

**PROBLEMS FACED BY STUDENTS AND TEACHERS ON LIMITS**

**THESIS**

**BY**

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## LETTER OF CERTIFICATE

This is to certify that Mr. Hari Prasad Pokharel a student of academic year 2069/070 with campus Roll No.438, Thesis No. 1152 Exam Roll No: 281036/2070 and T.U. Registration No: 9-2-559-89-2008 has completed his thesis under my supervision during the period of 2073 Bhadra to 2074Bhadra. The thesis entitled “PROBLEMS FACED BY STUDENTS AND TEACHERS ON LIMITS” has been prepared based on the result of his investigation. I recommend and forward that his thesis be submitted for the evaluations as the partial requirements to awarding the degree of Master of Education.

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**“Problems Faced by Students and Teachers on Limits”**

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.....

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## **ABSTRACT**

The main target of this research was to find out the causes of problems faced by mathematics teachers and students while teaching learning limits at Grade XI of higher secondary school. The research was conducted in six +2 colleges of Arghakhanchi district and Participants were selected by random sampling method. The tools used in data collection procedure are class observation form and face to face interview guidelines was in verbal form. The obtained data was collected on the basis of conceptual understanding of the study and then data was analyzed by weighted mean using three Likert scale. The descriptive survey research design was adopted to conduct the study. Though the nature of the study was quantitative, it is supported by qualitative to achieve the objectives. The previous study of research reports and journals were guide to the study. The researcher categorized the problems into five different parts as: problem related to classroom management, problem related to pre concept of students for learning limits, problem related to teacher training (pre service and in service), problem related to teaching methods and materials and problem related to school management and administration.

The above problems are due to student's weak pre- knowledge about functions, geometry and co-ordinate etc., unique cognitive structure and lack students project works. Teachers do not access modern teaching techniques, materials and evaluation at teaching, due to lack of idea to generate locally available materials.

Overall, limit learning has seemed to be exam oriented rather than practical oriented. It is a new concept; so it is difficult to create interest for the students. This research was successful to identify the problems of limit during teaching/ learning.

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## **LIST OF ABBREVIATIONS**

AAUW	Association of American University for Women
B. A.	Bachelor's in Art
B. Ed.	Bachelor's in Education
M. A.	Master's in Art
M. Ed.	Master's in Education
NESP	National Education System Plan
OALD	Oxford Advanced Learner's Dictionary
TU	Tribhuvan University
USA	United States of America
UNRISD	United Nations Research Institute of Social development
CDC	Curriculum Development Center
MDG	Millennium Development Goal
INGO	International Government Office
DEO	District Education Office
RP	Resource Person



## Chapter I

### INTRODUCTION

#### Background of the study

The term mathematics has been interpreted and explained in various ways. It is the numerical and calculation part of man's life and knowledge. Mathematics is the study of patterns and relationship. It is the science and way of thinking, an art, characterized by order and internal consistency. Mathematics is a language, using carefully defined terms and symbols. It is also defined as the science of abstract form. Mathematics is a branch of knowledge, an organized body of knowledge in which each proposition follows as a logical consequences of provisions such mathematical structure is characterized by undefined terms, assumptions and rules of logic.

Calculus is one of the subjects included in HSEB mathematics curriculum. It was developed in the 17<sup>th</sup> century by Isaac Newton and Gottfried Leibnitz. They was a bitter dispute between the men over who developed calculus first, because of this independent development. We have an unfortunate mix of notation and vocabulary that is used in calculus from Leibnitz we get the  $\frac{dy}{dx}$  and '∫' signs.

The development of an accurate clock in the 17<sup>th</sup> century led to significant role in science and mathematics. Newton and Leibnitz work on the algebraic and geometric work of Rene Descartes, who developed the Cartesian co-ordinate system. There are two main branches of calculus.

The first is differentiation, which helps us to find the rate of change of one quantity compared to another. The second is integration, which is the reverse of differentiation, which gives a rate of change and we need to work backwards to find the original relationship (or equation) between two quantities.

Calculus, historically known as “infinitesimal calculus, is a mathematical discipline focused on limit, functions, derivatives, integrals and infinite series. Ideas leading up to the notations of functions, derivative and integral were developed through the 17<sup>th</sup> century, but the Leibniz publication of Newton’s main treatises took many year, whereas Leibniz published first (nova method use,1684) and the while subject was subsequently marred by a priority dispute between the two inventors of calculus.

### **Ancient Greek period of the Calculus**

Greek mathematician are credited with a significant use of infinitesimals. Demo critusis the first person recorded to consider seriously the division of objects into an infinite number of cross- sections, but his inability to rationalize discrete cross-sections with an ones smooth slope prevented him from accepting the idea. At approximately at the same time, Zeno of Elea discredited infinitesimals by his articulation of the paradoxes which they create.

### **Medieval Development**

The mathematical study of continuity was revived in the fourteenth century by the oxford “Calculators and French collaborators such as Nicole or esome. They proved thee “Merton mean speed theorem”: that a uniformly accelerated body travels the same distance as a body with uniform speed whose speed is half the final velocity of the accelerated body.

### **Pioneers of Modern Calculus**

In the 17<sup>th</sup> century, European mathematicians Isaac Barrow, Pierre de Fermat, Blaise Pascal, John Wallis and others discussed the idea of a derivative. Fermat credited with an indigenous technique for finding the outliers of gravity of various plane and solid figures, which influenced further work in quadrature. James Gregory,

influenced by Fermat's contributions both to tangency and to quadrature, was then able to prove a restricted version of the second fundamental theorem of calculus was given by Isaac Barrow.

The higher education level education was started after the establishment of Tri-Chandra College in 1975 B.S. All educationalist, curriculum experts, psychologists and subject experts accept and argue that ten years school education system is not adequate for the students of present globalization who have to complete globally for the adjustment of the future life. To maintain the standard of education it needs to change to existing educational structure. To fulfill this need the education institutions of the world has changed their school structure and added other two years course in their school system. Consequently, Nepal has changed its school structure to make educational system as much as compatible and comparable with the educational system of the SAARC countries along with international standard. Thus, Nepal had introduced higher education system since 2046 B.S. under the HSEB. Mathematics is an essential part of the school curriculum as well as higher level curriculum. So, it is taught as compulsory and optional subjects at school level. Also mathematics is included as specialization mathematics at higher level for the students. In this way the topics 'limits' is included at intermediate level. At grade XI "Limits and Continuity" has been kept in the course of study and it contains 10 teaching hours. It contains some topics like notation of Limit, fundamental theorem on Limits, use of evaluating Limits involving simple algebraic and trigonometric functions.

### **Statement of the Problem**

In general, it can be seen that Limit teaching is essential part of one's daily life. In this way without knowledge of limit, we can't learn more in every field. Teachers and students are facing many problems during teaching learning Limit. Previous studies

have given some evidences for the existence of the problems such as lack of pre knowledge about function and relation, geometry etc., lack of appropriate teaching methods and materials, lack of students motivation as observed by the teacher, lack of proper knowledge in teaching strategies, lack of discipline, etc. The problems of this study are to find the causes of problems during teaching learning limit. The research questions set for the research study were:

- Why students feel difficult to understand Limit?
- Why teachers feel difficult to make understand about Limit to students?

### **Objectives of the study**

The main objective of this study was to identify problems faced by teachers and students in teaching learning Limits. The main objectives of this study are:

- To analyze the problems faced by teachers and students in teaching-learning Limits.
- To find out the causes of problems faced by teachers and students.

### **Significance of the study**

Mathematics is an essential part of school curriculum so it is taught as compulsory subjects at school level. Mathematics is also included as optional subject at secondary level for the students who want to learn more about mathematics. Although mathematics has been given an important place in the curricula of all levels of school education, most of the students are weak in mathematics. However, it is fact that most of the students dislike mathematics.

The topic limits is new for intermediate level and no one has researched on this topic. So this study is going to identify the problems faced on Limits learning as well as the cause of problem occurring to learner. Problems are caused due to the classroom management, pre knowledge of students, pre service and in-service teacher

training, teaching method and materials, school management and administrations and so on.

It is helpful to:

- the teachers for identifying instructional problems related to Limits.
- identify the reason and probable solution for the problem related to Limits.
- prepare contextual instructional planning for successive academic product.

### **The delimitation of the study**

The limitations of this study are:

- This study is related to the problems faced by teachers and students on teaching learning Limits in Arghakhanchi district.
- This study is concerned with only the teachers and students involving in teaching learning mathematics at intermediate level.
- This study is carried out in six sample colleges in Arghakhanchi district.

### **Definitions of key Terms**

#### **Problems**

The problem of students on Limits learning is difficulty in understanding and solving questions.

**Teaching-Learning:** An activity done inside a classroom for gaining and sharing of knowledge based in a fixed curriculum.

**Students:** In this study student means those who involve in learning higher secondary level school mathematics.

**Teacher:** In this study teacher means teacher who is teaching mathematics at higher secondary level.

**Calculus:** It is refers the content related to limits in this research.

**Trained teachers:** The teachers who have passed master level in mathematics education or have a special training provided by MOE or NECD or authorized institution.

**Untrained teachers:** The teachers who have passed master level in any faculty of mathematics except educational faculty or have not got special training provided by MOE or NECD or authorized institution.

## Chapter II

### REVIEW OF RELATED LITERATURES

Review of related literature is an essential part of the research because related literature helps and guides researcher to meet research objectives. The main purpose of related literature is to find out what works have been done in the area of the research problem under study and what has not be done in the field of the research study being undertaken. The review of related literature is useful to make the concept about the study and clear and also to direct to analyze and interpret the data. The researcher has reviewed some related literature are as follows:

Amatya, (1978) conducted a thesis entitled “A comparative study on the effectiveness of teaching mathematics with and without the use of instructional materials.” He was divided the class into two groups these are control and experimental groups to teach using materials and without using materials and find the conclusion by using Z-test. He concluded that the achievement of students taught by using instructional materials is significantly higher than the achievement of students taught without using instructional materials.

Lamichhane, (2001) conducted his research on the topic “A students of problems faced by the secondary level mathematics teacher in teaching mathematics” with the main objectives to identified the problems being faced by the secondary level mathematics teachers in teaching mathematics and to compare those problems in the rural and urban areas. He finds problems proposed up in the eyes in the teachers and the problems faced by the urban teachers were not significantly different from those of rural teacher.

Pathak, (1986) conducted a thesis “The problems faced by the teacher of Kathmandu district in the implementation of mathematics curriculum for lower

secondary school.” He administrated a set of questionnaires to the lower secondary mathematics teachers who had faced the problems; regarding the problems of mathematics curriculum, teaching methods and evaluation techniques. Then, he concluded that the problems regarding evaluation were the most serious problems to the lower secondary level mathematics teachers.

Dhakal, (2002) conducted a thesis entitled “A study on the attitude of the students towards mathematics education as major subject at 10+2 and PCL level at Kathmandu valley.” The aim of this study was to find students attitude towards the classroom of mathematics education, textbooks, reference books and the contents. He applied chi-square test, t-test to conclude that all the students have negative attitude towards their mathematics classroom their attitude remains positive to the well-organized mathematical classroom and they have positive attitude towards mathematics textbooks and reference books.

Chaulagain, (2005) Conducted a thesis entitled “A study on the problems faced by the secondary Mathematics teacher in teaching geometry”. The aim of this study was to find faced problem while teaching geometry at secondary level. He concluded that the teacher are facing problems due to various background characteristics of students, geometry curriculum and text, evaluation techniques, professional development of teaching schools admistration and so on.

Paudel, (2007) Conducted a thesis “A study on problems faced by teachers in teaching geometry at lower secondary level”. The aim of this study was to find faced problem while teaching geometry at lower secondary level. He concluded that teachers are facing many problems due to lack of training, large number of students, lack of proper teaching materials, lack of math labs, poor evaluation process and time factor and so on.



Thapa, (2005) conducted her thesis entitled “problems faced by teachers in teaching mathematics in primary level” she concluded that most of the problems arise because of large class size, irrelevancy of teacher guide book, in the sense of teacher’s needs, lack of instructional material, inadequacy of teacher training, lack of supervisory help, lack of physical facilities etc. preparedness and level of motivation to learn mathematics are poor on the part of the student.

Shah, (2008) conducted a thesis on the topic “A study on problems faced by students and teachers in teaching learning vector.” He concluded that vector teaching-learning is not satisfactory at Kavreplanchowk district; both the students and teachers have been facing problems during teaching- learning vector. It is also found that the causes of problems: problems related to pre knowledge of students, problems related to learning environment of school, problems related to evaluation techniques, Problems related to mathematical instruction, methods and materials on teaching vector.

Pathak, (2010) conducted on a thesis on the topic “Problems faced by students and teachers on Limit.” She collected data in two schools in Dadheldhura district. She concluded that teacher and student facing problems during teaching learning Limit. It is also found the cause of problems: problems related to learning environment of the sampled school, problems related to pre-concept of students for learning limit, problems related to instructions in the classroom, problems related to teacher and student characteristics, problems related to teaching method, materials and evaluation.

After review this related literature, researcher found that there has not been research in such topic. Therefore, selected topic is seen appropriate for research and above review of literature supports to conducts research.

## Conceptual Framework

The analytical management or design which contains the factors affecting achievement of mathematics and hindrances that faced by teachers and students in class performance of Limits portion. By the help of literature review, expert consultation and peer discussion it had been constructed by the researcher himself to make the study specific, systematic and easy.

Conceptual framework (Fig. 2.1) showing the component of problems in teaching learning on Limits.

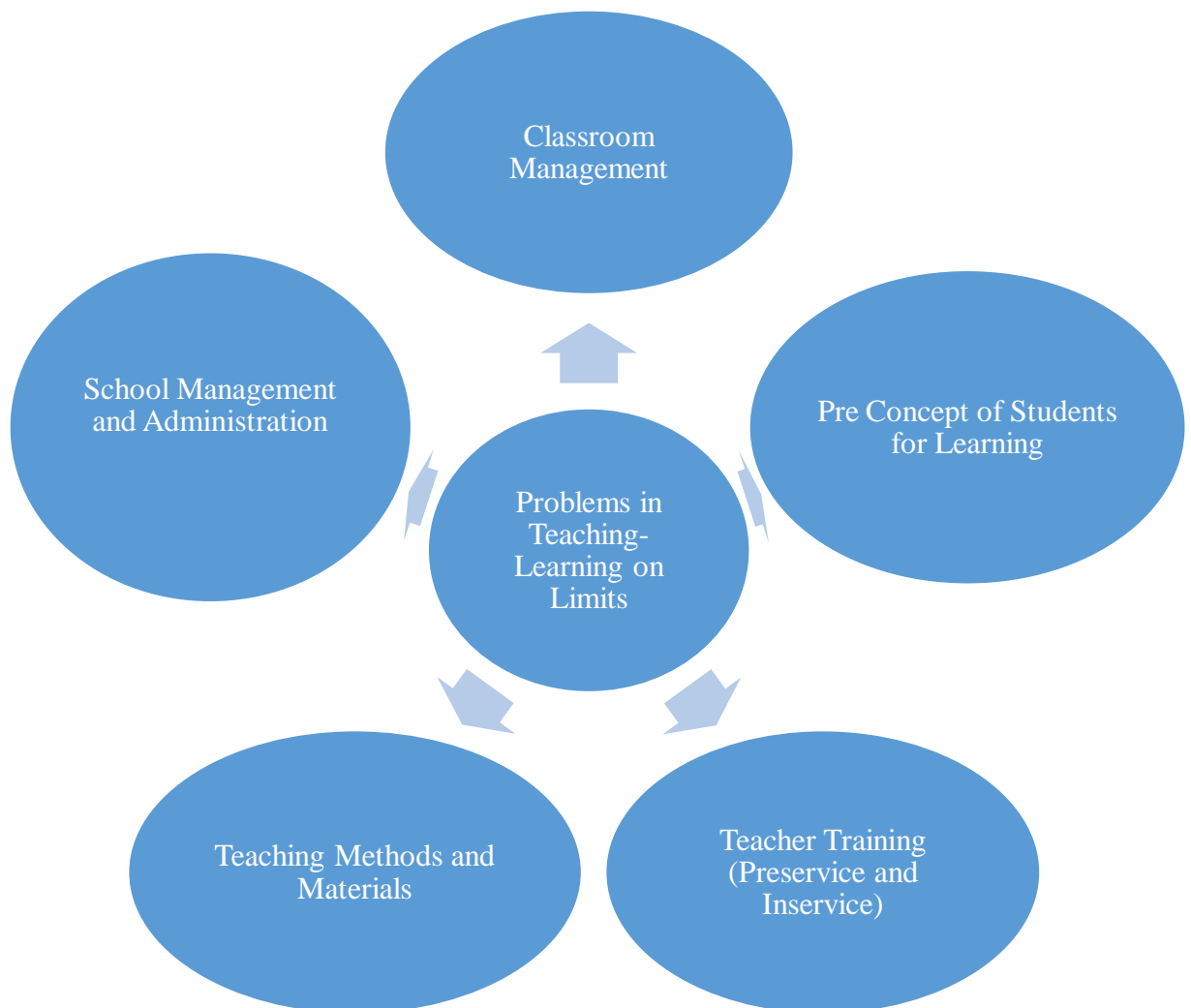


Fig No: 2.1

Source: Paudel (2007), Shah (2008), Pathak (2010)

**Classroom management:** It is related to physical facilities, teaching materials, psychological environment and teaching hour separated for the instruction. Well management classroom empowers the academic exercise being productive in the classroom. So the classroom management is considered as the necessary part of this research work.

**Pre concept:** Learning is directly affected by family environment. Culture, awareness, civilization and the level of the family also effects on the learning of children. These aspects psychologically and behaviorally effect on children's learning so had become the vital aspect to be cared in teaching learning activities. Individual suggestion, gender equities, peer's help and activeness on learning Limits, informal discussion and practice done by them were also taken as background characteristics. Obviously these portions are also the concern of this research.

**Teacher training:** It is related to performance of teacher, use of materials, teaching technique and dealing the problem with short cut and quick ideas. In this study, it is related to teacher training in the classroom teaching were limitation of the administrative support to buy teaching materials, passiveness of the teacher, lack of supervision, Teacher is the central person of instructional activities whose performance ability determines the effective delivery of knowledge and for clear conceptual understanding. So has become the part of framework.

**Methods and materials:** Here it includes the proper selection of things or objects as materials for additional example audio video, local, low cost, no cost, local materials are useful in instruction. In this study, it is related to methods and materials were preparation and confidence of teacher, uses concrete materials. This research work is related on the problem occurred during teaching learning period. Methods and materials determined the quality and productiveness of instruction.

**School management and administrations:** Management of instructional materials, lab, refreshment training and smooth school environment were the responsible factors related to school administration that affected on teaching learning activities.it is the key source in which all above mentioned topics of the framework depend therefore it has become one of vital base of this research work.

## **Chapter III**

### **METHODS AND PROCEDURES**

This section explains the design of the study in detail. It includes in detail description of the manner in which decision has been made about the type of data needed for the study, the tools, devices and methods used in collecting data. The chapter explains design of the study, population of the study, sample of the study, tools for data collection, reliability and validity, data collection procedure and data analysis procedure.

#### **Design of the study**

Research design is the specification of the methods and procedure. It is also a way of the research that provides the direction for the researchers to achieve the goal of the research. Research framework is derived from research design. This study focuses on the problems faced by students and teachers on limits. This is a research based on survey design.

#### **Population of the study**

All the teachers and students of mathematics at 10+2 level in Arghakhanchi district in academic year 2073/2074 were the population of the study.

#### **Sample of the study**

Sample of the study were six schools +2 colleges teachers and students, class observation of two school and study of students and teachers in six +2 colleges in Arghakhanchi district were done for the required objectives. The main purpose of this study is to find out the causes of problems in teaching learning on Limits. For this purpose researcher was consulted with campus chief, mathematics teachers and students.

## **Tools for Data Collection**

The main tools used in field to collect primary data was observation form and interview guideline. The already established class observation form was used to observe the activities of teachers and students in the classroom. Researcher constructed two interview guideline for mathematics teachers to find out the problems faced by teachers, his teaching strategies, use of teaching materials on learning Limits, attitude, belief and interest on calculus and for students to find out the pre knowledge, class work and homework, students relations with teacher, learning environment of classroom. Researcher studied teachers and students profile, student's attendance register and result sheet also. The main tools used in field to collect primary data were observation form and interview guidelines are discuss below:

### **Observation Form**

It is a field work. The main idea behind it is to collect real information by creating good environment. The researcher observed four contact classes with observation tools and took participant and non-participant role when observing classroom interaction. The observation includes main activities of students, way of questioning, area of interest and effectiveness, motivation, self- confidence, school environment, teacher performance and total educational management. The researcher conducted the observation work on the basis on the form. (See Appendix- A)

### **Interview Guideline**

Preparation for the interview is a critical step in the procedure of the data collection. Interviewers must have a clear concept of just what information they need. They must clearly outline the best sequence of questions and simulating comments that were systematically bring out the desired responses. Researcher constructed two interview guidelines for teachers (See Appendix- B) and students (See Appendix- C).

### **Reliability and validity**

The researcher (mathematics teacher at the time of research) consulted with highly experienced and established resource person to prepare the class observation form. He also elaborated modified and specified the peer teaching form used in micro teaching for its reliability.

Previous research, previous result, helping of internet, expert consultation, suggestion of subject guide is taken as base idea for the interview guidelines. Furthermore self-experience related to academic and social environment also were the motivational aspect to prepare the interview guidelines. It was also verified by the cross matching with colleague researchers.

### **Data Collection Procedures**

For the data collection, the researcher visited each of the selected higher secondary school along with the class observation form, interview guidelines and help to needed to the researcher from the school administration. After explaining the purpose of visit, the researcher requested each of the teachers and students of the college to take interview honestly. The researcher further observed four different teaching periods while teacher was teaching Limits and Continuity. There the researcher noted each and every specific activities of teachers and students. For the research work all the information were not available only through observation. To fill the gap teacher responses in interview, informal discussion with students and colleagues teachers who were the respondents. More than that the researcher carried out open ended interview to clear the confusion regarding the study and focus group discussion about their faced problems and their related causes with all mathematics teacher and students of sampled schools.

## **Data Analysis procedure**

The research adopted the descriptive method. Responses of teachers' and class observation were interpreted and analyzed with the help of three point Lickert scale. Statistical tool mean was used to find the mean weightage of both (class observation and teachers' response). Different conclusions have been derived. Responses of informal discussion and guidance of the supervisor were taken as the key source to find the problems related to students background characteristics and valuable bases to address the countered problems successively.

The result of class observation and teacher interview were used to answer the second research question i.e. the responses helped to determine the reliable factors that played vital role to promote difficulty in Limits learning. Scoring procedure for the positive statement was- Strongly Agree (SA) =3, Agree (A) =2 and Disagree (D) =1, for the negative statement was Strongly Agree (SA) = 1, Agree (A) = 2 and Disagree (D) =3. Mean Weightage $>1.8$  was considered to be good for positive and Mean Weightage $<1.8$  was considered to be good for negative statements. The data obtained from observation form and interview guideline was in verbal form. Firstly the observation form interview guidelines and was categorized based on different themes developed on conceptual understanding of the study and then the data was analyzed by weighted mean using three Likert scale. To suggest the probable strategies, observation note, teachers' and guardians' responses and the idea of supervisor had been used.



## **Chapter IV**

### **ANALYSIS AND INTERPRETATION OF DATA**

The data were collected from six higher secondary school in Arghakhanchi district. The collected data were tabulated and analyzed according to the objectives of the study. The tabulated data were statistically analyzed and interpreted by using statistical tool mean weightage. These data were calculated and categorized.

The researcher used class observation form (Appendix-A) to observe the class regularity for four days in each sample schools. Direct observation was done every day in the classroom and the classroom behavior was carefully observed by different outlook of setting. With the help of observation form, interview guideline for teacher and student the interactions with the respondents was categorized according to their category and then different themes were given in the text of interview and the observation note. The themes were considered as a code and similar code version of respondents were collected together and were explained in their prescription.

The whole data categorized into four groups. These are, classroom management, teacher training and its effect in classroom teaching, teaching methods and materials, school management administration. Thus, collected information were analyzed and discussed under the following tips.

- Problem related to classroom management.
- Problems related to pre concept of students for learning Limits.
- Problem related to teacher training (pre- service and in- service).
- Problem related to teaching methods and materials.
- Problem related to school management and administration.

### **Classroom Management:**

The classroom is the major sources of knowledge in formal education system in our country. Both teacher and student depend upon bookish knowledge which is used to exercise in the classroom. Not only mathematics, all teaching/learning process are carried out from indoor environment, this is the characteristics of Nepalese education system.

For the understanding of the problems in classroom, the researcher raised the five questions like There is a mathematics laboratory or mathematics lab in school availability of mathematics lab in school, Board is good and enough space in mathematics classroom, difficulties in completion of course if taught by using teaching materials, School is well equipped with desk and bench in the classroom according to the number of students and boredom feeling in limits teaching. These are the area of problem of classroom management. For the effective of limits teaching the classroom environment should be appropriate and proper maintained as the size of classroom according to number of students, physical facilities etc. Now, tries to elaborate the following problem in detail.

**Table 4.1 Problem Related to Classroom Managements**

SN	Statements	Responses			Mean Weightage
		SA	A	DA	
1	There is a mathematics laboratory or mathematics lab in school	0	2	4	1.3
2	Board is good and enough space in mathematics classroom	1	4	1	2.0
3	Difficulties in completion of limits course if taught using teaching materials	0	1	5	1.2
4	School is well equipped with desk and bench in the classroom according to the number of students	5	1	0	2.8
5	Boredom feeling in limits teaching.	2	4	0	2.3

The above weightage mean shows that there was a problem in using mathematics lab because there was not separate mathematics lab in selected schools. The weighted mean of the use mathematics lab was 1.3 which indicates the weak favor of the statement. Four teachers didn't have an experience about mathematics lab. The better result assumed by the use of mathematics lab in school but not practically yet. So, it is concluded that the teachers were not practical in using teaching materials in classroom teaching.

The second statement was focused on the problem of Board is good and enough space in mathematics classroom. The sampled school was facilitated as the requirement of educational environment. There were facilities which help them to learn more in proper environment. Although students were interested in learning on Limits, problem solving, there must be Board is good and enough space in mathematics classroom that support them learning effectively in college. The weighted mean of Board is good and enough space in mathematics classroom is 2.0 and it indicates strong favor of the problems.

There was other problem related to classroom management, which was a difficulty in completion of limits course by using teaching materials. The mean weightage of this statement was 1.2. In the sample schools, the course was hardly completed at the end of the session. In this regards the teacher responded as:

*Due to different strikes, classes' cannot be regularized. You know frequently Nepal Band schools are disturbed. The students are used by political parties. It is being a problem to complete the working days of academic session. On the other hands, books are not available in time. If there is problem to complete the course in time, how can I use teaching materials in class? (Teacher voice)*

From above view it is concluded that teacher should be careful towards teaching environment. They didn't want to make college as the platform of political parties. The government should also be aware for the provision of books in each and every school in time. Teacher should take consequent teaching materials, different method of teaching which helps the students to be aware of examination as well as understanding the problem related to limits.

The weighted mean of School is well equipped with desk and bench in the classroom according to the number of students was 2.8 which mean the problem was not found in the classroom and it was expert high performance in the examination on Limits of mathematics subjects. In this regard, teacher has no problem to control the classroom. It was easy to promote individual student who needs teachers support. The teacher responded as:

*“Because of small number of students it is easy to handle the class and usual activities in class. The relation between teacher and students is good. The course is smoothly running in silent environment and discussion of questions and answers is well.” (Teacher)*

The above view of teacher's shows that they have to give the feeling that they all are their friends. Moral education is also needed some extent. Teacher should have to create good environment to increase the number of students in higher level.

Similarly, the weighted mean of boredom feeling in limits teaching was 2.3 which were favorable to the problem of boredom feeling in Limits teaching. In this regards the teacher responded as:

*“At any cost students should get pass in the examination otherwise we should have to defense to the administration and the parent. So, we have more tension than*

*students in the case of exam result. The job security depends upon the percentage of the students passed in examination.” (Teacher)*

The above view of teacher suggested that Limits teaching was found difficulties to the teachers in the sense of result oriented system. In some extent the lack of consciousness was playing vital role in the above view of teachers. This was not only problem of the mathematics teachers but also of the school education system.

Administrative co- operation in limits teaching is being crucial aspects for the achievements of the students. As response of teacher, no friendly relation was found in the school. The teaching materials, mathematics lab, and other facilities were not managed by school administrators that caused the problem to the teacher as well as students. If student failed in an examination the administration and parents use to balance the teachers. This was the bitter truth of the college mathematics teacher.

The causes of above problems are economic crisis of administration to add materials for mathematics teaching, lack of moral education, lack of proper teaching/learning environment, lack of physical resources and not available separate place to store materials. Hence there is a lack of classroom management for mathematics teaching due to physical and economics crisis of colleges. The community participation should be encouraged to build up good educational environment in school.

### **Pre -Concept of Students for learning Limits**

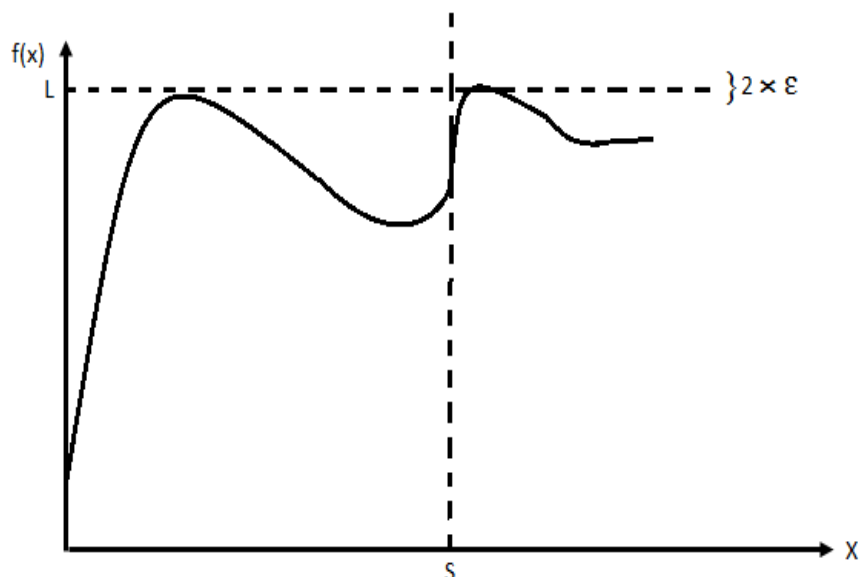
The knowledge and skill of mathematics is the regular ongoing process. In this process, the previous knowledge and skill are source of improving current to be taught by applying the former skill and knowledge. The concept (knowledge and understanding) that helps to learn the new topic is pre knowledge. Students should have good concept of functions and their relations, trigonometry, co-ordinate, graphs

etc. as pre concept for teaching – learning Limits. To observe the pre knowledge of Limit one classroom observation is presented below:

### Presentation 1

*Teacher went to his class taking teaching materials board marker and duster. When the teacher entered in the class then students also came to class. Then teacher opened the textbook wrote the topic “Limit at infinity” on the top of board. Teacher told that we have already learned about limit at a point. Now, we would like to learn about limit at an infinity. They discussed about the limit at infinity with examples. One example given here is*

*“Limits involving infinity*



*if  $f(x)$  is a real function , then the limit of  $f$  as  $x$  is approaches infinitely is  $L$ , denoted,  $\lim_{x \rightarrow \infty} f(X)=L$ , if and only if for all  $\epsilon > 0$  there exists  $\delta > 0$  such that  $|f(X)-L| < \epsilon$  whenever  $X > \delta$ . similarly the limit of  $f$  as  $X$  approaches negative infinity to  $L$  denoted,  $\lim_{x \rightarrow -\infty} f(X)=L$ , if and only if for all  $\epsilon > 0$  there exists  $\delta > 0$  such that  $|f(X)-L| > \epsilon$  whenever  $X < \delta$ .” He asked many questions to students: in this case wrong answers, teachers corrected. Also teacher taught procedure of finding of limit at*

*infinity with examples and asked question to the student by calling particular name among the class. At last teacher gave homework of textbook and went out.”*

From the above observation it seems that teacher didn't talk about previous knowledge which helps to the students to learn meaningfully and teacher is more active than students. Teacher doesn't know about how to teach students although he has sufficient knowledge about related subject. He asked questions, call upon the student for an answer, and then do not give the student enough time to formulate the response.

In this research for the topic of “Limits” functions, relations, trigonometry, coordinate, distance etc. are the main topics for pre knowledge but while observing the class. Neither teacher discussed about pre knowledge nor did students show behavioral that they knew before such concepts. While teacher taught the topic limit, students learned the rule to solve the problems without understanding its meaning. Teacher has faced problems to teach Limit due to poor knowledge of students. About pre – knowledge for teaching- learning limits the response of students are:

*“There was good use of functions and their relation, trigonometry, co-ordinates, graph which we had studied in junior classes so I felt happy.” (Student A)*

*“In my view, the junior classes, teachers did not give us the concept about the subject matter: they only focused on exercises while teaching. So now it has become difficult for us to understand the problems”. (Student B)*

“Do you think that students can put the concept into practice?”

*“Most of the students do not know the simple things which they had read in junior classes so it takes to long time to teach.”(Teacher A)*

*“There is no trend of practical in mathematics teaching-learning activities in Nepal but only exercises. Although mathematics is the practical subject, there is no*

*any practical problem, and no marks for it and also not any project work about mathematics. Students are asked few conceptual problems and more numerical problems. That's why they have less knowledge on related simple subject matter.*

*(Teacher B)*

From the above views, it could be seen that most of the students faced problem on Limits. Due to the poor pre- knowledge and base knowledge of students, teacher also faced problems and the teachers did not give proper concept in junior classes and they only focused on exercise.

It is also concluded that, before teaching limit concept, the teacher should give the simple examples like  $1.0001$  and  $1.00001$  are  $\lim$  of  $1$  etc. and determine the steps that are to be in sequential structure, where teacher should describe each step meaningfully and appropriately, otherwise students cannot learn in meaningful way. Due to the poor knowledge and bases knowledge of students in function in their relation, continuity, coordinates, graph, derivative and integration teacher have faced problem to teach Limits. Although function in their relation, graph, coordinates portion is not difficult in junior classes but most of the students do not read deeply and also do not give concept properly. So, the students have faced problems in this level.

### **Problem Related to Pre- service and in –service Teacher Training**

A short description of teacher training from sampled school for this study is given below:

**Table: 4.2 Training of the Mathematics Teachers**

Training	Number of teacher	Percentage
Trained	4	66.67
Untrained	2	33.33
Total	6	100



As shown in the table 4.2, responses of the 66.67 percent teacher were trained but 33.33 were untrained. Comparatively number of trained teacher is higher than the number of untrained teacher but for the effective teaching/learning all the teachers must be trained. Therefore, the status of untrained teacher in research area is unsatisfactory.

In the sampled schools, out of two untrained teachers, one currently joined teachers who had joined teaching from that session had not taken teacher training and remaining one untrained teacher has been taking ten month training. Especially the experienced teachers who have training were not applying their skill, knowledge gained in training in classroom teaching for developing local materials.

Construction and use of instructional material is the focused skill in teacher training session, its construction and use is one of the major components of the teacher training package conducted by NECD. Pictorial, printed and solid instructional materials are also provided. In the ten months training package teacher guide materials are suggested to be used while covering special lesson /actively.

Application of training skill in real classroom situation is most important aspect of the study. If there is not transfer of the training skills then the investment of time, money and labor will be useless and there would be question mark towards the whole package. Researcher observed the trained mathematics teachers classroom and found as follows.

## **Presentation 2**

*“The teacher entered into the classroom with the daily using and other limited teaching materials which were related to the topics. Teacher left the teaching materials in front of the student’s desk and reviewed the previous lesson. He wrote the topics of that day “Limit at infinity.” He described about limit at infinity wit*

*examples. He just wrote the definition of limit at infinity. Students were asking about how definition can be developed but the teacher replied 'definition is definition you have a recite'. Also teacher taught procedure of finding a limit at infinity with examples and asked the question to the students by calling particular name among the class. At last teacher gave homework of the text book and went out."*

From this observation, it seen that trained/skilled teachers were not also implementing their skill in the real classroom appropriately. In the observed school, there were some paper made materials related to the topics but the teacher did not use. If he used those materials then it would be easier to make students clear about limit at infinity. The place of placing presentation and summarization skill of instructional materials gained in training session were not also found to be transferred in the real classrooms.

Supervision is essential part of classroom teaching that also aware and gives feedback to teachers for transfer of training in classroom teaching. Head teacher, resource person and school supervisor are especially responsible for supervising the class. All the teachers were found to have in favor of supervision of the classroom teaching, however their supervision was limited to know whether the teacher were in classroom or not and course would be completed in time or not. It was found that the school supervisors used to come in their schools for sometimes and talked with head teacher and teacher but they did not observe the classes' regularity.

According to teachers, they never receive fruitful feedbacks from the resource person and supervisor. Moreover, they stated that provided feedbacks they would try to make their teaching effective through the teacher training.

The causes becoming the above problems are teacher's carelessness, work load, small class size, lack of encouragement, lack of supervision. The main reason

was seemed as teacher's carelessness. Most of the teachers were not consciousness and responsible about educational training. If there is regular supervision, reward/punishment system and providing refreshing training for trained teachers then the transfer of teaching training would be fruitful.

### **Problem Related to Teaching Methods and Materials**

Teaching methods and instructional strategies are the main ways for meaningful teaching and learning of particular topics. Teacher is the main agent of the instructional strategies. In the classroom activities teacher and student has vital role for the use of materials. The method of teaching should be based on knowledge, understanding, skill, and application.

For the understanding of the problems in teaching methods and materials, the researcher raised 9 questions. The researcher tried to elaborate the following problems in detail related to limit instruction method and materials.

**Table: 4.3 Problem Related to Mathematical Instruction, Method and Materials**

S.N.	Statements	Weighted Mean	Remarks
1	Teaching machine and computer are available in limit classroom	1.6	weak Favor
2	I don't make plans (yearly as well as unit) because I don't know how to do it	2.2	Strong favor
3	There is a lack of proper space to demonstrate instructional materials	2.0	Strong favor

4	Library facility is available	2.2	Strong favor
5	The room is equipped with a graph and bulletin board	1.5	Weak favor
6	I make daily lesson plans	1.4	weak favor
7	Some of the portion of limits are difficult to teach	1.8	Strong favor
8	Refreshment training is given regularly	1.6	Weak favor
9	I make and frequent use of instructional materials (other than text book and guide ) to motive my students and make limits more meaningful	1.6	Weak favor

On the 1<sup>st</sup> statement lack of teaching machine and computer are available in limit classroom created problems to the teachers. Their Weighted Mean score is 1.6.

In answer to 2<sup>nd</sup> statement, 2 teachers out of 6 answered that they are not used to making yearly and unit plans because they are not cognizant about how to do it. But 4 teachers out of 6 claimed that they do prepare yearly and unit plans before the commencement of the academic year. The weighted mean of magnitude 2.2 indicates that preparing plans (yearly and unit) do not post a great problem.

About the 3<sup>rd</sup> statement there is a lack of proper space to demonstrate instructional materials created problems to teachers. The weighted mean of the order of 2.0.

On the 4<sup>th</sup> statement about the laboratory facility, 70 percent of the teachers stated that the provision of library facility was not satisfactory at all whereas, only 15

percent opined that the facility is agreeable in their respective schools. A response position corresponding to 2.2 in the rating scale, indeed, indicated that the library facility is not an adequate at all.

About the 5<sup>th</sup> statement most of the teachers (60%) disagreed. The weighted mean of 1.4 also indicates the unavailability of graph board and bulletin board is a real problem.

About the 6<sup>th</sup> statement, about the lesson plan, 70 percent of the respondents said that they do not make daily lessons plans and 26.66 percent of the teachers claimed that they make daily lesson plan. The weighted mean 1.4 indicates that it is a problem. The teachers who do not make daily lesson plans gave the following reasons: heavy teaching load to spare to make daily lesson plan and it is cumbersome and it is not practical.

About the 7<sup>th</sup> statement, 53.3 percent of respondents agreed that the topics of limit is new one for all students and some sub topics is difficult to understand. Only 26.66 percent respondents disagreed and the weighted mean 1.8 indicates that it is significant problem. Further most of the teachers expressed that they found difficulty to teach for some sub units like: To give clear concept about the indeterminate forms, to give clear idea about trigonometric function, Figures are inadequate.

About 8th Statement, The weighted mean 1.6 indicates that there is problem so far as the training of teacher is concerned, further the following state of affairs are uncovered by reasons from the trained teachers: they felt confident on their ability to teach after the training, the training was very useful and relevant, the training program improved their teaching performance and the need further refresher short time training.

About 9<sup>th</sup> statement, the weighted mean 1.6 indicates that there is a problem in the use of instructional materials. The teacher gave following reasons for not using materials such as: do not get encouragement and suggestion to make and use of instructional materials, the materials are not available and found required is not easy to get and instruction by using materials consumes a lot of time and oral course should not be finished in time.

Most of the teachers who were found to be not using instructional materials even claimed that they were using materials. The reality was found by observing their classes. Some presentation of their observed class are follows:

### **Presentation 3**

*One day the teacher entered in the classroom with daily using materials and chart of the indeterminate form. All students stood up and said good morning sir the teacher said good morning and sit down please. He wrote a topic of limit in the writing board and wrote some formulae related to the topic and told student to copy it. After finishing that he explained some rules of limit, said students to copy it. After finishing that he explained about indeterminate form  $0/0$ ,  $\infty/\infty$ ,  $\infty - \infty$  and said that you remember that these form can't be used in the limit, if such case happened in the problem we factorize the given problem. After that he started to solve the problem in the exercise and wrote problem on the board.*

*A student asked about the meaning of  $x$  tends to 1, but the teacher told that it like equal sign. Again he asked can we write  $x=1$  in place of tends to? The teacher said it is like equal to but not exactly. And is near  $\text{Lim } 3n^2-2n+1$  then he solved it by using  $n=1$ . At the time a student stood up and to 1. Now in this problem you can put  $x=1$  then you get the result 2.*

*Again teacher wrote the another problem in the board*

$$\lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4} \quad \left(\frac{0}{0} \text{ Form}\right)$$

Teacher solved this problem by using  $x=4$  then result come  $\frac{0}{0}$  form. At that time a student asked sir,  $\frac{0}{0} = 0$ ? Teacher told him thank you, it is important question, we already discussed about some intermediate form  $\frac{0}{0}$ ,  $\frac{\infty}{\infty}$  and  $\infty - \infty$ . Thus we factorize  $x^2 - 16 = (x-4)(x+4)$  then by cancellation law we get a result 8 by putting  $x=4$ .

After five minute he wrote another problem and told to solve it. But only 15% students could. At that time bell rang and he said to them solve to another remaining problem at your home.

From the above episode, it was found that there is a lack of using teaching materials. He just wrote some formula and rule of limit without definition and example of limit. Teacher, himself had not clear concept about the limit. Students were confused about this sign and some intermediate form  $\frac{0}{0}$ ,  $\frac{\infty}{\infty}$  and  $\infty - \infty$ . Only theoretically, he expresses his class.

In this regard, teacher responds as:

*“We have only 7 students in the mathematics class, they want with me to solve the important and easy questions, we should pass only easy question and important question then teacher asked researcher (what I do?)”* Teacher

The above view indicates that, there are not any mathematical teaching materials not by using any technology. It seen that there is a lack of mathematical materials, lack of student interest and lack of student awareness. Due to the economic crisis of the college, low participation of students in mathematics, administration get problem to purchases mathematical materials and lab. In addition, there is a lack of

references books and text books. In this case teacher and students only depends on guide.

In the modern sense, teacher should have good presentation in the classroom that are: Planning the presentation in the view of two way communication between facilitator and learner, Planning of facilitating each and every topic in the hierarchy of knowledge, of knowledge, understanding, skill and higher ability application based objectives ,Awareness of not overlapping the fundamental concepts of complexity and Providing maximum opportunity to learner in developing knowledge, understanding, skill and higher ability of problem solving by themselves.

The above analysis shows that the problems on mathematics teaching learning are lack of teaching materials such as teachers guide, books and instructional materials, lack of learning management in classroom, lack of explanation of not giving feedback and suggestion to improve mathematics learning.

The cause of becoming above problems are not well participatory approach of both students and teacher in teaching classroom, lack of preparation and confidence of teacher, lack of diagnostic test and oral test, lack of uses of concrete materials, lack of friendly relation with teacher and student, lack of teaching/learning management, lack of appropriate teaching method but teacher mostly used lecture method.

### **Problems Related to school Management and Administration**

School management and administration plays a vital role to construct necessary instructional materials. But if it seems to be passive and irresponsible then may face problems mainly on teaching-learning process.

For the understanding of the problems related to school management and administration, the researcher raised four questions. These four questions on their weighted mean are tabulated as below:



**Table 4.4 Problems Related to school Management and Administration**

S.N	Statement	Weighted Mean	Remarks
1	Compulsion to take more classes because of low number of mathematics teacher	2.6	Weak Favor
2	Irresponsible administration to manage and construct necessary teaching materials	2.2	Strong Favor
3	Refreshment training is given regularly	1.6	Weak Favor
4	Lack of facilities and reward for the good performance	2.0	Strong Favor

Obtaining the above table from the research it had been found that the weighted mean of 1<sup>st</sup> statement is 2.6. That means they have no class load because of low number mathematics teachers. The weighted mean of 2.2 of 2<sup>nd</sup> statement specify that there is a problem. It means school administration is responsible to manage and construct necessary teaching materials. The mean weightage 1.6 of the 3<sup>rd</sup> statement shows that there is a problem on refreshment training to the mathematics teachers. Teachers need refreshment training time to time for difficult and rigor topics to foster a good education. However, during the research it had been found that most of the teachers were not getting such types of training.

To attract teachers toward teaching, they need good facilities and rewards for good performance according to their subject. But they were not getting such facilities as they respond. The Weighted Mean on the statement 4<sup>th</sup> is 2.0. It means this statement is favorable on the problem. About school Management and Administration the response of teachers are:

*“I have just completed my master’s degree, I have to collect experience, I will return back in my own hometown it is only my training center because I cannot do any progress by Rs.18000 per month”. Teacher*

*“I am taking IELTS class. Teaching in this institution is only for my temporary economic support and use of leisure time”. Teacher*

From the above views of teachers one can conclude that teachers are not devoted in quality teaching due to various reasons, one of the main reasons behind this is very less salary and uncertainty of job security. Imagine what the above teachers give to the students! Therefore most strong reason for the poor quality delivery is the lack of proper behavior of administration towards teachers, in some extent nation’s policy and condition also has played role for the above problem.

From above analysis of school administration it had found that there are many problem related to school administration that hinders teacher’s attraction on teaching and then directly affects the student’s achievement on mathematics. So school administration should be good and responsible to address teacher’s problems etc.

## **Conclusion**

The major factors creating problem in teaching and learning Limits were materials, methods, level of students and administration. Above mentioned techniques can be contextual, behavioral and applicable in almost all of the schools of our country and therefore even in Arghakhanchi district.

## CHAPTER –V

### SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

The purpose of the study was to identify the levels and extents of problems faced by students and teachers in teaching- learning of limit at grade XI. The specific objectives of the study were to:

- To analyze the problems faced by teachers and students in teaching-learning Limits.
- To find out the causes of problems faced by teachers and students.

For the convenience of this study, the problems were categorized into five different areas, viz. classroom management, pre concept of students for learning, pre service and in-service teacher training program, teaching method and materials, school management and administrations.

This study was entirely survey type. The researcher himself developed the questionnaire under the guidance of supervisor. The questionnaire and classroom observation were main tool of the study. The responses were collected from different teachers selected from purposive sampling method. Open questionnaire were included in each category on problems, and descriptive analysis of collected responses were carried out. Statistical indicator, weighted mean was used for the analysis of the problems. For this purpose researcher selected six colleges of Arghakhanchi district. He has observed the classes four days in each campuses. The tools used in data collection procedure are class observation, face to face interview and recorded history of campuses. The responses were collected from teachers and students. Some of the collected data (from class observation and interview) were quantified on the basis of

Three Point Likert Scale and analyzed on the basis of mean score. Class observation and responses of teachers were analyzed on the basis of different themes determined earlier in the conceptual understanding.

**Major findings:**

On the basis of data analysis and interpretation of the result, the summaries of major findings are as follows.

**Problem related to classroom management**

- Economic crisis of administration to add materials for teaching.
- Lack of moral education and proper teaching learning environment.
- Lack of physical resources and not available separate place to store materials.

**Problems related to pre concept of students for learning**

- Students do not have necessary pre-concept related to limit like: functions, co-ordinate geometry, geometry, trigonometry, equations and graph and so on. So, most of the students leave the limit questions in examination some students have faced problem in geometry figures. Hence they study just exam oriented point of view. The main causes are lack of practice for learned topics and lack of understanding basic concept.

**Problem related to teacher training (Pre service and in service)**

- Refreshment and new comers teacher training related to content by experts were not managed at most of the schools. Trainings were held in some of the schools but no trainings were there on the content basis of any subject.
- Most of the teachers were not consciousness and responsible about education training and Lack of meaningful training for mathematics teacher etc.

### **Problem related to teaching methods and materials**

- Teachers are not using mathematics teaching manuals, extra reference books besides the text book prescribes depend upon HSEB curriculum for effecting teaching.
- There are not sufficient mathematical teaching materials and teaching aids and teachers were not using available instructional materials, there is a lack of protection for available materials for future uses.

### **Problems Related to School management and Administration**

- Refreshment and new comers teacher training related to content by experts were not managed at most of the schools.
- Salary also could be the cause of less energy while making teaching plan. (it was noticed by researcher in informal discussion with some math teachers)
- Leisure periods of teacher also were pack with proxy classes in most of the schools because number of teachers was very limited.
- The instability of teachers also was noticed as one of the strong cause for the poor result of mathematics.

The causes of becoming problems are not well participatory approach of both students and teachers in limit teaching at classroom. Teachers evaluated the students by giving class work and homework but he didn't check them regularity, do not provide appropriate feedback and suggestions to improve teaching learning limits.

### **Conclusions**

From the above stated findings of the study, it can be concluded that the future plan and successful of college is linkage with the result. Most of the teacher showed lack of moral education, economic crisis of administration, lack of supervision, lack of proper teaching environment, lack of student's awareness towards the mathematics

class, lack of appropriate teaching plans, and materials, lack of student participation and poor background of the students, trained and skillful teachers were not implanting their knowledge. There was a lack of mathematics program like as seminar, conference, lab etc. mathematics teaching learning is not satisfactory in Arghakhanchi district. Among the five different categories described above it is found that there are numerous problems faced by teacher and students due to classroom management, pre concept of students, sufficient training program, teaching methods and materials and school management and administration.

### **Recommendations**

For the probable remedial measures the researcher asked to the selected guardians of the schools. The researcher also talked with the teachers, principals and took the suggestion of supervisor for the correct and behavioral solution of the above problems. The researcher had also read the previous research documents which included practical effort and suggested to apply various techniques to achieve the goal despite the problems stated above. The following are the recommendations presented in the basis of above aspects:

### **Recommendations to address the problems**

On the basis of above findings and conclusions. The following recommendations are presented:

- Government of Nepal should supply the essential teaching materials and should encourage the school administration to purchases such teaching materials.
- Mathematics teachers should search the suitable methodology which motivate and arises the interest in mathematics of the students.

- Frequent short time training facilities should be provided to upgrade the teachers.
- Mathematics teacher should become resource person for the students. It means they have competent in mathematics and should be good performers.
- Use of lesson plans should be encouraged.
- A district level orientation program should be conducted for mathematics teacher to make them familiar with the new curriculum and its other aspects.
- School should provide the information about the achievement of students to their parents and should create the environment for coordination with teachers, parents and students.
- School administration should not be weak.

#### **Recommendation for the further uses**

The researcher makes the following recommendations for the further study:

- A study on problems faced by teachers and students on various topics of Basic Mathematics at grade XI.
- Comparative study of problem faced by teacher and students on teaching learning limits in private and public higher secondary schools.
- Similar research can be carried out with large sample and various school of different parts of Nepal.
- The study should be extended to the higher level such as: Bachelor, Master relating on the same aspect.
- Similar studies should be expanded in other topics.

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