42%	54	43%	4.2
7.	65	52%	48	38%	8	6%	3	2%	1	1%	4.4
8.	1	1%	11	9%	5	4%	58	46%	50	40%	4.2
9.	2	2%	10	8%	12	10%	56	45%	45	36%	4.1
10.	78	62%	41	33%	6	5%	0	0%	0	0%	4.6
11.	74	59%	45	36%	5	4%	1	1%	0	0%	4.5
12.	22	18%	39	31%	44	35%	14	11%	6	5%	3.5
13.	34	27%	39	31%	35	28%	7	6%	10	8%	3.6
Overall Mean = 4.2											

Figure 4.1: Percentage of parents' view on Parental Involvement



From the Table 4.9, and Figure 4.1 item-1 indicates 'Parents' education level is the most important aspect which affects students' learning' and 49% and 46% of parents' are strongly agreed and agreed of this statement respectively. Only few students disagreed about item-1. 22%, 38%, and 32% parents' undecided, disagreed and strongly disagreed respectively on item-2. That means almost all parents' disagreed about the statement that 'Parents education doesn't have positive influence on students' achievement in mathematics. Also, almost full percentage of parents' gave positive response about the item-3 i.e. ' Parents' should help on homework of their students' for the betterment of achievement in math', item-5 i.e. ' Parents' monitoring and supervision makes students' responsible in their study', item-7 i.e. ' The motivation and appreciation increases students' achievement in math. In item-4 i.e. ' There is no relation between home environment and students' mathematics learning, 85% of parents' disagreed and few agreed. In item-6 i.e. ' High education of parents' is not the source of students' motivation'

43% and 42% of the parents are strongly disagreed and disagreed respectively. Only few parents only strongly agreed, agreed and undecided about item-6.

Item-8 i.e. 'Educational interaction between parents' and students doesn't increase learning achievement of student' and item-9 i.e. ' Involvement of parents' in students learning doesn't play positive role', were the negative statements in which around 80 % parents' disagreed. It means interaction between parents' and students increases their mathematics achievement and involvement of parents in students learning play positive role in students' achievement in mathematics. The highest i.e. 62% of the parents' strongly agreed about the item-10 i.e. ' Every parents must get progress information of their children from math teacher' and 33% of parents' gave agreed and 5% of parents' gave undecided. It means every parents' must be update about their children progress in mathematics. In item-11 i.e. ' Every parents' must visit on their children' school at least once month', 59% and 36% parents' strongly agreed and agreed. It means parents were positive about item-11. In item-12 i.e. ' Punishment by parents' has negative impact on students achievement', 18%, 31%, 35%, 11% and 5% of parents' are strongly agreed, agreed, undecided, disagreed and strongly disagreed respectively. In item-13 i.e.' The role of uneducated parents' is less than educated parents' in students' mathematics learning', 27% and 31% parents' strongly agreed and agreed but few undecided and disagreed.

Overly the above result shows that the involvement of parents in children's learning ensure the betterment of students' achievement in mathematics. Almost all the parents agreed about parental involvement is one of the important factor of students' learning process.

Chapter V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

After the analysis and interpretation of collected data, an attempt was made to summarize the finding and recommendation for further study. The first section of this chapter presents the summary of the research and second section presents its finding, third section present conclusion and last section present recommendation.

Summary of the study

The research entitled 'Influence of parents' education level on students' mathematics achievement' was intended to answer the question whether the parents' education level (illiterate, moderate, high) affects the students' achievement in math and parents involvement in students' education increase their mathematics achievement or not.

The survey research design was adopted to achieve the purpose of the study. The population of this study consisted the student studying at grade X in Nuwakot district and their parents'. The researcher selected two community and two institutional school by stratified random sampling. Achievement test for students and questionnaire for parents' were the main tool for this study.

For this study researcher developed the achievement test based on curriculum and textbook of grade IX and X. For the data collection of this study, pilot test was conducted on 16 students of the school Global Vidhya Mandir, Nuwakot. The researcher developed and tested the reliability of achievement test and also found the difficult level (P %) and

discrimination index (D) of items before their administration. The pilot test consisted 35 objective (multiple choice) taken from grade IX and X mathematics curriculum. The reliability coefficient of achievement test was found to be 0.94.

The researcher selected 125 students from four schools of Nuwakot district. The achievement score of the selected students were analyzed by using mean, variance, standard deviation, one way ANOVA, one tailed t-test at 0.05 level of significance under following headings.

- Comparison of achievement scores of students according to parents' of three educational groups by using ANOVA.
- Comparison of the achievement scores of students between two educational groups' of parents' by using t-test.

The result highlighted that achievement score of children's of highly educated parents were greater than moderately educated and illiterate parents' children's score.

For the fulfillment of the third objective, questionnaire was the main tool. The questionnaire related to five point Likert scale was used to analyze the parents' view on Parental Involvement. In this study, the set of questionnaire contained 13 statements using Likert scale of "1-Strongly disagree, 2-Disagree, 3-Undecided, 4-Agree and 5-Strongly agree" for positive statement and for negative statement the scoring process was reversed. This questionnaire was distributed to parents' through their children. The result showed that parents' gave positive view about parental involvement in students' education.

Findings of the study

After collecting the necessary data, the analysis and interpretation were done by using statistical procedures. From analysis and interpretation of the data following findings were found.

- There was significance difference in mathematics achievement of students according to their father's three educational groups.
- There was significance difference in mathematics achievement of students according to their mother's three educational groups.
- The mean achievement score of the students of highly educated father's was higher than mean achievement score of students of moderately educated and illiterate father's.
- The mean achievement score of the students of moderately educated father's was higher than mean achievement score of students of illiterate father's.
- The mean achievement score of the students of highly educated mother's was higher than mean achievement score of students of moderately educated and illiterate mother's.
- The mean achievement score of the students of moderately educated mother's was higher than mean achievement score of students of illiterate mother's.
- The result showed that 85% of parents' gave positive feedback or view about parental involvement in students' education.
- The involvement of parents on students learning ensure the betterment of students' achievement in mathematics.

- Almost all the parents agreed that parents' education level is an one of the important factor of students' learning process

Conclusions

This study showed that the education level of parent's has significant influence on students' mathematics achievement. This was shown through the score of children's of the parents' with different education level. The finding highlighted that the mean achievement score of the students' of the highly educated fathers' was higher, achievement score of moderately educated fathers' was lesser and illiterate fathers' was least. From this, we can conclude that fathers' education level has significant influence on their children's achievement in mathematics. Similarly the mothers' education level also has significant influence on their children's achievement in mathematics. Parents' generally gave positive feedback or view about the parents' involvement in students' education. In addition, this study also concluded that parents' involvement enhances, motivates, encourages and improves students' learning mathematics. Also the parental involvement on student learning is essential part of students' academic success. It plays an important role for the betterment of the students' achievement in mathematics.

Recommendations

The results of this study showed that the level of parents' education has significant influence on students' achievement in mathematics, but the following recommendations are forwarded for the further research:

- This kind of the study should be conducted at all level of school and other subject as well.
- This study was limited to student of grade ten in Nuwakot district. So the similar study should be done in other classes, district, region and nation.
- Result showed that, level of parents' education affects students' mathematics achievement so it is needed to focuses on parental education programs.
- Awareness programs should be provided for parents, to increase their involvement on students learning.

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Appendix - 1**Mathematics Achievement Test**

Class: X

Full Marks: 30

Subject: C. Mathematics

Time: 30 min.

School's Roll no:

Father's Education Status:

Mother's Education Status:

 Illiterate Illiterate Moderate (1-12) Moderate (1-12) High (12 above) High (12 above)**Tick (✓) the best answer.**1. If $n(A) = \{a, b\}$ and $n(B) = \{x, y, z\}$ then which is the value of $n(A \cup B)$ (यदि $n(A) = \{a, b\}$ र $n(B) = \{x, y, z\}$ भए $n(A \cup B)$ को मान कति होला ?)

a) 1

b) 2

c) 3

d) 5

2. If $n(U) = 25$, $n_0(A) = 6$, $n_0(B) = 12$ and $n(\overline{A \cup B}) = 5$ than which is the value of $n(A \cap B)$? (यदि $n(U) = 25$, $n_0(A) = 6$, $n_0(B) = 12$ र $n(\overline{A \cup B}) = 5$ भए $n(A \cap B)$ को मान कति होला)

a) 1

b) 2

c) 3

d) 4

3. The price of 15 pen is Rs 300 than what is the price for 4 dozen pen?

(15 वटा कलमको रु 300 पर्दछ भने 4 दर्जन कलमको कति रुपैया पर्छ ?)

a) Rs 860

b) Rs 950

c) Rs 960

d) Rs 980

29. If $\bar{x} = 20$ and $\sum x = 120$ then what is the value of N?

(यदि $\bar{x} = 20$ र $\sum x = 120$ भए N को मान कति होला ?)

a) 3

b) 4

c) 5

d) 6

30. If a card is selected from a pack of 52 then what is probability of selecting

Black Ace? (52 पत्ति तासबाट नहेरी थुत्दा कालो एक्का पर्ने सम्भावना कति होला ?)

a) $\frac{1}{13}$

b) $\frac{2}{13}$

c) $\frac{3}{13}$

d) $\frac{1}{26}$

Appendix - 2**Answer Key of Mathematics Achievement Test**

Q.N.	Right option	Q.N.	Right option
1.	D	16	a
2.	B	17	b
3.	C	18	b
4.	D	19	c
5.	A	20	d
6.	C	21	c
7.	B	22	c
8.	B	23	d
9.	A	24	b
10.	C	25	a
11.	A	26	c
12.	A	27	a
13.	B	28	b
14.	C	29	d
15.	D	30	d

Appendix - 3

Item analysis of objective questions of the test

S.N. → Q.N.	Upper 27%						Lower 27%						P% Value	D Value	Remark
	1	2	3	4	5	Total	1	2	3	4	5	Total			
1	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
2	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
3	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
4	1	1	1	1	1	5	1	0	0	0	1	2	70%	0.6	Accept
5	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
6	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
7	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
8	1	1	1	0	1	4	1	1	1	0	0	3	70%	0.2	Accept
9	1	1	0	1	0	3	1	0	0	0	1	2	50%	0.2	Accept
10	0	0	1	0	1	2	0	0	0	1	0	1	30%	0.2	Reject
11	1	1	1	1	0	4	1	1	1	0	0	3	70%	0.2	Accept
12	1	0	1	1	1	4	0	1	1	1	0	3	70%	0.2	Accept
13	1	1	1	1	1	5	1	1	1	1	0	4	90%	0.2	Accept
14	1	1	0	1	0	3	1	1	1	1	1	5	80%	-0.4	Reject
15	1	1	1	1	0	4	1	1	0	1	1	4	80%	0	Reject
16	1	1	1	1	1	5	0	0	1	1	0	2	70%	0.6	Accept
17	1	1	1	1	1	5	0	0	0	0	1	1	60%	0.8	Accept
18	1	1	1	1	1	5	0	0	1	0	1	2	70%	0.6	Accept
19	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
20	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
21	0	1	1	0	1	3	1	1	0	0	0	2	50%	0.2	Accept
22	1	1	0	1	0	3	1	0	0	0	1	2	50%	0.2	Accept
23	1	1	1	1	1	5	0	1	1	1	0	3	80%	0.4	Accept
24	1	1	1	1	1	5	0	0	1	0	0	1	60%	0.8	Accept
25	1	1	0	1	0	3	1	0	1	0	0	2	50%	0.2	Accept
26	1	1	1	0	1	4	0	1	0	0	1	2	60%	0.4	Accept
27	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
28	1	1	1	1	1	5	0	0	0	0	0	0	50%	1	Accept
29	1	1	1	0	1	4	1	0	0	0	0	1	50%	0.6	Accept
30	1	0	1	0	1	3	1	1	0	0	0	2	50%	0.2	Accept
31	1	1	0	1	0	3	1	0	0	0	1	2	50%	0.2	Accept
32	1	1	1	1	1	5	0	1	0	1	1	3	80%	0.4	Accept
33	0	0	0	0	0	0	1	1	0	0	0	2	20%	-0.4	Reject
34	1	1	1	1	1	5	1	0	0	0	0	1	60%	0.8	Accept
Total	31	30	28	27	26		15	12	10	8	9				

Appendix - 4

Reliability of objective questions of the test

S.N.	Scores on odd items(X)	Scores on even items(Y)	X ²	Y ²	XY
1	11	15	121	225	165
2	15	16	225	256	240
3	12	11	144	121	132
4	13	15	169	225	195
5	11	12	121	144	132
6	13	11	169	121	143
7	13	12	169	144	156
8	11	11	121	121	121
9	11	13	121	169	143
10	16	14	256	196	224
11	14	13	196	169	182
12	4	6	16	36	24
13	9	6	81	36	54
14	6	6	36	36	36
15	3	5	9	25	15
16	4	6	16	36	24
N= 16	∑ X = 166	∑ Y = 172	∑ X² = 1970	∑ Y² = 2060	∑ XY = 1986

$$\begin{aligned} \text{Correlation Coefficient } (r_{xy}) &= \frac{N\sum XY - \sum X \cdot \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2} \sqrt{N\sum Y^2 - (\sum Y)^2}} \\ &= \frac{16 \times 1986 - 166 \times 172}{\sqrt{16 \times 1970 - (166)^2} \sqrt{16 \times 2060 - (172)^2}} \\ &= \mathbf{0.88} \end{aligned}$$

$$\text{Reliability Coefficient } (r) = \frac{2r_{xy}}{1+r_{xy}} = \frac{2 \times 0.88}{1+0.88} = \mathbf{0.94}$$

Appendix - 5

Students' achievement scores according to Parent's education level

Father education level						Father education level					
Illiterate(30)		Moderately educated(46)		Highly educated(49)		Illiterate(37)		Moderately educated(52)		Highly educated(36)	
Marks	Stu.	Marks	Stu.	Marks	Stu.	Marks	Stu.	Marks	Stu.	Marks	Stu.
27	4	30	1	30	15	29	1	30	3	30	13
26	1	29	3	29	18	28	1	29	5	29	15
24	3	28	11	28	13	27	6	28	17	28	6
23	2	27	15	27	1	26	2	27	13	27	1
22	2	26	8	26	1	25	1	26	8	25	1
21	2	25	1	25	1	24	4	24	3		
20	2	24	4			23	4	21	1		
19	1	23	2			22	2	17	1		
18	5	21	1			21	2	16	1		
17	3					20	2				
16	2					19	1				
15	2					18	5				
12	1					17	2				
						16	1				
						15	2				
						12	1				

Appendix - 6

Scale of parents' view on Parental Involvement

LETTER FOR PARENTS'

विद्यालयको नाम:.....

विद्यार्थीको रोल नं:.....

कक्षा:.....

श्रीमान् अभिभावक ज्यू,

म त्रिभुवन विश्वविद्यालय अन्तर्गत शिक्षाशास्त्र संकाय अन्तर्गत गणित विषयमा स्नातकोत्तर तहमा अध्ययनरत विद्यार्थी हुँ । स्नातकोत्तर तहको उपाधीको लागि **आमाबाबुको शैक्षिक योग्यताले विद्यार्थीको गणितिय उपलब्धिमा पार्ने प्रभाव** अध्ययन शिर्षकमा शोधपत्र गर्दैछु । यसै सन्दर्भमा विद्यार्थीको पढाइमा आमाबाबुको संलग्नताको कुन हदको प्रभाव पर्दछ भनी जान्न खोजेको छु । यसैको लागि उपयुक्त कथनहरु निर्माण गरी यसै पत्रसाथ संलग्न गरी पठाएको छ । कथनहरु आफैमा सहि वा गलत छैनन् । उक्त कथनहरु आफै वा बालबालिकाको सहायताले पढेर आफुलाई उचित लागेको विकल्पहरु(उच्च सहमत(S.A)/सहमत(A)/अनिर्णित(U)/असहमत(D)/उच्च असहमत(S.D)) मध्ये एउटामा ठिक(√) चिन्ह दिएर बालबालिकालाई फिर्ता पठाइदिनुभई आवश्यक सहयोग गरीदिनु हुन हार्दिक अनुरोध गर्दछु ।

.....
शोधकर्ता : रघुनाथ लामिछाने

तपाईंको शैक्षिक योग्यता : अशिक्षित

मध्यम(कक्षा १देखी १२)

उच्च(कक्षा १२ भन्दा माथी)

कं.स	कथनहरु	S.A	A	U	D	S.D
१	विद्यार्थीको सिकाइमा प्रभाव पार्ने तत्व मध्ये अभिभावकको शैक्षिक स्तर महत्वपूर्ण पक्ष हो ।					
२	अभिभावकको शैक्षिक योग्यताले विद्यार्थीको गणितिय उपलब्धीमा सकारात्मक प्रभाव पाउँदैन ।					
३	विद्यार्थीको गणित उपलब्धी राम्रो हुन अभिभावकले होमवर्कमा सहयोग गर्नुपर्छ ।					
४	घरको वातावरण र विद्यार्थीको गणित सिकाइ उपलब्धिमा कुनै सम्बन्ध हुँदैन ।					
५	अभिभावकको अनुगमन र सुपरीवेक्षणले विद्यार्थीलाई पढाइ प्रति जिम्मेवार बनाउँछ ।					
६	अभिभावकको उच्च शैक्षिक योग्यता विद्यार्थीको प्रेरणाको स्रोत होइन ।					
७	अभिभावकको उत्प्रेरणा र प्रोत्साहनले विद्यार्थीको गणित सिकाइ उपलब्धि बढ्छ ।					
८	अभिभावक र विद्यार्थी विचको शैक्षिक अन्तर्क्याले विद्यार्थीको सिकाइ उपलब्धि बढाउँदैन ।					
९	विद्यार्थीको पढाइमा अभिभावकको संलग्नताले विद्यार्थीको शैक्षिक उपलब्धिमा सकारात्मक असर पार्दैन ।					
१०	प्रत्येक अभिभावकले गणित शिक्षकबाट आफ्ना विद्यार्थीको प्रगति वारेमा जानकारी लिनपर्छ ।					
११	प्रत्येक अभिभावकले कम्तिमा महिनाको १ पटक विद्यालयको भ्रमण गर्नुपर्छ ।					
१२	अभिभावकले दण्ड दिँदा विद्यार्थीको गणित उपलब्धिमा नकारात्मक असर पर्छ ।					
१३	विद्यार्थीको गणित सिकाइ उपलब्धिमा शिक्षित अभिभावकको भन्दा अशिक्षित अभिभावकको भुमिका कम हुन्छ ।					

Appendix - 7

Statistical formula used in data collection and analysis procedure

S.N.	Subject	Notation	Formula
1.	Mean	\bar{X}	$\frac{\sum X}{N}$
2.	Standard Deviation	S	$\sqrt{\frac{\sum(X - \bar{X})^2}{N}}$
3.	Pooled Variance	S_p^2	$\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}$
4.	t – distribution	t	$\frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$
5.	Total Variance	S_t^2	$\sum x_i^2 - \frac{(\sum x_i)^2}{N}$
6.	Between group Variance	S_b^2	$\frac{\sum x_1^2}{n_1} + \frac{\sum x_2^2}{n_2} \dots \dots \dots + \frac{\sum x_i^2}{N}$
7.	Within group Variance	S_w^2	$S_t^2 - S_b^2$
8.	F- distribution	F	$\frac{S_b^2 / (K - 1)}{S_w^2 / (N - k)}$
9.	Pearson's Correlation Coefficient	r_{xy}	$\frac{N\sum XY - \sum X \cdot \sum Y}{\sqrt{N\sum X^2 - (\sum X)^2} \sqrt{N\sum Y^2 - (\sum Y)^2}}$
10.	Reliability Coefficient	r	$\frac{2r_{xy}}{1 + r_{xy}}$
11.	Difficulty Level of Item	P%	$(\frac{R_u + R_l}{N} \times 100)\%$

	Discrimination Index of Item	D	$\frac{R_u - R_l}{\frac{N}{2}}$
			<p>Where R_u and R_l are the number of correct response given by upper 27% and lower 27% students respectively. N is the total number of lower 27% students plus total number of upper 27% students.</p>

Appendix - 8
Specification Chart

Cognitive Domain						
S.N.	Unit	K	C	A	Total	%
1	Set			2	2	7%
2	Arithmetic	2	1	2	5	17%
3	Mensuration	1	1	3	5	17%
4	Algebra	3	3	2	8	27%
5	Geometry	3	1	1	5	17%
6	Trigonometry	1		1	2	7%
7	Statistics		1	1	2	7%
8	Probability			1	1	3%
	Total	10	7	13	30	100%
	Percentage (%)	33%	23%	43%	100%	

K= Knowledge

C = Comprehension

A = Application

Appendix - 9**List of Sample Schools**

S.N	Name of the schools	Sample Students	Sample parents
1.	Shree Tribhuvan Secondary School, Manakamana-8,	31	31
2.	Shree Kalika Secondary School, Kakani-3,	28	28
3.	Shree Bhairabi Academy, Bidur-4,	18	18
4.	Shree Star English Boarding School, Bidur-1,	48	48
Total		125	125