CAUSES OF FAILURE IN MATHEMATICS AT HIGHER SECONDARY LEVEL

A

THESIS

BY

MADAN SINGH KHADAKA

IN THE PRACTICAL FULFILMENT OF THE REQUIREMENTS

FOR THE MASTER DEGREE OF EDUCATION

SUBMITTED TO

DEPARTMENT OF MATHEMATICS EDUCATION

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS, KIRTIPUR,

TRIBHUVAN UNIVERSITY

KATHMANDU, NEPAL

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LETTER OF CERTIFICATE

This is to certify that Mr. Madan Singh Khadaka, a student of academic year 2067/068 with campus Roll No. 2236, Exam Roll No. 281451,(2068) Thesis No. 866 and T.U. Registration No.6-1-329-88-2003 has completed his thesis under my supervision, during the period prescribed by the rules and regulations of Tribhuvan University, Nepal. The thesis entitled "**Causes of Failure in Mathematics at Higher Secondary Level"** has been prepared based on the result of his investigation conducted during the period of 2013 under the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur Kathmandu. I recommend and forward for evaluation as the partial requirements to award the Master Degree of education in Mathematics.

……. ……

(Mr.Bed Prasad Dhakal) Mr. Laxmi Narayan Yadav

Supervisor For-Head

Date : 29Aug 2014

Letter of Approval

A

Thesis

By

MADAN SINGH KHADAKA

Entitled

"CAUSES OF FAILURE IN MATHEMATICS AT HIGHER SECONDARY LEVEL"

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

Committee for the Viva-Voce	**Signature**
Mr. Laxmi Narayan Yadav	……
(For Chairman)	
Prof. Dr. Hari Prasad Upadhyay	……..
(Member)	
Mr.Bed Prasad Dhakal	……..
(Member)	

Date : 29Aug 2014

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.....

Date : 29Aug 2014 Madan Singh Khadaka

ABSTRACT

This is a case study and qualitative in nature related to causes of failure in Mathematics. The objective of this study was to identify causes of failure in Mathematics at Mahendra Higher Secondary School, Dadeldhura.

A total of 12 students of grade XII of mathematics of Mahendra Higher Secondary School, Dadeldhura were the participants of the study. Among 12 students all were boys.

The instruments used in the study were interview and observation. Two separate interviews for students and teacher were used on the basis of guideline prepared on the theme school environment, home environment, students related variables and teacher related variables. Class observation was used during teaching learning activities. The observation mainly focused on school environment, teaching learning process. After collecting information from interview and observation, common results were categorized and then data were analyzed.

The findings of study show that the school has sufficient physical facilities. The causing variables related to home environment were parents' occupation, parents' level of schooling, parents' support, household work and mathematics study at home. There was no proper interaction between students to each other and also teacher and students. The causing variable related to school environment were class environment and class work. Similarly the causing variables related to students' were poor high school base, poor language skills and vagueness about long-range goals.

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LIST OF ABBREVIATION

HSEB	: Higher Secondary Education Board
SLC	: School Leaving Certificate
CCO	: Canadian Corporation Organization
HSS	: Higher Secondary school
NGO	: Non-Governmental Organization
INGO	: International Non-Governmental Organization
MOE	: Ministry of Education
VDC	: Village Development Committee
SMC	: School Management Committee
M.Ed.	: Masters in Education
TU	: Tribhuvan University

Chapter - I

INTRODUCTION

Background of the Study

Mathematics is one of the languages of human life and certainly no more marvelous languages were ever created by the mind of man. Mathematics cut short the lengthy statements through its symbols is free from verbosity, help the expression of ideas in an exact form and enable to understand and appreciate precision, brevity, sharpness, logical beauty and mathematics. Mathematics fulfills the educational values such as practical, disciplinary, cultural, intellectual, more aesthetic, social, vocational, inter-disciplinary etc in order to realize the educational values and instructional objectives of mathematics, the subject must be practiced in classroom by utilizing the service of traditional methods, educational innovations and technological advancements. The views of Roger Becalm about the concept of Mathematics: Mathematics is gate way and key of sciences .Neglected of Mathematics works injury to all knowledge, since he who is ignorant of it. Common now the other sciences or the things of the world and what is worse, men who are thus ignorant are unable to perceive their own ignorance and so do not seek a remedy (Kalhotra, 2013).

Thus for a long time, mathematics was taught because of the training in discipline it was supposed to be a dull subject, but is increasingly recognized that it is of high importance in scientific developments today. Indeed, mathematical research has evidenced the horizon of the human mind tenuously and has helped in the understanding to some extent of nature and the physical world. It is a vehicle of exact scientific thought.

Hence mathematics which is a science by any criterion and which right fully belongs to this group have not been accepted and emphasized as a sense. We can analyze that mathematics is a science of numbers as well as it is an art of computing.

The importance of having a slid background in mathematics is well recognized as it serves as a gateway to future professions in a variety of fields (Raj, 2013) Mathematics is very important in our daily lives since it deals with real life situation in our daily activities (Ojose, 2011). A thorough understanding of mathematics is an asset, if not essential, for applicants interested in obtaining better employment the word over. In other words mathematical competence is an essential component in preparing numerate citizens for employment and it is needed to ensure the continued production of highly-skilled persons required by industry, science and technology (Raj, 2013). Mathematics does not only empower people with the capacity to control their lives but also provides science a firm foundation for effective theories; it also guarantees society a vigorous economy.

The world's technological advances today involve a solid mathematical background which leads to job opportunities in the world (Raj, 2013). At its most basic level, mathematics is a requirement for science, computer technology and engineering courses. This is based on the fact that from homes to the workplace technological tools have become apart of our day to day life activities. Because of the importance of mathematics, already high-lighted above, school must respond with effective teaching and learning of mathematics from grade one to university level.

Despite the importance of mathematics high-lighted above, learners continue to fail in mathematics such that failure rate in mathematics increasing each year by year. An analysis of mathematics results over a five year period, 2065 to 2069 in Mahendra higher secondary school at Dadeldhura district, in table 1 shows an alarming rate of failure in mathematics.

Table 1: Record of results for mathematics in selected higher secondary school for the past 5 year at grade XII.

Years	2065	2066	2067	2068	2069
Pass rate	16.66%	0%	_	10%	12%

Fail rate	83.34%	100%	_	90%	88%

Source : Status of HSEB result on mathematics, Sanothimi Bhaktapur.

Table 2: National achievement of regular students in mathematics at grade XII.

Years	2065	2066	2067	2068	2069
Pass rate	59.50%	70.8%	81.01%	72.56%	75.28%
Fail rate	40.50%	29.20%	18.99%	27.44%	24.72%

Source : Status of HSEB result on mathematics, Sanothimi Bhaktapur.

The performance of the learners in the selected higher secondary school from the above table clearly indicates the pass rate is low in the comparison of national achievement. From the researcher's point of view, not much research focusing on mathematics high failure rate have been conducted in Mahendra higher secondary school at Dadeldhura district yet the examination results continue to be unsatisfactory in the subject mathematics which is a key subjects for country's development. It is against this background of poor performance of students in mathematics that the present study would want to find the causes of high failure rate of mathematics in Mahendra higher secondary school at Dadeldhura district.

Statement of the problem

Mathematics is a significant subject in human life. As mathematics is emphasized like language, most of students fail in mathematics as a difficult subject. By this problem the great deal of time, money, effort and manpower of the nation have been wasted. So the educationists, professionals as well as the state are facing the challenge with the problem of failure in mathematics at higher secondary level.

Although mathematics in higher secondary level is optional subject, desired students are devoted to study it, but most of them are also failing in mathematics. Fails in mathematics

was affected by various factors like home and school environment, physical facilities, attitude towards mathematics, peer groups, teaching learning materials and process, economic status of parents etc.

The researcher found that there was greater difference between National achievement of the regular students in mathematics at grade XII and student's achievement of Mahendra Higher Secondary School. Thus for finding causes of failure in mathematics and then improving on mentioned factors as well as minimizing failure rate in mathematics in higher secondary level was the main focus of this study . The problem of the study mainly concerned with following question:

- How the causes of failure in mathematics at Higher Secondary level impact on students' achievement?

Objectives of the study

Objectives in the research are the heart of the work. So this study designed especially to fulfill the following objective:

- To find out causes of failure in mathematics at higher secondary level.

Significance of the study

Mathematics is widely used and most applicable discipline in the field of science and technology. The result of the student in mathematics is low in average at higher secondary level. Maximum numbers of the student have been failed in mathematics and most of them felt more difficult to understand. In this context this research is going to find the following significance.

- This study helped mathematics teachers to do effective teaching in classroom by using teaching materials.

- This study helped to minimize failure rate in mathematics at higher secondary level
- This study helped the parents, teachers, students with aware of the responsible factors of the failure in mathematics at every level.
- This study helped the policy makers, educators, administrators, and teachers to improve the teaching learning procedures.
- Researcher and scholars to carry out and complete to their research work in the field of teaching learning activities in mathematics.
- This study opened the door for further research in the areas of factors affecting failure in mathematics.

In the light of above mention significance, it become necessary to investigate the causes of failure in mathematics at higher secondary level in Mahendra Higher Secondary school Dadeldhura.

Delimitations of the Study

The study has the following limitations:

- The study was limited to Dadeldhura district.
- The study was limited to Mahendra higher secondary school math teachers and 12 students
- This study was limited to explore the causes of failure in mathematics at higher secondary level only.

Definition of terms

Causes

It is related to the things that make students fail.

Failure

The Student who got less than 35 marks in grade 11 and 12

Mathematics teacher

Teachers who teaches mathematics in higher secondary level

Student

The students, who were studying mathematics at higher secondary level.

Higher secondary school (HSS)

The school based in the class 1- 12.

School leaving certificate (SLC)

Student who has completed their study in secondary school level has to pan, respectively, the secondary level examination, which are conducted annually by ministry of education and office of controller of examination

Interest

The feeling, that someone want to know or learn more about something or somebody.

Parent's Supports

It is related to the support given by the parents or guardians of the student at the home for the study of mathematics.

Fathers' Level of Schooling

It is related to the formal education of student's father.

Mothers' Level of Schooling

It is related to the formal education of student's mother.

Peer's Interaction

It is related to the interaction among students about mathematical ideas, problems and their solutions for discussion.

Class work

It is related to the amount of the class work that is done by the student during the mathematics class period.

Class Size

It is related to the number of students studying in the class.

Pri- Knowledge: Previous knowledge in related topic or in subject

Time Variable

It is related to the time spend by student in doing and practicing mathematics at the home

Literate

It is related to those persons who can read and write or may also have formal education.

Illiterate

It is related to those persons who cannot read or write.

Chapter-II

LITERATURE REVIEW

Review of related literature was an exacting task, calling for a deep insight and clear prospective of the overall field. The main purpose of related literature was to find out what works have been done the area of the research problem under study and what has not been done in the field of the research study being under taken. The review of relate literature helped to make the concepts clear for the study and also directed to analyze and interpret the data. There were some study related to achievement of mathematics was review for this study. Bearing these advantages in mind, the researcher reviewed several studies. Some of them are given below:

Empirical Literature

Dangol, (2012**)** did the research work on "Causes of failure in mathematics in SLC examination. It was case study and qualitative in nature. Interview and class observation were used to collect the data. This study was conducted with the sample of thirty students of grade X. The findings of the study shows that the traditional type of exercise in teaching learning activities, no proper interaction between teacher and students, school's learning environment, facilities at home and so on were causes of low achievement in mathematics in SLC examination.

Acharya, (2006) conducted a thesis entitled "A study on the problem faced by HSEB teacher in teaching mathematics of grade XI". It was descriptive survey and questionnaire was used for data collection, It had chosen 15 higher secondary schools of Kathmandu district for this study were to identify the problems faced by HSEB mathematics teachers. He conducted that prescribed curriculum and existing text books are not well planned, sequential and practical problem are not well manage. On the part of trained and untrained teachers, it was found the both were facing similar kind of problems in Kathmandu.

Khanal, (2012) did research work on "Causes of failure in mathematics at grade VIII in Nuwakot district. The major findings were as; Parent involvement, parent support, household activity at home, effective teaching learning process, motivation and interest, teaching strategies play a very important role in the achievement in mathematics.

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

Subedi, (2005) Studied on "Factors affecting failure in mathematics in SLC examination." The major findings of the study are given below:
The variable school environment has strongly positive effect on the failure's mathematics achievement. The variables effective classroom teaching and time variable have a nod positive effect on the mathematics achievement. The physical interest of the learners has low positive on the mathematics achievement.

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

Sapkota, (2005) studied on "A comparative study of the mathematics achievement on SLC result of Kathmandu and Kavre district of Nepal." The major findings of the study in several variables are presented as follows:

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

Giri, (2008) "A critical analysis of SLC Compulsory mathematics scores 2063". Intending well educational out comes the state has finance large amount of money as well as guardians also have invented their children education, but result of SLC is still poor. Mathematics is being the major causes to make students failure. There is saying that the course content, the way of managing circumstances, evaluation system all are within the favor advantages group, which always ignore the marginalize and deprived group. Almost all research findings have shown that there is not a unique determination, with affects student's achievement. Factors or variable such as student's gender, as parent's education, occupation, location of school, student's 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 findings among all variable state about which variable is most influencing.

Fonseca & Conboy, (2006) had conducted a research on "Secondary student's perceptions of factors effective failure in mathematics ". They had found that the most important factor and one of the most difficult to influence directly, is the quality of teaching. They have found other factors such as, previous student's preparation, reasonable school organization classroom decoration, teacher effectiveness, quality of mathematics teaching,

guardian's involvement. The main factors that affect poor mathematics result were lack of appreciation, fear of math, teacher's bad attitude, poor education system etc.

Pandey, (2007) conducted a case study of ineffective secondary school of Kailali district in about "Factors influence Mathematics Achievement" with the objectives to find the current mathematics achievement, the influencing factors of low achievement in ineffective secondary schools of Kailali district. Some findings based on personal factors are: girls had to be involved in household work which had resulted to be poor in mathematics because they had less time for their mathematics homework, motivation plays important role in student's mathematics achievement, prior knowledge and present achievement are strongly co-related, more students study and labor hard at home the more success is seen in mathematics learning, some findings based on environmental factors are: (i) Teacher's activities, emphasis on extra mathematical context, IQ-test had positive result for the students.(ii) Laziness of teacher and their lack of knowledge on student's psychological understanding have given poor result to the students.(iii)There was no lesson planning of mathematics teachers daily and use of teaching materials in class room was rare.(iv) Student centered teaching training activity was neglected because the teacher's lacked those kinds of experiences.

Theoretical Literature

In theoretical literature research was going to introduce the theoretical discussion, which is relevant for the interpretation of the finding of the study.

Many research, unpublished theories, journals and books states that factors influence the student's fails in mathematics are: Age and maturity, intelligence and multiple intelligence, teaching style, family environment, cultural background, students practice, motivation towards the subject. Factors affecting mathematics low achievement are also the causes of

failure in mathematics at every level. According to (Pandey, 2008), physical facilities, mathematics instruction, classroom environment, teaching activities, teaching materials, closure to lesson, teaching of amendment, relation with community, school policies are causes of failure in mathematics. Some of the theoretical literature about student's failure has presented below:

Theory of Fear

John Holt, (1964)in his book how children fail postulate that children fail because of fear in schools. The boredom confusion, fear, limitless hoes, and expectation of adults all contribute to failure. Fear is one tactic or strategy that schools and teachers have used for a long time to control, discipline and motivate teachers. Fear destroys intelligence and affects a child's whole way of looking at, thinking about and dealing with life. A fearful mind cannot learn. Fear and failure are very closely linked. Schooling is about fears, and throughout their schooling children one taught to be afraid of failure. The fear of failure and subsequent experience of humiliation, insult, punishment and schooling prompts children to refrain from working hard. Children then being to perceive themselves as incompetent learners.

Theory of School Effectiveness

Chesler & Cave, (1981) State that when a child enrolls in a school, a formal educational setting, s/he encounters with new a difficult unexpected circumference, as s/he has to interact with children and teacher of different cultural background. For the time s/he feels a big difference which is again widened up by the rules and regulation of the school, teaching styles as s/he inherits her/his traditional cultural values, norms and beliefs through his/ her family and community as an enculturation process in one hand and s/he has to learn new and emerging things in school as an acculturation process.

Edmonds, (1997) provided an alternative interpretation of the interaction between student performance and family background. Now popularly known as the school effectiveness research, asserts that variability in the distribution of achievement of school age children drives from variability in the nature of school to which children go school achievement is therefore relatively independent of family background, at least when achievement is defined to be one where the proportion of low-income children demonstrating good performance is identical to the proportion of middle-class children who do so. Edmonds concluded that the most powerful force in school achievement in the school itself. He further argued that the school effect is more powerful than the familiar effect, but it is also more powerful than the teacher effect.

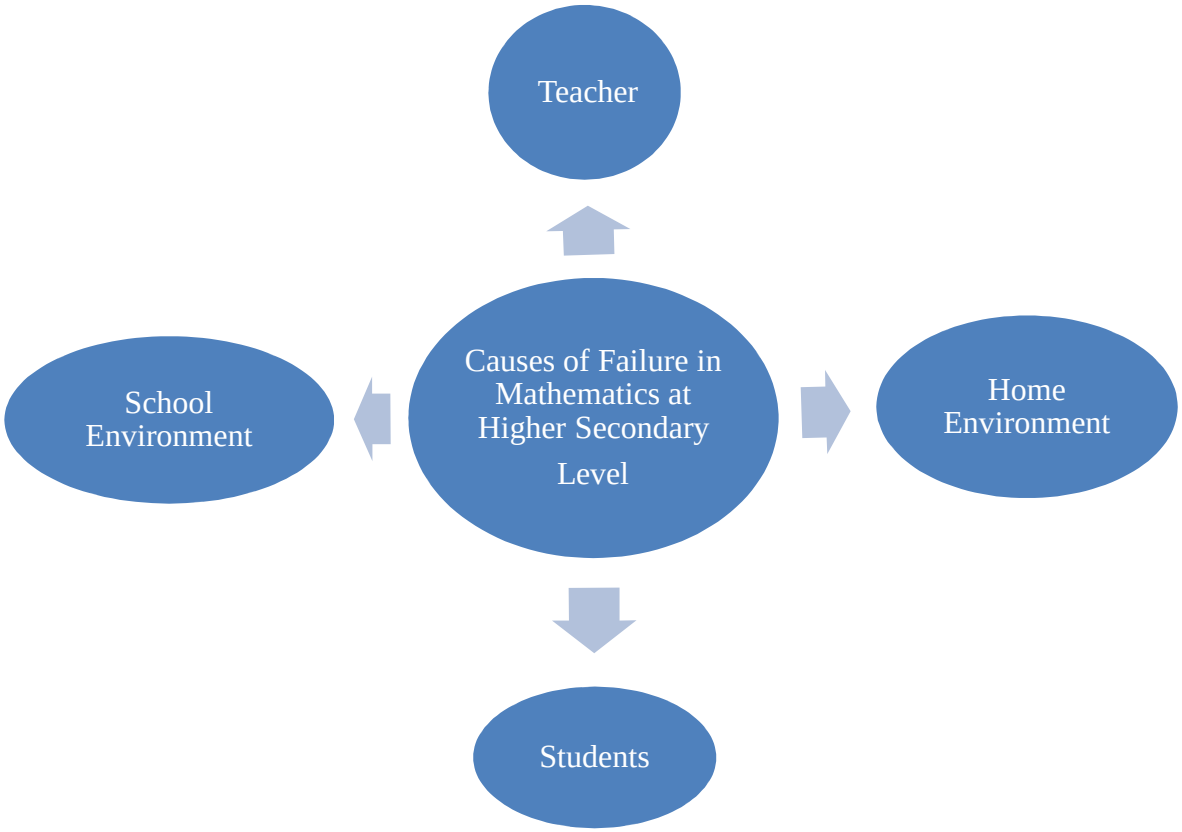
Theory of Educational Productivity

H.J.Walberg, (1981) proposed a theory of educational productivity which has an its theoretical foundation. Walberge's theory requires optimization of nine factors to increase student's achievement of cognitive and affective outcomes. The nine productive factors are:(i) age (ii) motivation/self-concept t(iii) ability/prior achievement(iv) Quality of instruction(v) Quality of instructional experience(vi)Home environment(vii) Classroom/school environment(viii)The peer group environment (ix)The mass media(especially television). These factors were classified into three general groups Wilkins et.al.(2002)(1) personal variables, such as prior achievement ,age, motivation, or self-concept(2) instructional variable such as amount or quality of instruction, and(3) environmental variables related to the home , teacher/classroom, peers and media exposure.

Carroll, (2014) Carroll’s model of school learning involves five factors. Three of these factors are related to the learner: (1) aptitude: the amount of time required to learning the task under optimal instructional conditions, (2) ability to understand instruction and (3) perseverance: the amount of time the learner actively engaged in learning. The remaining two are external to the learner: (4) opportunity for learning and (5) the quality of instruction.

Conceptual Framework

For to study of causes of failure in mathematics at higher secondary level of students of Mahendra Higher secondary School, researcher had studied 10 related empirical literatures which were mentioned on previous topic and article of Dr. Robert Pitcher. And then tally the all variables and researcher found that four most repeated variables were students, teacher, home environment, school environment. So researcher took four variables related to students, teacher, home environment, school environment as of major causes for failure and were shown in the following model:



Sources

(a) Pitcher, (2014). Causes of Failure in College.

(b) Pandey, (2008).Causes of Low Achieveent in Mathematics.

In summary, there is theoretical understanding and empirical evidences that various causes affected in students' failure. Basically the study wouldn't include the failure students in higher secondary level yet, so this study was conducted in Mahendra Higher Secondary School of Dadeldhura District and was done for determining the causes of failure in mathematics at higher secondary level.

These above theories helped the researcher to research about this topic. These theories clearly guided the researcher. After studying these theories, researcher prepared tools and interview guidelines. The main aim of researcher was to find out the causes of failure in mathematics of HS level at Mahendra HIgher Secondary School Dadeldhura, which causes were reflecting in these theories. These variables play crucial role for students to fail or pass. Therefore, the researcher wanted to review of these theories.

Chapter-III

METHODOS AND PROCEDURES

Research methodology is a combination of design and process that determine how to complete the research systematically. This chapter deals with procedures carried out for this study. It describes the design of the plans, selection of case college and selection of case respondents, tools of the study, method of data collection, data analysis and interpretation of the results. The present study focused on identifying causes of student's failure in mathematics in grade XII

Design of the Study

This was a case study and qualitative research as well as descriptive in nature to find out the causes of failure in mathematics. The main importance of this research design was to help researcher to collect data, interpret and analyze it.

Site Selection of the Study

Dadeldhura district lies in far western region neighboring to Baitadi and Doti district. There are many historical heritages. This is famous for Ugratara temple, Ghatalthan, Dageshwori temple, historical Dewali, statue of Bhimdatta Pant, Amargadi Killa. The main festivals of the district are Gaura and Jaat respectively on the occasion of Bhadra Purnima and Kartik Purnima. Also people of the Dadeldhura district celebrate Dashain, Tihar, Holi, etc.

Dadeldhura district has one municipality namely Amargadi and 20 VDCs. All VDCs are connected to proper facilities of road, electricity, telephone, hospital, educational institution.

Shree Mahendra Higher secondary school located in Amargadi municipality ward no.5 was hearth of Dadeldhura district was selected for the case study of the causes of failure in mathematics at higher secondary level specially grade XII. The surrounding places of the

school's area also had much diversity. The Brahmin, Chhetri, Newar, Magar , Dalit etc are local residents of this area. Mostly the parents of the students are engaged in agriculture as well as worked on NGOs and INGOs being Dadeldhura is second district having NGOs and INGOs in the context of Nepal. Economically peoples in the communities not so better.

Initially, at the time of establishment of this school, it was pronounced as Kalika Aadahar school.After that 2014BC Late king Mahendra Bir Bikram Shah when he was on visiting program of Far-western region, had opened the door of education by school named Mahendra Middle school in 2014 B.C. Jestha 19 . Four years later the current minister of education, Bishwobandhu Thapa had observed the Mahendra Middle school and gave affiliation on 2018BCJestha 19. The name of this school was modified four times as Shree Mahendra High School, after taken affiliation on 2019 Jestha 19. The second was Shree Mahendra Professional Lower Secondary from 2032 B.C. Falgun 1 to 2036 B.C.The third was Shree Mahendra Ma.Vi.fro 2037 BC to 2050 B.C. and last was Shree Mahendra Higher Secondary School from 2051 B.C. Mangshir 20 to till now.

The school has eight building precisely, building first of two floors having four rooms, building second of two floors having eight rooms, building third of two floors having two rooms, building four of two floors having six rooms, which was made by the help of Indian Embassy, building five of single floor having 2 rooms was namely called old hostel building, building six having single floor having 14 rooms was made by the help of C.C.O. and namely called girls hostel, building seven having single floor having 14 rooms, was also made by the help of C.C.O. and namely called boys hostel and building eight of single floor having 3 rooms. There is one office room, one staff room, one science lab including library, 12 classroom, six roomed toilet separated for boys and girls. It is compound by stoned wall as well as wire fence. It has sufficient playground volleyball ground and small football ground. There are twenty eight teachers, two administrative staff, one helper and one sweeper. There

were 563 Students in which 434 boys and 129 girls. Among them, at +2 classes only145 Students in which 104 boys 41girls. Again among +2 classes' students total students in mathematics at +2 level were 22. Being the study was focused on +2 levels and precisely on the class of 12^{th} students of mathematics, the total numbers of the students on mathematics at 12th class were 12 in which all were boys.

The result of +2 is especially poor because of mostly students fail in compulsory English and students of mathematics also fail in their major subject. In the past the school policy was very loose. There was not proper managed for the teachers and students. The parents of the students were mostly engaged with the NGOs and INGOs and also they were engaged in their profession. Students were also busy on field work of the INGOs and NGOs as a combination of parents profession and students self, it was obvious that parents had not guided their child properly.

Now there are vast change in that school and the society. There are available of proper class rooms, office rooms. Science lab, toilets for boys and girls. There are different types of indoor and outdoor paying materials for children. It has more than 25 rapines of field lands, open ground.

The data taken from HSEB of results of +2 level in mathematics at Mahendra Higher Secondary school approved that failure rate is unilateral from initial to now although some where small vary. The researcher found that there was greater difference between National achievement of the regular students in mathematics at grade XII and student's achievement of Mahendra Higher Secondary School from 2065 to 2069 BC. Thus for finding causes of failure in mathematics and then improving on mentioned factors as well as minimizing failure rate in mathematics in higher secondary level, it is considered as case school and 12 (all) students were taken as unit of analysis.

Sources of Data

The data were collected from primary and secondary sources. Mostly researcher used primary sources to collect data by taking interview with students and teachers as well as by class observation. The secondary sources were used to collect data by taking information about student's scoring on mathematics at class XI and XII. Also information by mark ledger, personal profiles, record, and report was used as secondary sources.

Tools and Instruments

Observation

This case study was focused on those students who had currently given mathematics examination of class XI. But for proper information about causes of failure in mathematics at higher secondary level, class observation was suitable instrument for to collect data. So class observation of class XII of mathematics was conducted. The observation mainly focused on school environment, teaching learning process, students' and teachers' activities, closure to lesson, Evaluation process.

The class observation note was prepared to observe school environment, teachers' and students' activities, beginning of the class, used materials, closure of lesson, class work and current evaluation of the students during teaching learning activities.

Interview

Interview was conducted for to get the qualitative information. Questions were asked to students and teacher with the help of interview guidelines.

Semi-structured interview guidelines prepared on the base of school environment, home environment, students related variables, teacher related variables for students and also

semi-structured interview guidelines prepared on the base of school environment and teacher related variables.

Reliability and Validity of Tools and Instruments

Reliability and validity of the research tools and instruments were necessary qualities of the instruments. It was established by its approval from the subject experts. To check the gross defects in language, suitability of the items, appropriateness of statement, complexity, coverage of contents etc. of all instruments, it was shown to the supervisor and modified if necessary and was finalized. The interview and class observation form were prepared according to research variables which had identified in the conceptual framework of the study..

Data Collection Procedure

For the data collection at first, researcher went to the School, built rapport with them and explained them the purpose of the study and request them for correct responses.

The school's records were studied such as mark ledger of the students, teacher's profile, physical facilities and other relevant documents. The researcher noted the behavior and activities of both teacher and students during teaching learning activities. For, to get information, researcher had observed the classroom 7 times during his research work.

On first day researcher went to selected school and explained the purpose the study to principal and math teacher. After, got permission to observe the class, researcher went in the class room with teacher and explained the purpose of the study to the students. Then researcher sat on last bench of the class, although teacher had managed the chair in front of the students for researcher. Three days later researcher had observed second time. After one week researcher had observed third time and noted what he saw in the classroom during teaching learning activities. Similarly fourth observation was completed after 7 days from third observation and noted what researcher saw in the classroom during teaching learning

activities in the classroom. These above observations were completed before Dashain vacation.

After Dashsin vacation researcher had observed the classroom fifth time with guideline of class observation form and noted as previous days. The sixth was completed after 6 days from fifth observation.

The last observation was completed after 5 days from sixth observation. After class had finished, researcher had thanked to students, teacher and principal for their kindly help and requested for many other helps if researcher would needed.

Data analysis Procedure

This was qualitative research hence the major part of data analysis was based on descriptive analysis. The information's were collected from the observation and interview by questioning present status of school facilities, students', teachers' activities, closure to lesson, used methodology and materials in classroom teaching. Then the researcher explained the data and their perspectives according to the respondent's responses. The collected information from class observation, interviews and school's documents first categorized according to the category of the respondents and then different themes taken. These themes considered as similar code versions according to the respondents and explained in their perspectives. Cross match were adopted to maintain the validity and reliability of the study. The researcher also tried to ensure the internal validity by observing the same data on the basis of theoretical framework developed by the researcher in previous section.

Chapter -IV

ANALYSIS OF DATA AND INTERPRETATION

This chapter deals with the analysis and interpretation of the collected information. The researcher minutely studied the schools documents such as teacher's profiles, mark ledgers, attendance as well as the records of the students of the sampled. Also the researcher had observed mathematics class of grade XII being participate with math teacher regularly for seven days during teaching learning activities. Then the classroom observation note was prepared on the basis of the class observation. Every activities and behaviors of the students and teacher were carefully observed and noted. The interview was taken to the students and math teacher. The responses of the respondents during the face to face interview were noted. There was no limitation to responses for the respondents. They were able to express freely whatever they have in their mind.

Thus for to increase failure rate there were various causes that researcher had concluded after observation and interview with students and mathematics teacher about school environment, home environment, students related variables, teacher related variables. Thus researcher had analyzed the data under following sub headings:

Home Environment

Home is the first school for children. Also the environment of home plays vital role on achievement of students. Parents are considered as first teacher for a child, so parents related factors like; parents' support, parents' level of schooling, parents' occupation as well as household work and mathematics study at home were considered as causing variables related to home environment.

Parents' Occupation

The first school of child is home. Parents are the first and most influential teachers of their child.

Each and every child spends more time at home than at school. Parents can support their child schooling by attending schools' function and responding to school obligations. Also children are seeking and mostly dependent on parents' economical status and psychological guidance. Parents' occupation may influence students' performance in various ways. For example: occupation related to income may determine access to learning opportunities and resources also plays a vital role in learning outcomes (Sah, 2006). The education and types of skills associated with different occupation modeled by parents may motivate students to develop their own skills in a particular ways. Parental occupation may also influence how students perceive the value of mathematics learning and learning environment at home. Parents who perform complex work will encourage self direction and cognitive achievement in their children.

The researcher conducted interview with 12 students about impact of parents' occupation on their study and found that 4 parents were farmer. 4 parents (fathers only) were engaged on government job, 3 parents were engaged on NGOs and rest 1 parents were engaged on INGO. Also researcher found that the parents who were engaged on government job, NGOs and INGOs facilitate their child on tuition classes, textbooks, fees, etc properly but the parents who were engaged on farming did not facilitate their child as others parents. Both above facilities were due to parents' occupation and consequently parents' occupation has major effect on achievement of students on mathematics.

Also researcher analyzed the profiles of 10 students of previous year and mark ledger at the same time, and found that parents were engaged on farming(4), government job(3) and job on NGOs and INGOs(3). Also researcher found that 3 students whose parents were

engaged on farming were failed in mathematics. Similarly 2 students and 1 student whose parents were respectively engaged on government job and job on NGOs and INGO were failed. Again according to the result of sampled students given by HSEB, researcher found that 3 students were passed and rest 9were failed in mathematics. In addition the parents of 3 students who were passed had occupation on NGO (1), INGO (1), government job (1). Among 9 failed students, 4 of them parents were engaged on farming, 3 of them parents were engaged on government job and rests 2 of them parents were engaged on NGOs.

Thus from comparative study of records and mark ledgers of previous year's students the result found from interview with students, result of sampled students of grade XI, researcher concluded that student with their parents having low income were failed generally at +2 level. Thus parents' occupation has major effect on

Parents' support

The environment plays the vital role in learning mathematics. How much time students get for learning and how much time they pass for the household work, affect the learning of mathematics and achievement on mathematics.

The researcher conducted interview with 12 (all) students and found there were 3 types of common views one of them was related with illiterate parents, second was related with literate parents and third one was related with mixed type of view which were as follows:

"*Our parents are illiterate they could not read and write. So our parents could not support and guidance at home for mathematics learning."*

-Students view of illiterate parents

"Although our parents are literate, but they cannot give time for us because of busy schedule from 10am- 4 pm on their job in NGOs, INGOs and government office."

-Students view of literate parents

"They are busy on their work (official or farming), so they cannot manage time for us and there is lack of guidance on mathematical activities. They are limited to facilitate books, tuition classes, fees and advice, which are not sufficient for us."

-Mixed type of view

Thus from above view s it can be concluded that parents' did not support their child. Among 12 parents, 9 were literate, 2 of them had knowledge on mathematics of HS level and rest 7 had lack of mathematical knowledge of higher secondary level and remaining 3 parents were illiterate, they had also the lack of mathematical knowledge of higher secondary level. Again according to the result of sampled students' given by HSEB, researcher found that 3 students were passed and rest 9 were failed in mathematics. Among 3 passed students, 2 students were supported by their parents on tuition classes, college fee, materials and subject matter, rest 1 student who was passed in the examination was not supported on subject matter. Again the 9 students who were failed in examination were not supported on subject matter, tuition classes and other facilities given by parents.

Those above aspect directly play a vital role on increasing failure rate in mathematics at higher secondary level. Hence parents' support has major effect on students' achievement in mathematics at higher secondary level.

Parents' Level of Schooling

Educational level parents directly linked with their children's achievement in mathematics at every level. At higher secondary level, it becomes major aspect. After conducting interview with 12 students, researcher found that 50% of mothers' level of schooling was lies on illiteracy and that 50% of mothers' level of schooling was lies on literacy. Similarly 76% of fathers' level of schooling was lies on literacy and 24% of fathers' level of schooling was lies on illiteracy. Also researcher found that fathers' level of schooling had less effect on achievement of child but mothers' level of schooling had major effect on

achievement in mathematics being the base level of child is directly related with mothers' activity and her qualification.

The learning performance of child related with parents' level of schooling investigated that mothers' level of schooling had major effect than fathers' level of schooling (khanal, 2012).

The researcher conducted interview with the 12 students and found from their view that parents' level of schooling with their involvement had important role that affected or could play a role in improving learners' performance and achievement on mathematics. In spite of this identified importance it seems students agreed that parents were however not involved. The researcher asked the question to 12 students, how your parents level of schooling related with their involvement, affects on your mathematical activity?. About this common views of students were as follows:

"….Parents never come to meet us at school and ask about our report cards…..but sometimes I understand they do not have the time and lack of literacy."

"I know, my parents do not have mathematical knowledge, so how can they involve on my mathematical activities."

"Although my parents had mathematical knowledge but their busy schedule on their office disturbed us for their guide and mathematical help."

This is a point that learners could however not find a solution about since, most of the students have not educated parents and also not uneducated culture, and they have not full support in studying mathematics that also leads the poor achievement. As a result high failure rate in mathematics at higher secondary level.

Thus researcher found from interview with students, mothers' level of schooling had major effect than fathers' level of schooling. Again 3 students who were passed in the HSEB examination, 2 of them parents had schooling level as Masters and Inter, Inter and Inter, 1 of

them parent had schooling level of Bachelor and illiterate. Similarly on failed 9 students, 5 parents were illiterate and 4 parents were mixed type of schooling level. So parents' level of schooling directly affects the achievement of students in mathematics.

House Hold Work and Mathematics Study at home

The work for house is called household work. It directly linked with mathematics study at home and consequently students' achievement. The effect of students' household work on students' achievement in mathematics, was analyzed according to their Interview and researcher found that the students having much work load on home had low achievement and less work load on home had high achievement on mathematics. The common view of students about household work and mathematics study at home were as follows:

"*Before and after school time I have to finish so many household works till my parents come home, so I haven't time for study mathematics at home"*.

-Students' view

"Usually I can't go to school because I should do household work and other laborious work with my parents, so I haven't time for study mathematics at home."

-Students view

Again the study on causes of failure in mathematics at SLC level indicates that the effect of mathematics study at home on students' achievement in mathematics had major effect (Khanal, 2012). Again according to the result of sampled students given by HSEB, researcher found that 3 students were passed and rest 9were failed in mathematics. The average hours for mathematics study at home of passed and failed students were approximately 4 hours and 2hours respectively.

Thus from above all evidences researcher concluded that household work and mathematics study at home has major effect on students' achievement on mathematics at higher secondary level.

From the above result researcher concluded that: parents' level of schooling, parents' support and parents' occupation are supplementary part of better academic performance. These variables are closely link with "Theory of School Effectiveness" of (Edmonds, 1997)and (Carroll, 2014). Again household work and mathematics study at home or practice of homework, are also most important aspects in learning sector. These variables are closely link with "Theory of Educational Productivity of (Walberg, 1981).

School Environment

Environment is considered as supplementary aspect with heredity. A good environment for learning effects the achievement of students in various ways. For better performance of students, home environment and school environment play vital role. As home environment discussed above, in this topic school environment is going to discuss that how it affects on achievement of students. School's physical facilities, class environment, Class work, Peer interaction were considered as causing variables related to school environment.

Physical Facilities of the School

The physical facilities of school play a great role in the achievement of students. The classroom is considered as a heart and the school as the nucleus of the educational system. The school is located within the area of 7 ropanies and rest 18 ropanies jungle area and open ground down side of the school area.

The school has eight building precisely, building first of two floors having four rooms, building second of two floors having eight rooms, building third of two floors having two rooms, building four of two floors having six rooms, which was made by the help of Indian Embassy, building five of single floor having 2 rooms was namely called old hostel building, building six having single floor having 14 rooms was made by the help of C.C.O. and namely called girls hostel, building seven having single floor having 14 rooms, was also made by the help of C.C.O. and namely called boys hostel and building eight of single floor

having 3 rooms. There is one office room, one staff room, one science lab including library, 12 classroom, six roomed toilet separated for boys and girls. It is compound by stoned wall as well as wire fence. It has sufficient playground volleyball ground and small football ground. There are twenty eight teachers, two administrative staff, one helper and one sweeper. There were 563 Students in which 434 boys and 129 girls. Among them, at +2 classes only145 Students in which 104 boys 41 girls. Again among +2 classes, total students in mathematics at +2 level are 22. Being the study was focused on +2 level and precisely on the class of 12^{th} students of mathematics, the total number of the students on mathematics at 12^{th} class were 12 in which all boys.

The researcher asked the question about the physical facility of the school to the mathematics teacher and students. The received versions by the researcher were following:

"The physical facilities of our school are satisfactory. But our school hasn't math lab and proper library for students, proper hall for seminar, workshop. Thus we are going to build one another building for hall, one building for math lab and library. We have a long-term plan for the promotion of physical infrastructure and new trends in teaching learning process at school"

- Math Teacher

"*Our school has not proper library, so we cannot get sufficient reading materials. Also there is lack of math lab, so we are far from practical knowledge of mathematics. There are not sufficient teaching materials for mathematics, so we are facing only the parrot learning."*

-Students view

Thus from direct observation of the school, students view and teachers view, researcher found that there were sufficient building for class room but there were no modern facilities for library, math lab, seminar hall etc, which affected to extra learning activities for the students. Consequently the achievement of students is affected. Thus physical facility

related to school environment is causing variable for high failure rate in mathematics at higher secondary level.

Classroom Environment

The classroom environment includes the two important aspects. The first is physical environment; it includes the location of room, arrangement of desks, benches, chairs, position of whiteboard, facility of ventilation etc. Another is psychological; it refers to the relationship of students and teachers to each other.

As the researcher went into the classroom with math teacher, every student said good morning sir. Then every student took their seats. After that at the beginning of the lesson the teacher explained the required topic but did not check for the understanding of the students. The teacher frequently showed high level of interest in the lesson and tried to start the lesson by connecting the students with their previous class. The teacher explained required topic of the lesson but not its objectives before introducing the lesson on that class it can be seen that beside textbook not any other teaching materials were used during teaching learning activities.

Also researcher observed the physical environment of the class and found that the desk and benches were kept in two rows and sufficient for students. The classroom was clean and well swept. It was well ventilated but there were no chair for teacher and dustbin for rough things. The white board was in front of students. There were only 12 students and 3 were absent on the day.

The researcher asked the question about classroom management and its environment to the mathematics teacher and students. The received versions by the researcher are following:

"*There is good management in each classroom. In our school, the students are from different cultural background, caste and socio-economic status. Mainly, students from middle and low*

socio-economic status are studying here. In grade 12 of mathematics class the students with different cognitive level could be found easily. Many of the students had poor high school base in mathematics and poor language skills."

-Math teacher

"Our class has good facilities. But here is lack of inverter during loadscheding period at morning classes. Many of we are from middle and low economic status, so there are not necessary materials with us and some noise in the class."

- Students view

Thus from direct observation and view of Math teacher and students, the classroom management and its environment has major effect on achievement of students in mathematics.

Peer Interaction

The discussion about subject matter with friends in classroom and after school is called peer interaction. Interaction, discuss and practice are essential to get better achievement in mathematics. Knowledge can be constructed through active participation. Students gain knowledge while reflecting on their own action. In the classroom, activities are individually performed and judged on the basis of each individual performance. Activities are detached from meaningful context and from real-life situations and communities of practice (Khanal, 2012)

The researcher conducted interview with 12 students and math teacher to find out the influence of peer interaction in mathematics achievement. For this purpose researcher asked the question to students and mathematics teacher about peer interaction and found the common views, which were following:

"*Although I study mathematics but reality is that I was very weak in mathematics from earlier classes. I have still problem in learning mathematics. So I have no interest to peer interaction in mathematics class."*

- Students view

"There is workload of all subjects and so we haven't time for peer interaction only about mathematics."

–Students view

"Talented friends did not take interest on peer interaction and did not give time on discussion in the classroom for us."

-Students view

"*The students who participate in peer interaction they had got better achievement in mathematics. So I had tried to motivate all of these students for peer interaction but they ignore."*

-Math Teacher

Also on direct observation, the researcher found that there was lack of peer interaction between students. On the leisure time students were busy on mobile activities, joking and something else.

Also the F-test between mean achievements of mathematics according to peer interaction explained there is a statistically significant difference between the students' mathematics achievement in grade VIII and peer interaction (Khanal, 2012)

The above views indicated that students who less participated in peer interaction they got low achievement. Thus it can be concluded that peer interaction has major effect on achievement in mathematics.

Class work

The work given by the teacher during the class is called class work. Sometime it is defined as peer interaction between students in the classroom. Class work is considered as current test for students conducted by teacher. For every subject it has vital affect to increase students' performance as well as achievement. In mathematics class, class work is considered as current test for students. Thus researcher conducted interview with 12 students about class work and found that all (12) students are not favor on class work and also said "our *math teacher never given us class work being fear of course not finish."* Also they said "*our teacher did not care for weak students*. He just taught and spent time. He did not tell anything about class work also. Only talent student asked the question to the teachers".

Also researcher directly observed the classroom of mathematics four days and found there was lack of class work. On the question about class work to the math teacher he replied: "There is lack of time for to finish the course so I can't give class work for students. Also students are not interested on it. But I am trying to convince them and I will give class work to the students. Really class work improves students' weakness currently in classroom, so it directly linked with achievement of students. More precisely greater class work supports the achievement of students."

Also the *F*-test between mean achievements of mathematics achievement to class work explained, that there is a statistically significant difference between the student's mathematics achievement in grade VIII and class work (Khanal, 2012)

Thus from above responses and evidences indicated that student participation in class work and practices mathematics lesson is very poor and it results the failure so it can be concluded the class work had a major effect on achievement in mathematics.

From the above result researcher concluded that: physical facilities of school, class room environment, Peer interaction and class work are supplementary part of better academic

performance. There variables are closely link with “Theory of School Effectiveness” Of (Edmonds, 1997), “Theory of Educational Productivity of (Walberg, 1981)and (Carroll, 2014). Therefore these variables should be maintaining and then +2 level results would increase.

Students Related Variables

Student is vital aspect of education system. The main target is how student becomes qualified learner. The selected Mahendra Higher Secondary school's students of mathematics and main causes of failure in mathematics was the research question in the study. Students related factors like; poor high school base, poor language skills and vagueness about long-range goals were considered as causing variables related to students.

Poor High School Base

The knowledge of high school mathematics has vital affect on learning of higher secondary mathematics. If high school base is better, then learning of higher secondary mathematics is so easy.

Thus about high school base, the researcher conducted interview with 12 students and found 5 students had taken optional mathematics at SLC level and rest 7 students had not. Among 5 students, 3 students had scored below 50and 2 students had scored above 60. Again on compulsory mathematics, 3 students had scored below 50, 4 students had scored below 60 and rest 5 students had scored above 60. All students were favorable on affect of optional mathematics at SLC level on study of higher secondary mathematics. Also on the question about course completed of both mathematics at SLC level, 3 students had replied yes and rest 9 had replied no. According to the result of sampled students given by HSEB, researcher found that 3 students were passed and rest 9were failed in mathematics. In addition among 3 passed students, 2 students had taken optional mathematics and scored above 60 on both

mathematics in SLC level and rest 1 student had not taken optional mathematics but scored on compulsory mathematics was above 60. Again 2 students who were passed had scored above 60 on mathematics at higher secondary level and rest 1 student who was passed had scored 48 on mathematics at higher secondary level.

Thus the data obtained from interview with students indicate that poor high school base has major effect on students' achievement on higher secondary level mathematics.

Poor Language Skills

Language is means of communication. It is said that no language no learning. At higher secondary level mathematics is taught through English medium. So for better performance and achievement on mathematics at higher secondary level, skill on English language is most important. The success or failure of a students in college/ higher secondary level, directly hinges on skills of the language. A student must be able to read, to write, to speak and to listen effectively. Being ineffective in even one of these language abilities can lead to academic difficulty (Pitcher, 2014)

The researcher conducted interview with 12 students about language skills (school medium) and found that 7 students were from government schools and rest 5 students were from boarding school. On the question about impact of English language on learning of mathematics at higher secondary level, all students were favorable on its great impact. According to the result of sampled students given by HSEB, researcher found that 3 students were passed and rest 9were failed in mathematics. In addition among 3 passed students, 2 students had passed SLC from English medium school and rest 1 was from government school. Again among the failed 9 students, 6 students were from government school and rest 3 students were from English medium school (here the students who were from English medium school were considered as having better language skills than the students from government school)

Thus from above evidences researcher concluded that poor language skill has major effect on achievement of students in mathematics at higher secondary level.

Vagueness about Long-Range Goals

Most of the adults realize that success in college demands a great deal of hard work. However the desire of pleasure and fun is also a very strong need among adolescents. One of the signs of maturity is the ability to delay immediate pleasure and look at long-range goals. These goals do not have to be specifically defined, but they must be one's own. A student must have a sense of working towards a goal that students really wants, whether it is the pleasure of good grade, a still undefined career, or status and security. College work is likely to seem grim, difficult and even meaningless if it is not related to personal goals and objects (Pitcher, 2014).

If there is no goal about any work, then there is not interest on that work. As a result success on that work may far from consideration. Therefore researcher conducted interview with 12 students about long-range goal related with study mathematics at higher secondary level and found that 2 students replied “we will do what seniors doing”, 4 students replied “ we will engaged on teaching field’, and rest 6 students replied “ we don’t know”. Also, researcher found that students having specified goal were interested on study mathematics and students having not any specified goal were not interested on study mathematics properly. Again according to the result of sampled students given by HSEB, researcher found that 3 students were passed and rest 9were failed in mathematics. In addition 3 students who had passed HSEB exam were belonging in those students who had specified goal on teaching field. Similarly, among rest 9 students, 8 were belonging in two versions as; "we will do what seniors doing," "we don’t know" and rest 1 student was belonging in the version "we will engage on teaching field".

Thus, from students' view, researcher concluded that vagueness about long-range goals related with study mathematics at higher secondary level has major effect on achievement of students in mathematics at higher secondary level.

From the above result researcher concluded that: Students related factors like; poor high school base, poor language skill and vagueness about long-range goals effect poor academic performance. This view closely links with the "Theory of Fear'' of (Holt, 1964), "Theory of Educational Productivity" of (Walberg, 1981) and (Carroll, 2014).Therefore these variables should be maintaining then +2 level results would increase.

Teacher Related Factors

Achievement of students depends upon teacher related factors. Teacher has great deal for students' achievement. Thus teacher related variables like; teachers' behaviors, teaching materials and methodology used by teacher, teachers' qualification and years of experience were considered as causing variables related to mathematics teacher.

Teachers' behaviors

Students' learning is directly linked with teachers' behaviors. Teacher must be liberal for students such that students may express their feeling, confusion, problems about subject matter without any hesitation and fear. Teacher must have to treat the students as their intension. When teacher entered in the classroom first of all teacher has to know about students' intension such that what they want? How they want to learn? Are they looking for a joke?

About teachers' behaviors, researcher conducted the interview with 12 students and found the common view as follows:

"*Our math teacher is very strict in the classroom, kindly help in his home, replied our question normally but verbally, so many times he beats us."*

-Students view

"He teaches us by linking yesterdays' content with today's' content but not sufficient for absent students."

-Students view

"At leisure time when we ask, sometime he helps us and sometime says I am tired and come on my home. He helps on our problem only by verbally not written form, which we can't understand properly."

-Students view

"Our math teacher mostly absent on school and classes, he insult us in class for giving wrong answers, he do not motivates us in class and so many times he beats us."

-Students view

Also on class observation, researcher found that math teacher never smiled at the classroom, never told any joke. When one of the absent student asked about the previous class problem then teacher replied it is taught yesterday, why did you absent? So ask with your friend. On the class observation time researcher asked to the students' "why you are not questioning to the teacher about subject matter?.'' They replied we were suffering from fear of the teacher, he is strict person.

Thus from above evidences researcher concluded that students were suffering from teachers' behaviors and they can't express their expression, feeling, problems which directly linked with students' achievement and so teachers' behavior has major effect on students achievement on mathematics at higher secondary level.

Teaching materials and methods used by math teacher

Teaching is an art. Teacher is considered as artist. By the use of teaching materials and method teacher completes his art. But which type of teaching materials and methods did he use is most important. By suitable teaching materials and methods, teacher could teach

mathematics practically. So, teaching materials and methods are considered as best instruments in the period of teaching learning activities.

About teaching materials and methods used by teacher, researcher conducted the interview with 12 students and found the common view as follow:

"*Our teacher never used any new materials rather than textbooks, marker and whiteboard. He usually taught us by lecturer method and teacher centered method, such that what he wrote on white board we have to copy as it is."*

-Students view

Also researcher conducted interview with math teacher about same topic and found his view as follows:

"Our school has not proper and sufficient manipulative, interactive and physical materials. But available materials in our school generally I used them relate with problems."

-Math Teachers' view

"I have already told about teaching materials. So really there is lack of practical knowledge of mathematics. At that time how I teach by student centered method? But how it possible I am trying to teach by student centered method such that each student will participate on teaching learning activity individually."

-Math Teachers' view

The researcher had observed the classroom also found that usually, the teacher tried to start the lesson by connecting the students with their previous class. The teacher explained required topic of the lesson but not its objectives before the introducing the lesson. After that teacher wrote the definition or statements and formula on white board and then he solved the problem by using formula deductively. Students' copy as it is. The subject teacher can be easily explained about the teaching lesson by the effective teaching materials. Beside

textbook, whiteboard and marker not any other teaching materials were used during teaching learning activities.

Thus from all evidences students achievement is affected by teaching materials and methods used by teacher. Therefore teaching materials and methods has major effect on students' achievement in mathematics at higher secondary level.

Teachers' qualification

Teachers' qualification directly linked with subject matter and consequently linked with students' and their achievement on related subject. Teachers' qualification is also called teachers' formal education. The required formal education normed by MOE for mathematics teachers for every level played vital role on students' achievement in mathematics. Some studies showed positive effects of advanced degree (Ruth, 2003). Some argue that the requirement of a second degree raises the cost in terms of teachers' formal education and the time it involves and may prevent quality candidates from choosing this profession (Murane, 1996).

The required formal education normed by MOE for mathematics teacher of higher secondary level is M.Ed or equivalent. About teachers qualification researcher conducted the interview with math teacher and found that he had qualification of M.Ed in mathematics with first division normed by MOE. Also for verification researcher had studied his personal biography/profiles and found same result as he said above. So many students knew about teachers' qualification because teachers' squalification was disciplayed in the staff room of Mahendra Higher Secondary School. About impact of teachers' qualification on students' achievement researcher asked with mathematics teacher and students and found the result as follows:

"Qualification of mathematics teacher and his quality are related things. Mostly qualification with best percentage is regarded as the teacher having greater quality. If the teacher has

greater quality then he taught the students properly and consequently students' achievement is affected. So teachers' qualification has greater impact on students' achievement."

-Math Teachers' view

"Our mathematics teacher has required qualification as HSEB needed. He is qualified in mathematical knowledge, what he taught we anyhow understand but we are suffering from his behaviors."

-Students view

Thus from all evidences teachers' qualification is most important causing variables related to teacher related factors. And it has major effect on students' achievement.

Years of experience

Being teaching is an art, it depends upon experience. Experienced teacher taught the students more effectively than inexperienced teacher. Studies in the effect of teacher experience on students learning have found a positive relationship between teachers' effectiveness and their years of experience but not always a significant or an entirely linear one .The evidence currently available suggests that while inexperienced teachers are less effective than more senior teachers, the benefits of experience appear to level off after a few years (Ruth, 2003). The relationship between teachers' experience and students' achievement is difficult to interpret since this variable is highly affected by market conditions or motivation to work during student rearing period.

From interview with teacher, researcher found that the teacher had experience of 3 years at Mahendra Higher Secondary School as a part time teacher and full time teacher at Dadeldhura Education Campus, Dadeldhura.

Also researcher had observed the data given by Mahendra Higher Secondary School about math teacher and found that the math teacher name was Shree Mr. Krishna Prasad Bhatt. His date of birth was 2038-04-10. According to his date of birth he was of 32 years

old. From 2067-03-12 he had worked in Mahendra Higher Secondary School as a part time mathematics teacher at higher Secondary level. So he had experience of 3 years at Mahendra Higher Secondary School as a part time mathematics teacher at higher secondary level, which was same as the result found from interview with him.

About impact of years of experience of math teacher on students' achievement, researcher asked the question to mathematics teacher, students and received versions were as follows:

"Greater experience on teaching makes the teacher greater qualified. Qualified teacher has better quality and greater knowledge on subject matter. If a teacher has greater knowledge and quality on subject matter, he will teach the students properly. As a result students may achieve better score."

-Math Teacher view

"I feel I am improving my knowledge. In this year I have great confidence to teach students than last two years. And I guess that after some years I will do better than now a day on my profession that is since teaching experience. Really there is chain such that students achievement depends upon teachers' quality, teachers' quality depends upon teachers' qualification and experience on subject matter. So students' achievement is directly affected by years of experience of teacher."

-Math Teacher view

"*Our math teacher did not do any mistake while teaching but on derivation of formula and to prove theorems he depends upon his notes, without notes and textbooks he cannot derive the formula and prove the theorems. Also so many days we were waiting for him for his class but he absent being he is busy on college and another HSS. He is a part time teacher for our school so if he had time he would have come otherwise not."*

-Students view

Thus from all evidences researcher concluded that years of experience on teaching of a math teacher has major effect on students' achievement. Also a part time teacher was causing variable related to years of experience of a teacher concern on teacher related factors for students fail in mathematics at higher secondary level.

From the above result researcher concluded that: behaviors of teacher, teaching materials and method used by teacher, teachers' qualification and years of experience of teacher have major effect on students' achievement in mathematics at higher secondary level. This view closely link with "Theory of Educational Productivity" of (Walberg, 1981)and "Theory of Fear" of (Holt, 1964). It concludes that teacher' behaviors, teachers' qualification, years of experience of teacher are varying essential for increasing pass percentage in mathematics at higher secondary level. Also improper use of teaching materials and methods leads the student as fail, so by improving on use of teaching materials and methods, students' fail rate can be minimized.

Chapter –V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to present precisely the picture of the study. After research analysis and interpretation of collected data, an attempt has been made to summarize and enlist of the findings, conclusion, Educational implications and some reformations for future study.

Summary

The study was concerned with the causes of failure in mathematics at Mahendra Higher secondary School, Dadeldhura. High failure rate in mathematics are creating difficulties in teaching learning activities at higher secondary level. Providing individual right to education and managing classroom with different cognitive level to bring out common educational outcome is a matter of problems to the school administrators. They are also challenging to the curriculum designers. The achievement of a student is not only affected by a single variable and there is not a single answer for the question "why many students fail in mathematics in higher secondary level?"

This case study had been done to find the causes of failure in mathematics at higher secondary level. The researcher had selected Shree Mahendra Higher Secondary School on the basis of the achievement of students in mathematics. As the researcher was the local residence of this area and school was facing problem of low achievement in mathematics in higher secondary level, so the researcher had selected this school for case study. After constructing the tools of data collection such as class observation form, interview schedule for students, interview schedule for teacher, the researcher participated at school and studied relevant documents related to school, teacher and students for to find the causes of failure in mathematics at higher secondary level.

How students learn mathematics is concerned with their opportunities to learn and the discussion he/ she take part in. The level to which student learn mathematics depends on their engagement and experiences in classroom activities. In this research, the researcher had analyzed the school environment, home environment, teacher related factor, and student related factors to find out the causes of failure in mathematics at higher secondary level.

There were four theoretical literatures which were “Theory of Fear”, “Theory of Educational Productivity”, “Theory of school Effectiveness” and Carroll’s Model of School Learning.” These theory helped researcher to validity and reliability of this study.

Findings

- Parents' occupation, parents' support, parents' level of schooling, household work and mathematics study at home were major causes on students ' achievement related to home environment variable.
- Physical facilities, classroom environment, peer interaction and class work were major causes on students' achievement related to school environment variable.
- Poor high school base, poor language skills, vagueness about long- range goals were major causes on students' achievement concern on student related variable.
- Teacher' behavior , teachers' qualification, years of experience of teacher in teaching field, materials and method used by teacher in the classroom teaching were major causes concern on teacher related variable.

Conclusions

Classroom practices and curriculum are closely linked. Achievement of student is always affected by different variables such as school environment, home environment, teacher related variables and students related variables. These variables positively affected on mathematics learning. These above mentioned variables should be positively carrying then the students of pass percentage in mathematics could be increased.

The causing variables related to school environment such as; physical facilities of school, class environment, peer interaction, class work have strongly positive effect on mathematics achievement. So school environment is very essential for increasing the achievement of mathematics. The causing variables related to home environment such as; parents' occupation, parents' support, parents' level of schooling, household work and mathematics study at home had strongly positive effects on failure in mathematics. It concludes that the home environment has major effect on failure on students to be failed. The causing variables related to students such as; poor high school base, poor language skills and vagueness about long-range goals were most important aspects in learning sector. Similarly, causing variables related to teacher such as; behavior of teacher, inadequate methodology and materials, years of experience in teaching field, teachers' qualification affect poor academic performance. Therefore all mathematics teachers improve in these variables to teach better. Also teachers and administrators should be commitment to reform +2 result of Nepal.

Recommendations

After concluding this research, the researcher would like to suggest some recommendation for the educational implication and further study to improve failure students' mathematics achievements in +2examination. The following educational implications for teachers, students, parents, educators, educational planners and administrators working in the related field may laid down:

- Parents should be attention about their children. They have to look about how their children are doing in mathematics, they are doing their homework or not. They have to provide enough time to study at home and also have to visit school at least once in a month to see their students' progress.

- Students need to be motivated by their teachers and significant others so that they develop a positive attitude towards mathematics. Teachers and others like parents should help learners develop a sense of having the ability to succeed in mathematics. Learners need to be continuously informed that they will succeed if they put their best effort. The motivation learners should receive may include exposing them to the benefits of learning mathematics and making mathematics relevant and interesting. The motivation may be done through career guidance and counseling sessions. The learner absenteeism challenge may also be addressed through guidance and counseling services provisions.

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- The formative and orientate character of assessment is another idea that has to be developed, assessment should be considered a critical judgments that stimulates, orientates and promotes better understanding and a great control of knowledge on the parts of students that shows success and that make them feel satisfied with the effort. The teacher should stimulate and develop this style of working on a daily base.
- Teacher need to use variety of methods and instruments, some that are systematic and others that favor the creative aspect of mathematics.
- Teachers have to provide the environment for peer interaction because it helps them to understand properly. Teachers have to emphasis on class work and homework. For minimizing communication gap between teachers, parent and poor students in mathematics teacher have to create an environment for interaction among them.

References

Acharya, P. (2006). *A study on problems faced by HSEB Mathematics teachers in teaching of Grade XI.* ktm: unpublished.

Carroll. (2014, 08 16). carroll's Model of School Learning.

Conboy, M. F. (2006). Secondary Students' perceptions of factors effecting failure in mathematics. *Eurasia Journal of Mathematics* .

Dangol, A. (2012). *Causes of failure in mathematics in SLC examination.* ktm: unpublished.

Edmonds. (1997). *Theory of School Effectiveness.* published.

Giri, G. R. (2008). *A critical analysis of SLC Coompulsory mathematics scores 2063.* ktm: unpublished.

Holt, J. (1964). *Theory of Fear.* published.

Kalhotra, S. K. (2013). *A Study of causes of failure in mathematics at high school Stage.* Hyderabad: Published.

Khanal, K. (2012). *The causes of failure in mathematics at SLC level.* ktm: unpublished.

Ojose, B. (2011). Mathematics literacy:Are we able to put the mathematics we learn into everyday use? *journal of Mathematics Education* , 89-100.

Pandey, R. P. (2007). *Factors influencing Mathematics Achievement.* ktm: unpublished.

Pandey, T. R. (2008). *Causes of Low Achievement in Mathematics.* ktm: unpublished.

Pitcher, R. (2014, 08 16). Causes of Failure in College.

Raj, K. (2013). *High failuureRate in Mathematics Examination in Rural senior Secondary School in Mthatha district.* Walter: Published.

Ruth, Z. (2003). *Teachers' Qualifications and their Impact on student Achievement.* Israel: Published.

Sah, D. N. (2006). *Effect of occupation on mathematics achievement within Rai community.* ktm: unpublished.

Sapkota, B. P. (2005). *A comparative Study of the mathematics achievement on SLC result of kathmandu and Kavre district of Nepal.* ktm: unpublished.

Shrestha, P. D. (2002). *A study of mathematics Achievement of private and Regular students in SLC examination.* ktm: unpublished.

Subedi, G. P. (2005). *Factors affecting failure in mathematics in SLC examination.* ktm: unpubllished.

Walberg, H. J. (1981). *Theory of Educational Productivity.* published.

Yadav, V. K. (2008). *Causes of low achievement in mathematics.* ktm: unpublished.

Government of Nepal, Office of the controller of examination, Status of HSEB results (2065-2069).

Journals for educators, Teachers and trainers, vol4(2) ISSN 1989-9572.

Ferguson, P.and Womack, S.T. (1993). The impact of subject matter and education coursework on teaching performance. Journal of Teacher Education, 44(1),155-163.

Guyton, E. and Farokhi, F. (1987). Relationships among academic performance basic skills subject matter knowledge and teaching skills of teaching education graduates. Journal of teacher education, 38, 37-42.

Appendix-A

Class Observation Form

School's Name: Classes: Time:-

Unit/Topics: Subject:- Period:-

S. N	Description						Remarks
		Low 1	Moderate 2	Satisfactory 3	Good 4	Excellent 5	
1	Teachers' behaviors • Normal • Loyal • Strict • Changeable						
2	Presentation • Knowledge of subject matter • Order presentation • Appropriateness of example • Relation with curriculum						
3	Initiation of topic • Class management • Motivation towards lesson • Connection to prior knowledge						
4	Student Activity • Student participation • Question answer • Discipline						
5	Physical Facilities) Type of Board • Class management • Library • Math Lab						
6	Use of instructional materials • Clearly visible • Clearly understanding						

	• Related to topic • Appropriately used • No any used materials						
7	Teachers activities • Lecture • Demonstrations • Encouraging students • Deductive • Inductive						
8	Evaluation • Do you understand • Solved the problem on board • Solved the problem on your copy • Homework						

Source: (Khanal, 2012)

Appendix-B

Interview for Teacher

Part I. Personal profiles:

Give appropriate information on your personal back ground.

- Sex: a) male b) female
- Age: a) less than 20 years b) 20 to 30 years c) greater than 30 years
- Educational Qualification: a) B Sc. /B ED/BA plus Masters Degree other than Math b) M Ed/ M Sc

  c) others, please specify.....
- Work experience: a) less than 5 years b) 6 to 20 years c) greater than 20 years

Part II. Interview Questions:

Please express your valuable views and opinions freely.

- How do you express the problems? (Written from or ask)
- Do you use manipulative, interactive and physical materials in teaching?
- Do you encourage students on discussion while solving the problem?
- Do you try to elaboration the student's initial responses?
- Do you wait time after posing questions?
- How do you try to develop curiosity of students before solving problem?
- Do you provide opportunity to students while teaching?
- What kinds of role do you play while solving the problem?
- Do you relate problem and materials while teaching?
- What are the problems you face in teaching?
- How do you manage extra time for poor students?
- What kinds of motivational factors do you use in teaching?
- What strategies did you use to promote the habit of independent learning?

- What to do when the class room was disturbances (noise)?
- What factors contribute to use different teaching strategies?
- Which methods used for teaching Mathematics?
- How did you manage the classroom before teaching?
- Did you feel any lack of the school facilities?
- Did family background affect the achievement of students?
- What kinds of relations should have between school and parents?

Thank you for your co-operation!!

Appendix-C

Interview for students

Part I: Personal profile

Give appropriate information on your personal background.

Name:

Sex: Age:

Part II: Interview questions

Parents Related

- What is your parent's occupation?
- Is your parents occupation support your study?
- How is your parent's occupation support your study or not?
- How your parents are busy on their job?
- Do they guide you properly?
- Does your parent have mathematical knowledge?
- What is your parent's level of schooling?
- Which of father or mother's level of schooling mostly affected your study? How?
- How much time you had worked on house hold work?
- Does household work effects your study?
- How much time you have managed for practice of mathematics at home?
- ……
- ……..

Teacher Related

- Are you satisfied on teacher's behavior?
- Did he solve your problem any time?
- Did he call you at home if busy?
- Did you express your feeling, confusion, problems about subject matter freely with your teacher?
- Which of method teacher teaches you?
- Is math teacher uses teaching material or not?

- Is math teacher teaches as your interest?
- What is your teachers' qualification?
- How do you know about teacher’s qualification?
- Is teachers' qualification affects your study? How?
- Did he finish the course of mathematics in previous year?
- Did your teacher teach you trial and error method?
- Did he depend on his note?
- Part time or full time teacher?
- Is status of your teacher affect on your study? How?
- ……
- …….

Student Related

- Did you choose mathematics as your interest? If not how?
- Are you thinking Mathematics as hard subject? Why?
- What do you do after study mathematics?
- Is English language skill affects on your teaching of mathematics?
- In which medium you had passed SLC?
- Did you study optional mathematics at SLC?
- What were your score on both mathematics?
- Did you select right college?
- ……..
- ……..

School Environment Related

- How much time have you managed for peer interaction?
- Does your teacher motivate for peer interaction?

- Is class management suitable for you?
- What is your view about class environment?
- What are the physical facilities that you think lack for you?
- In your class there is white board or black board.?
- Does your school have proper library for to study mathematics?
- Does your school have math lab?
- What do say about class work?
- Did your teacher give you class work?
- How he help the poor students in class work?
- …….
- …….

Appendix-D

Classroom observations note: I

During the class observation in Mahendndra Higher Secondary School researcher saw that the teacher came in the classroom and he wrote topic “Permutation” and its definition as “An arrangement of objects taken some or all of them at a time is known as the permutation” and it is denoted by p(n, r). And some formula about permutation such as:

1) Permutation of n different objects taken r of them at a time = p (n, r) = n! / (n-r)!
2) Permutation of n objects taken all of them at a time when p of them be of one kind, q of them be second kind= p (n, r) =n! / p! q! r!
3) Permutation of n objects taken r at a time when each object may repeat any number of times = n^r.
4) Permutation of n objects arranged in a circle= (n-1)!
5) If clockwise and anticlockwise arrangements are not taken different, then the circular permutation of n objects= (n-1)!/2

At that time one student raised the question. Sir how 0! =1? Then teacher replied it is taught in yesterday why did you absent so ask your friends. After that teacher started to solve the problems by using formula deductively such as: he question is (Exercise-1.2, Q. No.2) If three persons enter a bus in which there are ten vacant seats, find in how many ways they can sit?. The teacher starting to solve the problem and students copy as it is. The another question is (Exercise-1.2, Q. No. 4) In how many ways can four red beads, be arrangement in a row?. The activities of teacher and students were same as previous question.

When the teacher was solving the problems most of the students were joining out of matter, so discipline of class were not well must of the students could not keep the norms and value of the classroom. When the teacher found the result of the problem, then he said that you can solve the problem in the same way. The teacher could not give any particular class work. Also, could not motivate to do class work. At that time bell ring and class finished.

Appendix-E

Classroom observations note: II

During the class observation in Mahendndra Higher Secondary School researcher saw that the teacher came in the classroom and he wrote topic “combination” and its definition as “The selection of objects taken some or all of them at a time without regard to the order is known as the combination and it is denoted by C (n,r) and given by C(n,r)= P(n,r)/r! = n!/(n-r)! r!. And wrote some properties relating to combination such as:

1- C(n,0)= C(n,n)=1

2- C(n,r) = C(n,n-r)

3- C(n,r) + C(n,r-1) =C (n+1,r)

4- C(n,0)+ C(n,1)+……+C(n,n) =2^n

At that time one student raised the question. Sir what is the difference between permutation and combination? Then teacher replied both are arrangement but difference is on specified order. In permutation there is specified order but in combination. After then teacher started to solve the problems by using above formula deductively such as: The question is (Exercise-1.3,Q.No.4) A bag contains 8 white balls and 5 blue balls. In how many ways can 5 white balls and 3 blue balls be drawn? The teacher starting to solve the problem and students copy as it is. The another problem is (Exercise-1.3, Q.No.8) A person has got 12 acquaintances of whom 8 are relatives. In how many ways can he invite 7 guest so that 5 of them may be relatives?. The activities of students and teacher were same as previous problem. When, the teacher found the results of the problems. Then he said that you can solve the problem in the same way. At last, teacher said by same way complete the exercise as homework.

After the class researcher asked about class work to the teacher and he replied “*Here is fear of not completition of course, so there is not time for class work and also students are not interested on class work. I will try to give class work from next class.”*

Appendix-F

Classroom observations note: III

On third day class observation in Mahendndra Higher Secondary School researcher saw that: when the teacher came in the classroom and he wrote topic “Rolle’s Theorem with its statement as:

If the function f(x) is continuous in the closed interval [a, b], differentiable in the open interval (a, b) and f(a) = f(b) then there exists at least a point c belongs to (a, b) such that f ´(c) =0.

After that, teacher explained about closed interval, open interval, differentiable function, continuous function and its geometrical interpretation. Then teacher verified Rolle’s Theorem for the function f(x) = (x+1) (x-2) in [1,2] and he said verify the Rolle’s theorem for the function f(x) = (x-1) (x-2)(x-3) in [1,3] as a class work.

When all students were trying to solve the problem at that time teacher was helping to the weak students. At that time one student raised the question about pattern of Rolle’s theorem then teacher replied that the question will ask as “State Rolle’s Theorem. Interpret it geometrically. Also verify it for the function f(x) =…in specified closed interval. At last, teacher gave the homework to the students as Exercise-1.3, Q.No.1 (b), (d), (g) and (h).

Appendix-G

Classroom observations note: IV

On Fourth day class observation in Mahendndra Higher Secondary School researcher saw that: when the teacher came in the classroom and he wrote topic "Skewness" with its definition as "A distribution which is not symmetrical i.e. Mean # Median #Mode is said to have the skewness. It is related to the shape than its size." And some formula about skewness such as:

1 - The first measure of skewness = Mean- Mode = Mean – Median

2- Karl Pearson's coefficient of skewness = (Mean -Mode) / s.d. = 3 (Mean – Median)/ s.d.

3- Bowley's Coefficient of skewness = $(Q_{3+} Q_1.2Q_2) / Q_3-Q_1$

After that teacher started to solve the problems by using formula deductively such as: The question is (Exercise-13.2, Q.No.9) the following distribution gives the weight of 40 persons. Find the pearson's and Bowley's coefficient of skewness

Weight (kg)	40-50	50-60	60-70	70-80	80-90
No. of students	5	10	15	8	2

The teacher starting to solve the problem and students copy as it is. Then teacher said find the Bowley's and pearson's coefficient from the following distribution (as class work)

Wages (Rs)	100	110	120	130	140
No. of persons	2	6	10	8	4

When all students were trying to solve the problem at that time teacher was helping to the weak students. At last, teacher gave the homework to find Bowley's and Pearson's Coefficient from the following distribution:

Height (in cm)	Below7	Below 14	Below 21	Below28
No. of plants	4	12	24	30