Geometry in Teaching and Learning at School Level: A Mixed Method Study

A

Thesis

By

Ramesh Kohar

For the Partial Fulfillment of the Requirements for the Degree of

Master in Education

Submitted

To

Department of Mathematics Education

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Tribhuvan University

Kathmandu

Nepal

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Letter of Certificate

This is to certify Mr. **Ramesh Kohar**, a student of the academic year **2018/2019** AD with thesis number **1631**, Exam Roll No. **7428304**, Campus Roll No. **411,** and T. U. Regd. No. **9-2-306-90-2014** has completed his thesis under my supervision during the prescribed by the rules and regulations of T. U. Nepal. The thesis entitled **"Geometry in teaching and learning at school level: A mixed method study"** embodies the result of his investigation conducted from **2020 to 2021** at the Department of Mathematics Education, University Campus, Tribhuvan University, Kirtipur, Kathmandu. I recommend and forward that his thesis is submitted for evaluation to award the Degree of Master of Education.

..........……………................

Prof. Dr. Bed Raj Acharya

(Head)

Date: 3 Dec. 2021

Letter of Approval

Submitted

By

Ramesh Kohar

Entitled

"Geometry in teaching and learning at school level: A mixed method study" has
been approved in partial fulfillment of the requirements of the Degree
of Master of Education.

Viva-Voce CommitteeSignature

Prof. Dr. Bed Raj Acharya   ………………………
(Chairman)

Prof. Dr. RamjeePandit   ...……………………
(External)

Mr. Krishna Prashad Bhatt   ………………………
(Supervisor)

 Date: 21 Dec. 2021

Recommendation for Acceptance

This is to certify that Mr. **Ramesh Kohar** has completed his M. Ed. thesis entitled "**Geometry in teaching and learning at school level: A mixed method study"** under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize the final viva-voce.

........................……………

Mr. Krishna Prashad Bhatt

(Supervisor)

Date: 21 Dec. 2021

Dedication

This thesis is dedicated to my father Mr. BaburamKohar ,my mother Mrs. AlenaKohar and all my family and friends Whose love, support, and encouragement ha enriched my soul and inspired me to Purpose and completed this research.

Declaration

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

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Date: 21 Dec. 2021   …………………

Ramesh Kohar

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Date: 21 Dec. 2021   …………………
                                                                    Ramesh Kohar

Abstract

This is a qualitative and quantitative study based on survey design entitled "Geometry in teaching and learning at school level: A mixed method study" in Rupandehi Districtfor this study, the researcher divided Rupandehi district intwo areas on the basis of development status. i.e. urban and rural area . Five schools were selected from both areas . Among them four public school were selected from rural area and one public school from urban area. From each school, forty students of grade ix were selected through the random sampling method. Onemathematics teacher was also taken from each five school. Furthermore, the researcher had prepared questionnaire, class observation form, Test paper and interview schedule. For the theoretic supports Van Hieles five level of geometrical through also taken, Afterthe researcher made an interview with concerning the students and subject teacher. The collected data were tabulated, interpreted and analyzed with simple percentage, mean score. The finding of this study are as follows.

Teaching learning geometry in secondary level is affected by so many factors such as lack of encouragement for study, congested and uncomfortable classroom for students, unavailability of teaching learning materials, lack of trained teachers are problems for students. Also lack of physical facilities and in-properly arrangement, lack of good administration and negligence of students in learning geometry etc.are the main problems of students. By proving the above requirements, the problem faced by students may decrease in school to provide good opportunities for students in secondary level.

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Chapter I

Introduction

This chapter presents the background of the study, statement of the problem, objectives of the study, justification of the study, delimitation of the study and definition of the related terminology.

Background of the Study

The place of Mathematics in the life of any nation cannot be over emphasized because it is linked with the place of development in that nation. Science, Technology and Mathematics Education have been widely acclaimed to be the index of measuring any nation's social-economic and geo-political development .Among science and technology courses ,according to the National policy on Education "Mathematics is one of the cone subject to be offered by all subject till the tertiary levels of education .Mathematics is made science .Ancient men also felt their concern with this branch of knowledge .They were of course, motivated in their attempts by their social needs. Civilization flourished such as the Babylonians, Greeks, Hindu, Romans, Chinese, Japanese and the Arabians etc. They have contributed a lot of in discoveries in field of Mathematics has led to the development of various subjects vocations and technology .It is science which is skill playing an implement role in carious field of life .We must related the Mathematics to history, logic, science, Arts, Music and literature as well as to any other development.

The Mathematics may be defined in number of ways. It is the numerical and calculation parts of man's life and knowledge. Mathematics is the mother of science because it helps the every part of science such as psychical; chemistry .It has also been defined as the science of number and science as calculation. It is related to measurement of calculation, discovering relationship and dealing with the problem of space. It is a system which organized and exact branch of science. Mathematics is the science that deals with the logic of shape, quantity, and arrangement. Math is all around as in everywhere which we do, It is the building block for everything in our daily lives, including mobile device architecture art, money, engineering and event sports. According to John Locke " Mathematics is away to settle in mind a habit of reasoning" According to Oxford Advanced Learner's Dictionary " Mathematics is the

science of numberand spaces" Branches of Mathematics include Arthematics, Algebra, Geometry and Trigonometry etc. Mathematics is the deductive study of number, geometry and various abstract constructs of structures.

The following views are the different mathematicians in defining the definition of mathematics.

"Mathematics is the science, which draw necessary conclusions." (Pierce)
"Mathematics is the gate and key of all science." (Roger Bacon)
"Mathematics a free invention of the human intellect." (Einstein)
"Mathematics is the classification and study of all possible patterns." (Sawyer)
"Mathematics is the science which drawn necessary conclusions." (Klein)

Mathematics is a study of pattern. It is through mathematics description that regularities and similarities in nature can often be clarified. Mathematics is the language of science and as such user carefully defined terms and symbolic representation that enhance our ability to communicate, Mathematics in each proposition follows as logical consequence of proved proposition of assumption and mathematical structure characterized by undefined term assumption and rules of logic.

The words Geometry is derived from the Greek two words Geo and metro where Geo means "earth" and metro means "measurement" that means Geometry is earth measurement. The great mathematician Euclid is the father of Geometry .Geometry is one Euclid of the oldest branches of mathematics. It is concerned with properties of figure and space that are related with the distance, shape, size, angle, point, line, plane, surface and curve etc. Euclidean geometry, Algebraic geometry, Computational geometry and convex geometry etc are the branches of Geometry

Until the 19th century, geometry was almost exclusively devoted to Euclideangeometry, which includes the nations of point, line, plane, distance, angle, surface and curve. Later in the 19th century, It appeared the geometries without the parallel postulate (non-Euclidean) can be development without introducing any contradiction. The geometry that underlies general relativity is a famous application of non -geometry. Geometry includes an enormous range of ideals and can be viewed

in many different ways .It has been inter locked with many other subjects and ideas of mathematical system originated in geometry.

Kelly and L add (1986) write, "It is not certain who first had idea of trying to prove a mathematical rule by reasoning rather that by testing it in different way"

About the development of geometry Butter and wren say "primitive people obtained their first knowledge of geometry from natural objects and later on from arts as well the needs that arose to understand and came to further the legacy of arts, architecture, surveying, measurement etc. Provides the simulators the development of science of geometry" (Butter and Wren, 1970)

"Let no one ignorant of geometry enter my door." (Say, Plato)

Geometry was extremely important to ancient societies and was used for surveying, astronomy navigation and building. Geometry helps us in deciding what materials to use, what design to make and also plays a vital role in the construction process itself. Different houses and buildings are built in different geometric shapes to give a new look as well as to provide proper ventilation inside the house. Geometrical tools like the protractor, ruler, measuring tape, and much more are used in construction work, astronomy, for measurements, drawing etc. Different art forms are made by joining different geometric shapes together. Engineers, architects and builders use geometry to calculate area and volume before they start making plans for different structures. School mathematics curriculum of Nepal have given emphasis on geometry learning from the beginning of schooling .The curriculum have aimed to develop students understanding of intended geometric concept at primary lower secondaryand school level. Similarly geometry is one of the content standards of school mathematics which aims at developing special reasoning problem solving skill and communication.

A vision for school geometry (2005) writes "reasoning is fundamental to mathematical activities" Active learners questions examine conjecture and experiment. Mathematics program should provide opportunities for learners to develop and employ their reasoning skill. Learners need varied experience to constructs a problem setting and to evaluate the argument of other (A vision for

school geometry, 2005; sited in Puri 2016). Thus geometry is regarded as cone content area of school mathematics programme. It is the important integral part of school mathematics curriculum showing the importance of geometry .Vance (1973) writes it is way of modeling our physical environment because there is a great abundanceof models suitable for all developing intuition. From Kindergarten through school geometry is a natural vehicle for developing intuition creativity and a spirit of inquiry. Furthermore, geometry is a fertile source for interesting and challenging problems and geometrical methods are powerful tool in problem solving.

Even through mathematics being very important subject, through the result of previous school learning certificate examination .It should majority of the students failed in mathematics under performance of the student may be the cause of learning problem .Thus mathematics teaching learning situation of Nepal seems to be very poor. Poor learning in mathematics has become a strong for candidate of school learning certificate. Problem of student and teacher in geometry teaching learning due to educational system and political condition, complex content and structure of construction and theoretical poor were the main reason to nerves students. (Puri, 2016)

Problemrelating to geometry learning might have affected the achievement in teaching of mathematics .This is the great challenge to the mathematics teacher .Some problem of learning geometry in students might directly be related to the teacher's academic background, classroom , practices, school management ,leadership and other such situation might affect the efficiency and potentiality of student performance.(Bhatta,2016). Teachers are the important agent for the successful implementation of mathematics curriculum. Only by hard work of the teacher the mathematics curriculum can be successfully implemented. Successful teacher is he who can influence upon the attitude of student to mathematics learning.

There are many various researches about the teacher and student problem in geometry .Many government and non-government official research indicate the investment of huge of time and money to find the problem of teacher and students in geometry. But they cannot found the result of satisfactory. Hence no successful solution can be found to address the teacher and student. So many problems that are occurring frequently.

That is why the researcher decided to make a systematic study on the topic "**Geometry in teaching and learning at school level: A mixed method study**"

From the above study, it is usually seen that those student and teacher whose are the users of mathematics curriculum are facing with the following problems to deal other sources of problem in the implementation of mathematics curriculum were:

) Teaching learning activities
) Physical facilities
) Classroom management
) Unavailability of instructional materials
) Lack of knowledge how to use materials in teaching
) Prior knowledge of the student
) Background of the students
) Economic factor
) Innovative teacher and personality
) Emotional and Social factor
) Intellectual ability of the students
) School administration
) Content
) Evaluation system

Different educational report have given emphasis in method of teaching Nepal National Education Planning Commission (NNEPC1954), All Round National Education Commission (ARNEC1961), National Education System Plan (NESP1971), Primary of Royal Higher Education Commission (NEHC1998) has been important to method of teaching for educational improvement innovative technique and advance teaching equipment with perfect training should be involved for every subject as it is clearly mentaional in NESP. (Puri, 2016)About the modern mathematics classroom, Bhatia and Bhatia (1987) said that the teacher tools have long consisted of chalk, blackboard, and pencil and text book. However today is to use demonstration models of various shape and size, drawing, instrument, graph stencils, measuring instruments, many pictures pamphlets, books and mathematical magazing, Films, slides, manipulate are being used in teaching mathematics in the modern

classroom. But the learning in Nepalese school is totally based on text book, It is more difficult for those students who have other language speaking background than Nepali on the other hand the teachers the text bookas an ultimatemeans of teaching that do not provide the opportunity of relating their learning with local context because of financial problem. Nepalese school could not provide money to spend in materials and equipment .Some schools do not have enough classroom. A large number of students are packed in a small classroom. Thus the crowed classroom is one of the major problems of implementing interactive teaching and learning situation. Classroomis not well lighted and well ventilated .Physical facility such as teaching materials, mathematics lab; Computer and Collection of low cost and cost materials that are essential for teaching and learning activities are not organized properly by concerned agencies.

Statement of the Problem

In Nepal, the school education system has introduced mathematics as Compulsory subject upon grade x and optional subject in grade xi/xii . It shows that mathematics has been placed as an important subject in school education .It provides platform for the development of entire mathematics education as well as foundation for higher study of science and technology.The new curriculum of mathematics (Geometry) in secondary level has been implemented in Nepal since2076 B.C. and the student seen average have become under the achievement. So it is well appropriate to discuss about the teaching and learning problem facing by student and teacher to improve the condition of teaching and learning geometry.

This study should focuses to answer the following research questions:

1. What are the current problems faced by the secondary mathematics student in learning geometry?
2. Do the problem faced by the mathematics students in rural area different from urban area school?

Objective of the Study

The main objective of this study as following:

1. To identify the factors that affect in teaching and learning of geometry in secondary level.
2. To explore the problem faced by rural and urban mathematics students in learning geometry in secondary level.

Justification of the Study

Mathematics is an essential part of school curriculum of Nepal. It has been taught as Compulsory subject at all level of school education program. Also mathematics is included as optional subject at secondary level education .Although mathematics has been gives an important place in the curriculum of all levels of school education. Most of the student are weak in mathematics and hence it is felt most of the students dislike mathematics and afraid of it. The result of S.L.C.and SEE examination shows that the most of the failures were in mathematics subject. There may be many factors that hinder students progress in this subject .Most of the teacher and students take geometry as difficulty and abstract subject .Most of the teachers give low priority to geometry learning from the lower classes .Asa result ,most to the students lose their interest in learning geometry and they have poor motivationin geometry classes . Many student have a wrongimpression about the need of geometry and seem to fear and even hate geometry many student have poor intellectual ability so that they are like difficulty in geometry.

There are various reason behind this researchwork as lack of Physicalfacilities which are essential for teaching learning activities unavailability of experienced and trained mathematics teacher in various school, unavailability of textbook in time ,print mistakes in textbook , lack of instructional materials , unavailability of teacher 's guide ,heterogeneity of students, Readiness ofthe student, and lack of knowledge about the proper class management.

In this research teaching learning problem being faced by the mathematics student are the main focused of the study. Therefore this study would provide some logical valuable information about the current problem of mathematics.

The justification of this study as follows:

) This study would identify to actual problem of teaching learning in geometry in secondary level.

) This study would certainly improve the mathematics problem by means and ways that are being faced by students.

) This study helps in designing a revised mathematics curriculum at secondary level.

) This study helps for the successful implementation of the mathematics curriculum.

) This study helps to create sound environment to parent as well as concern administration.

) This study would set up the implementation of mathematics curriculum in the present context and may be ground for the further research in this issue.

) The most significance aspect of this study was to be sure whether the mathematics   student faced only academic problem or other problem also.

Delimitation of the Study

This study has been delimited to the following facts:

) This study was concerned with the problem faced by the teacher and student of grade ix in teaching learning geometry.

) Forty students from one school ration was adopted in the study

) Only 200 students from 5 sampled schools were selected in this study.

) This study was carried out only in the urban and rural public school of RupandehiDistrict.

) The data of this study were generated through the questionnaire, observation form , interview schedule and Test

Definition of Related Terms

Curriculum. Mathematics curriculum which had been implemented at present at grade ix.

Geometry. The science that treats of the shape and size of things the science of properties andrelated of lines and solids.

Problem. Learning difficulties faced by teacher and student while teaching and learning geometry.

Rural school. The school which lies in remote area.

School. The public place where student learners that various skill and the teacher teach.

Student. The student who are studying at grade ix.

Teacher. Teacher who are teaching mathematics at grade ix.

Urban school.The school which lies inside the region of city center and 3 mile boundary of it.

Chapter II

Review of Related Literature

The researcher tried to find out the literature on the topic that related to problem of Geometry in teaching and learning at school level: A mixed method study. Number of book, papers, research report and booklets can be found that concerned with curriculum, instructional materials and method and so on. However, the researcher could not found any investigation on the problem of Geometry in teaching and learning at school level: A mixed method study.

The researcher has reviewed some selected literature as follows:

Empirical Literature

Lamichhane (2001) did a survey types research on "A study of problem faced by the secondary level mathematics teacher in teaching mathematics" in Kaski districtHe concluded that several problems proposed up in the eyes of teachers such as inadequacies of text book and teachers guide, lack of instructional materials, teacher's training, lack of supervisory help, lack of physical facilities etc. Further he concluded that the lack of motivation to learn mathematics is poor on the part of students.

Thakuri (2011) did study on " Problem faced by student in Geometry at secondary level of Jajarkot district"The main objective this study was to find the problem of students in teaching learning activities in Geometry at secondary level , to identify the problem ofrelated to prove and verify theorem and construction , instructional material, student evaluation technique. The sample of this study was only two school of urban and rural area each of them 150 students from 5 sampled schools. For the data collection through observation, interview and questionnaire was used as tool. This study concludes that gives lecture and using chalk, and board only may not help average and below average students to understand mathematical concepts of geometry in normal class. There were a lack of motivation and encouragement about geometry.

Pathak (1987) conducted a research on " A study of the problems faced by theteacher of Kathmandu District in the implementation of mathematics on of mathematics curriculum forlower secondary level" He administered a set of

questionnaire to the lower secondary mathematics teacher who has faced problem regarding the problem of mathematics curriculum teaching method and evaluation techniques. Then he concluded that the problem regarding evaluation was that most serious problem to the lower secondary level mathematics teachers.

Pandit (1999) mentioned on an article problem faced by mathematics teacher educator in the implementation of three years Bed level mathematics curriculum in Nepal. He concluded that mathematics teacher education program in Nepal is disturbed by so many factor such as lack of lecture's involvement in curriculum planning , lack of efficiency to conduct teaching facilities and students weak back ground in the subject matter, lack of opportunity given to upgrade their Knowledge and a huge number of personnel problem of lectures.

About the problem in teaching mathematics Pandit(1999) writes in his one article , teachingmathematics as the mathematics teacher may face different kinds of problem while teaching further their may be problem related with mathematics education program , which directly or indirectly affect to mathematics teaching such problems as a whole can be divided into two parts .

Problem in Mathematics Education

Problem faced by them while teaching mathematics in real classroom situation and some are medical suggestions has also been given in this article.

Bhattarai (2005) made a study entitled "The problem faced by the mathematics students in existing curriculum.This study being description in nature. Twelve schools from urban in ilam district were selected by simple random. Sampling method as well, from each school one teacher and four students were chosen respectively. The main tool of the study was questionnaire. The questionnaire was developed into three point likert scale. The collected data are analyzed by calculating percentage. Themajor finding of this study are concluded that learning mathematics in secondary level is disturbedby so many factors such as lack of teachersinvolvement in classroom planning , lack of referential and instructional facilities and aids , students weak background in the subject matter and so on.

KC (2009) conducted a thesis "A study of problem faced by student in Compulsory mathematics at secondary level" The nature of this study was quantitative as well as qualitative.This study followed survey design. He selected six schools from urban area of Lamjungdistrict randomly. Among them three were private and three were government schools .From each school, one mathematics teacher and three mathematics students of grade x were selected as a sample for the study. For the data collection, a set of class observation form and interview schedule were used. The obtained data was analyzed interpreted with the help of mean weight age.

The main finding of this study was illiterate parents, poverty of parents, lack of encouragement for study, the gap of low achievement and high achievement students, unavailability of teaching learning materials, lack of mathematics lab, lack of trained teacher, lack of physical facilities and sufficient budget for school. It concluded there had been significant problem in learning geometry at secondary level.

Shrestha (1991) conducted a thesis "A study of sex different in achievement in mathematics of ninth grade students in Gorkha district" The nature of this study was descriptive survey types. He selected five schools of Gorkha district randomly .Form each school forty mathematics students of grade ix were selected as a sample for the study. For the collection of data he used questionnaire and interview schedule. The obtained data were analyzed and interpreted with the help of t- test and analysis of the variance. The finding of the study show that different problems creators were responsible such as gender discrimination, traditional concept, study hour at home and less interest in study of mathematics were the main indicates to create problems.

Bhatta (2017) conducted a thesis entitled "Problems faced by mathematics teacher at basic level in teaching Geometry" The nature of this study was quantity as well as quality. The main aims of this study was to identifying and explore the problem and proffering solution them. For the data were collected by descriptive survey method to hundred teachers among them 57 male and 43 female teachers in Bhakatapur and Lalitpur district. The study concluded that the school administration is irresponsible to manage and construct necessary teaching mathematics, there is lack of facilities and reward for the good performance of the teacher and school does not manage refresher training to teach difficult and guide and curriculum are not available

in time. The government should endeavor to provide the necessary infrastructures and facilities that will motivate teaching and learning of mathematics.

Gautama (2016) conducted a thesis entitled "Difficulties in learning vector Geometry at secondary" The main aims of this study was to explore the different kind of difficulties in teaching vector geometry and find out the way for minimizing of this difficulty in teaching vector geometry at school level. The main instruments of this study were observational note, semi - structured interview and test. The study was concluding that the per-knowledge and poor geometrical background of the students, traditional teaching strategies and untrained teacher, poor evaluation systematic were main causes to made difficulty on vector geometry teaching learning at seconding level.

Baral(2000) conducted a thesis entitled " Problem faced by mathematics teacher in teaching mathematics " indicated that there were number of problem related to curriculum designing , textbook, writing, teaching method , classroom situation , student's background , teaching materials ,teachers training and so on.

Poudel (2009) did a study on "A study on the problem faced by grade viii student in mathematics" He took eight schools for study. Among them three school were selected from urban area and five were selected from rural area. From each school six student and one mathematics teacher were selected for the study, both the boys and girls students were equally selected. The study followed by descriptive survey method. The questionnaire and class observation form were the main tools for data collection. The obtained data were analyzed with the help of mathematical calculation mean weight-age and observation note. The major finding this study are concluded that the involvement of student in housework more than student in household work more that study ,illiteracy of parents , lack of pre- requisiteknowledge on the student of mathematicsknowledge on the student of mathematics , irregularity of the student in school, congested classroom, unavailabilityof physical facilities and lack of trained and experienced of teachers etc were the causes to create problem in teaching learning mathematics at grade ix.

Theoretical Literature

Van Hiele's levels of Geometrical Thinking

Two Dutch educators, Dina and Pierre Van Hiele, suggested that children may learn geometry along the lines of a structure for reasoning that they developed in the 1950s; educators in the former Soviet Union learned of the Van Hiele research and changed their geometry curriculum in 1960s. During the 1980s there was interest in the United States in the Van Hiele's contributions of the National Council of Teacher of Mathematics (1989) brought the Van Hiele model of learning closer to implementation by stressing the importance of sequential learning and an activity approach. The five levels of geometric through (Numbered levels 0-4 or 1-5) do not correspond with student's age. As students develop the cognitive skill necessary to master one level, they progress to the next. The mental development levels of instruction as suggested by Van-Hiele's theory are given below:

Level 0 (Basic Level): Visualization

Students recognize figure as total entities (Triangle, square) but do not recognize properties of these figures (right angles in a square)

Level 1: Analysis

Students analyze component part of the figures (opposite angles of parallelogram are congruent) but, interrelationships between figures and properties cannot be explained.

Level 2: Informal Deduction

Students can establish interrelationships of properties within figures (in a quadrilateral, opposite sides being parallel necessities opposite angles being congruent) and among figures (a square is a rectangle because it has all the properties of a rectangle) informal proofs can be followed but students do not see how the logical order could be altered nor do they see how to construct a proof starting from different or unfamiliar premises.

Level 3: Formal Deduction

At this level the significance of deduction as a way of establishing geometric theory within an axiom system is understood. The interrelationship and role of undefined term, axioms definitions, theorems and formal proof is seen.

Level 4: Rigor

This level of geometric thinking most often applies to college level geometry classes, where students use formal logic to compare abstract systems often without a concrete model. Student's reason formally about mathematics system. The product of their reasoning is established, elaboration and comparison of axiomatic systems.

All the above mentioned Van Hiele level of geometrical thinking can be summarized in the following table:

Table 1: *Van Hiele level*

Levels	Stages	Characteristics
Level 0	Visualization	Students recognize the figures on the basis of their physical appearance
Level 1	Analysis	Students analyses the component of figures
Level 2	Informal deduction	Students establish the interrelationships of properties both within figures
Level 3	Formal Deduction	Students able to construct proofs using postulates or axioms and definitions
Level 4	Rigor	Students can work in a variety of axiomatic systems

(Source: Puri, 2016)

Conceptual Framework

      The analytical management or design which contains the factors affecting achievement of mathematics and hindrance that faced by teachers and students in class performance of geometry portion. By the help of literature review, expert consultation and peer discussion it had been constructed by the researcher himself including school related and out of school contextual factors to make the study specific, systematic and easy.
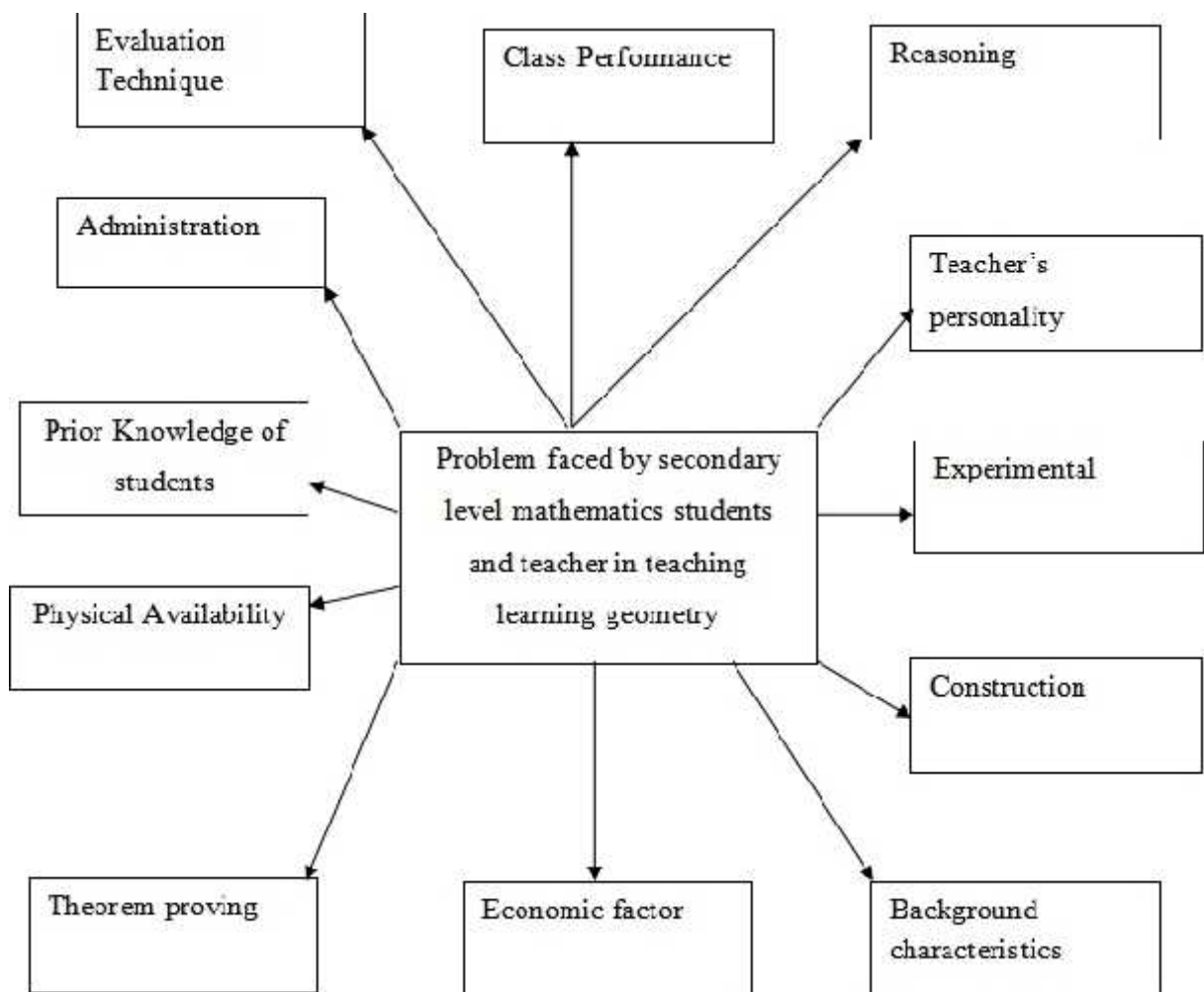
Figure No. 1 *Conceptual Framework*

Filling the Gap

All the researcher were done in different field. But there is no such researcher about problem faced by mathematics teachers and students in teaching and learning in secondary level form different government school of Rupandehi district. This study tried to fulfill the gap in which there is lack of researcher in problem faced by mathematics teacher and student in teaching and learning geometry in different characteristics of problem. Teacher are facing many problem due to lack of training, crowded number of student, lack of proper teaching materials, lack of mathematics lab facility, poor evaluation process, urban oriented curriculum are the burring problems of theteacher in teaching geometry. It is quite possible that a teacher is better at teaching geometry to give training and more facilities and suitable environment to teaching and learning is quite important for policy decisions. Government of Nepal should supply the essential teaching materials and should encourage the school administration to purchase such teaching materials. Mathematics teacher should become resource person for the students. It means they have competent and should be good performers. Based on available literature review major contributing factors that Geometry in teaching learning at school level: A mixed method study taken under study.

Chapter III
Methods and Procedures

Research design would considered as the heart of research. It would present the plan of study, it had told how the research became complete and systemic. This study would concerned with the study of Geometry in teaching learning at school level: A mixed method study. The major components of procedure followed in this study were as follows:

Research Design

Survey method would adopted to conduct the study. For the study using this method more items could asked and more flexible but factual information couldcollected.

Site Selection

This study were in a public school situated in Rupandehi district. As me as a researcher when I was studying in my school level during 2059-2068, I found so many problems in this government school. I found that most of the students were poor in mathematics and also the result of the school in math subject is very low. The main reason was the geometry problems, the awareness of the teachers and students. On the other hands, at the time of my teaching practice in intermediate level and bachelor level, I found the same problems in rapidly growing in the areas of geometry in math subject. Because of my familiarizes with the students at the time of teaching in the same school as tuition tutor, Ihadselectedthis issues as my research.

Population of the Study

All the student of public school who studiedmathematics in grade IX of Rupandehi district were the population of this study. Also mathematics teacher of all secondary level of Rupandehi district were population of study.

Sample of Study

According to the recordedof district education office, there were264 secondary school in Rupandehi district. Among them 178 werepublic school and 86 wereprivate school.On the basis of Development of Status of Rupandehi. It had

divided into rural and urban area. Among them 5 public school. One urban and four rural had selected by using randomly selected method. From each school forty students hadrandomly selected. Furthermore, details of sample characteristics were as follow.

Detailed sample characteristics
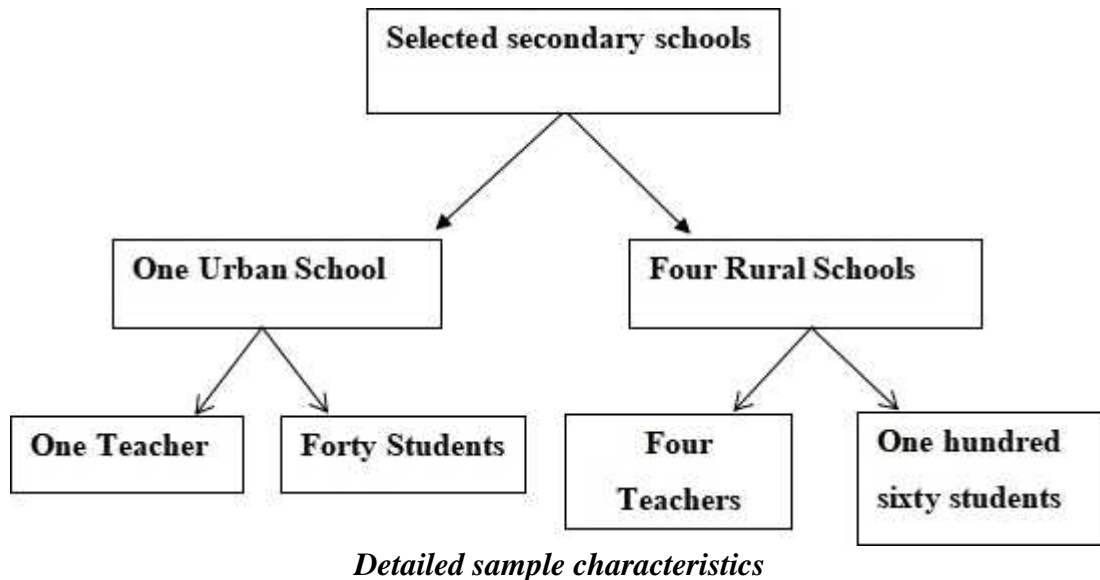
Tools of Research

For the collection of primary source of data, questionnaire,Test, class observation form and interviewhadused .The questionnaire haddeveloped by the researcher himself with the help of supervisor. The major tools for the collection of data in this study were beingas follows:

Questionnaire

Questionnaire had regarded as the main tool of this study which would bedeveloped by researcher himself with the help of the supervisor. Two separate questionnaires wouldbe developed for the teacher and students questionnaire for the teacher consisted10questions about objective of curriculum , content in curriculum , textbook, teaching method , instructional materials, teacher training, class management, physical facilities and evaluation technique and so on.Similarly questionnaire for the students consisted 30 questions concerning about teaching learning activities, instructional materials, and evaluation technique and so on. The validity of the questionnaire would be checked and approved by supervisor.

Test

      Test is a kind of assessment which has been taken as paper pencil test with student. It is widely used to evaluate the student standards. It helps to examine the knowledge of students acquired from the certain content. Test would be a set of question which makes by researcher purposely form the related content of geometry.Questions were selected purposely to examine the knowledge of student and to explore the problem on Geometry. After making the set of questions, the researcher administered it with the grade ix students. After checking, the researcher took discuss and explore the difficulties with them.

Observation

      Class observation form and interview schedule had regarded as the tool of this study. Before developing class observationform and interview schedule, the research consulted with mathematics experts and experienced teacher. The questions of the interview had constructed in such a manner it could find out the problems of mathematics students in the classroom.Theclassroomobservation form also prepared didfind the real problems of the students about teaching learningactivities such as interest, opinion, behavior and so on. The area of problems hadrelated to the classroom management instructional materials, home environment of the students, evaluation technique and so on.

      The respondents hadasked to tick ( )the appropriate column of development questionnaire in the given box.Each section of the questionnaire would begin with sufficient direction and information for answering the questionnaire. The questions of the questionnaire hadconstructed in such a manner that couldfind out the problem of students in learning geometry. The questions had developed considering the Van Hiele's five level of geometric though. The questionnaire covered the relating various problems of secondary mathematics geometry on following areas:

- Problems related to teaching learning activities.
- Problems related to classroom management.
- Problems of instructional materials.
- Problems of proving and verifying theorems.
- Problemsof evaluation techniques

At the end of the questionnaire the respondents hadrequested to comment on the areas not covered by the items of questionnaire. This hadhelpful in exploring some more problems of mathematics students.

Data collection Procedure

The data had been collected by primary source. For this purpose the researcher visited each of the sampled school along with the questionnaire, observation form,Testinterview schedule and request letter from T. U.To render any help needed the researcher form the school administration. After explaining the purpose of the visit the researcher requested each of the students of the schools included in the sample to fill the questionnaire honestly. Theresearcherwouldexplain and clarify the confusions that arose in understanding the statements. The researcher also had takenclass and recorded the information on the basis of set of observation form. Researcher also requested the teacher to fill on the questionnairefor the mathematics teacher. Researcher also used interview on the working fieldof mathematics teacher and students.

Besides the physical facilities the researcher hadunable to know about the detail activities of classroom by using the class observation form. So that the two day's detailed class observation of two schools hadtaken in the form of Episode. For the purpose of this, research selected two schools for detailed observation class of mathematics teachers.

Scoring Procedure

For the analysis of the items , Score of5, 4,3,2,1 isassigned to statement 'Strongly agree' ,'Agree' , 'Undecided' , ' Disagree' , and' Strongly disagree' respectively. For the statements opposing to this point of view, the items scored in the opposite order. Mean Score hadcalculated. Total score of five point Likert scale is 15, thus its average score is 3. If the calculated index is greater than three, then it is concluded that the statement contains in strong favor to the problems. If the index measure is less than or equal to three then it is weak favor to the problems.

Table 2: *Likert's 5 point scale*

S.N.	Meaning of scale	Positive statements
1	Strongly agree	5
2	Agree	4
3	Undecided	3
4	Disagree	2
5	Strongly disagree	1

If the statement is positive , theygivetheiropinion stronglyagreethenscoreis 5 , Inthe similarmanneragree , undecided, disagree , strongly ,disagreehave scored 4, 3,2 and 1 respectively .

If the statement is negative, theygive theiropinionstronglyagree,thenscoreis 1 , In thesimilarmanneragree , undecided , disagree , stronglydisagree havescored 2,3,4and 5respectively.

S.N.	Meaning of scale	Negative statements
1	Strongly agree	1
2	Agree	2
3	Undecided	3
4	Disagree	4
5	Strongly disagree	5

Atlastthe responsesofteachershadcategorizedin fewcolumnsandcalculatedbypercentage, Interviewalso used to justify the quantitativeand qualitative datathatreferred theproblems.

Data Analysis Procedure

The datahadcalculateditemswiseandwisein thevariousproblems faced by teacher and students related to teaching learningactivities school environment in mathematicslearningand so on .The collected data had tabulated and analyzed according to the objectives of study.The information received through interview hadinterpreted to justify to the numerical findings.

The obtained data hadanalyzed and interpreted with the help of following satisfied techniques.Mean score is used to locate the central position of the response to the statements of students as a whole in the rating scale.

The collecteddatathroughobservationform, questionnaireandinterview scheduleand test interpretedwiththehelp ofPercentage,meanscoreandasking crossquestions tothestudents, teacherandadministrator respectively. Obtained information and data hadanalyzed and interpreted on the headings teaching learning activities, instructional materials, evaluation techniques, classroom management and proving verifying the theorems.

Chapter IV
Analysis and Interpretation

The responses of the 200 students' form their questionnaire, face to face interview of 10 student s, classroom observation of each school form 5 sampled schools and the responses of interview with 5 teachers were used to analyzed data.

The data were collected for the study form five secondary schools selected one form urban and four form rural area schools of Rupandehi district. The collected data were tabulated and analyzed according to objectives of study. The obtained data were statistically analyzed and interpreted by using statistical tools mean score,t-test and percentage . The interaction with respondents was recording to the category of the respondents and then different themes were given in the context of interview considered as a code and similar code versions of respondents together and explained in their perspective.

The mean score of every item of data was calculated area wise in various problems faced by the techniques of proving and verifying theorems, evaluation techniques and classroom management. The collected data were analyzed under the following main headings which relates to the developed questionnaires and correspondents to the objectives of the study.

- Problems related to teaching learning activities.
- Problems related to instructional materials.
- Problems related to proving and verifying theorems and construction.
- Problem related to evaluation techniques.
- Problem related to classroom management.

Analysis and Interpretation of Student's Responses

Stepwise analysis and interpretation are given on the topics: Teaching learning activities, Instructionalmaterials , Provingand verifying theorems, Evaluation techniques and Classroom management are given below.

Analysis and Interpretation of the Responses Related to Teaching Learning Activities

Teaching activities play important role to shape knowledge and understanding the subject matter. Student's performance and perception depend upon how the teacher presents subject matter. Students centered teaching learning activities are given below as:

Table 3: *Students' Responses on Teaching Learning Activities*

S.N.	Statements	SA	A	U	DA	SDA	Mean Score	Remark
1	The class starts from interesting way	55	85	22	33	5	3.76	Favorable
2	Teacher given extra parallel problems related with exercise	60	80	21	9	30	3.65	Favorable
3	Teachers provide opportunity for weak students	20	64	16	40	60	2.72	Favorable
4	Theteacher also participate with you in classroom activities	63	76	12	23	26	3.63	Favorable
5	We do not feel difficult while proving theorem	0	34	19	101	46	3.79	Favorable
	Total						3.51	Favorable

From the detail study of the above table it is clear that there were problem in teachingmathematics due to difficult level ofteachingcapacity of students in the class, Most of the students were facing problems on the teaching learning activities that is the total mean score of in favorable to the problems statement items 1,2,4 and5have mean score morethan three which implies thatthere were problems on teaching learning activities related to solving questions , in given exercise,proving theorems and teachers' participant in the classroomactivities.

According to students, classes were not started interesting , Students responded that the teacher didn't give the extra parallel problem of their ability . The weak students didn't get appropriate chance to learn clarify while the talent students didn't get the chance more to learn in the class. The teacher didn't participate with students in classroom activities. Some students responded that students feel difficult while proving theorem.

Similarly,the researcher observed five mathematics classes to collect some information about teaching activities.The class observation records related to teaching learning activities are given below:

Table 4: *Class observation Records to Teaching/Learning Activities*

S.N.	Statement	Yes		No		Remark
		NR	%	NR	%	
1	The teacher moves in classroom.	2	40	3	60	
2	Teacher provided clear instruction for new concept .	2	40	3	60	
3	All students involved in all activities	2	40	3	60	
4	Sufficient examples provides for new concepts.	1	20	4	80	
5	Teachers encourage all students.	2	40	3	60	
6	Teacher solves problems	3	60	2	40	
7	Teacher shows positivebehavioron difficult question .	3	60	2	40	
8	Teacher has good command over subject matter	2	40	3	60	
9	Teacher provides opportunity for weak students.	2	40	3	60	

Form the 5 classes observation the researcher concluded that some classes are not good .The movement of the teacher had not seen in Three classes. Teacher did not give the concept in the four class's observation .The teacher did not care to all

students in the classroom. The teacher did not provide good opportunity for weak students. Three classes observation out of five, it was seen that the teacher had not good command over the subject matter.

Most of the teacher agreed that we were facing various teaching learning problems such as large number of students, different learning capacities of students in a classroom etc. Besides these problems, teacher was again argued that we did hard labour to provide quality education but students were not interested for their study.

Interaction with the teachers and students problems related to teaching and learning activities in the classroom were as follows:

) More emphasis should be given to finish the course rather that students' learning.
) It was very difficult to prepare and implemented the lesson plan.
) Motive students towards learningmathematicswas very difficult.
) Class control and students motivation was the difficult task for the teacher.

Weakness of the students and the teachers faced difficulty in teaching which further leads to show speed of teaching . The different category of students and their negligence towards mathematics created problems in teaching.

It was generally agreed that students in schools differ in the learning ability of mathematics due to the various background such as age , maturity and socio-economic status

Interview Schedule

In order to know the relevancy of text book researcher took the interview to the some students and teachers. That is given below.

What types of problems do you face in the textbook?

Teachers view "*In remote area textbook is ours student, nether we get have the referencebooks nor other related materials in the schools. If there are problems in solving the exercise then it is very difficult to solve it because of the lackof the*

solution materials and facility of internet . Some problems given in the exercise are not clear to the students and all the examples of the text book are helpful to the exercise but not sufficient and not concerned with real life situation. Proposed time for each unit is not sufficient because of the preserve of the students in class. Also there are large numbers of printingmistake , wrong answer and pictorial problems in the book.

Students views " *When teacher teaches to usin the class he does not give us the clear concepts about the topic so that feel difficulty in solving the exercise" problem. He did not use the teaching materials and unit test in the classroom".*

From the above response of the related respondents, it concluded that there were problems related problems in the textbook as availability of it and some errorinto it and teacher did not follow the rulers of learning and he was unknown about the selection of the teaching methods, materials and evaluation technique.

Analysis and Interpretation of Responses Related to Instructional Materials

To make teaching learning activities effective and meaningful, use of instructional materials are indispensable .Different kinds of teaching materials can be used in teaching geometry such as audiovisual aids ,models, textbook, and computer and so on .Thesematerialscould be used in classroom to facilitate teaching learning situation instructional materials are strong weapon to motivate the class .To minimize the geometrical problems all sorts of instructional materials can be adopted. Different teaching tools and materials can be used to make the teaching effective Table no.5 shows the situation of problems related with instructional material

Table 5: *Students' Responses on Instructional Materials*

S.N.	Statements	SA	A	U	DA	SDA	Mean Score	Remark
1	Text book and practices books are available in time	37	97	15	38	13	3.53	Favorable
2	Our teacher uses locally available and low cost materials in teaching	40	76	14	9	61	3.12	Favorable

	geometry							
3	Manipulative geometrical materials are not available in our school	70	81	18	17	14	3.88	Favorable
4	Less use of teaching material**s**	86	62	12	14	26	3.84	Favorable
5	Teacher uses instructional materials while teaching geometry	13	27	6	5	149	1.75	Less Favorable
	Total						3.22	Favorable

The analysis of Table No. 5 shows that total mean Score of statements is 3.22 implies that students are facing problems on the field of instructional materials.Mean score of items 5 is 1.79 follows that students agreed only about availability of instructional materials but which are not sufficient for learninggeometry . Items numbers 1,2,3 and 4 have mean score 3.53, 3.12, 3.88 and 3.84 respectively which followed that students were in favor of the problems with availability of text book , uses of locally materials, availability of manipulative materials and less use of teaching materials. Teaching facilities and teaching aids play an important role to improve mathematics education program. Taking this fact into account it could be argued that mathematics laboratory or mathematics resource center.

The next concern to investigation is to identify the availability and adequacy of materials such asGeometry box, micro-computer,projector, calculator, mathematics models , mathematical charts, cardboard, plywood tools and school books in the schools. The only materials available in school were some mathematics charts, models cardboard, plywood tools and some textbook in urban school. As indicated by the teachers and students, these materials were not adequate.

According to theresearcher discussion to the head teacher of every sampled school. There was unavailability of materials like Geometry box, micro computer,projector and photo copier, In order to improve the mathematics education program, finances must be found for keeping teaching materials and aids in the mathematics laboratories and more emphasis should be given to produce and use local

teaching materials it has been found that the teachers wereunable to make necessary teaching materials due to lack of training and enough time some of them noted that economic aspect is another factor. Time factor hinder use of instructional materials dueto the short time period of mathematics class. Teaching materials had not been used because of large number of class size.

Interview Schedule

Which kinds of teaching material teacher use in teaching period?

" Teacher only use daily used materials at teaching period in Geometry" (student)

The above view of students shows that there is lack of the teaching materials .

" The classroom is so much crowed but the school neglect another section for mathematics" (Student)

There is large number of students in classroom student feel difficulty for learningandteacher can not use teaching materials so mush this may be lack of teacher.

*"All the facilities of school depend on the economic status . We have poorof economic. In future we hope to provide sufficient materials" (*Head- teacher)

The above view of head teacher indicates there is a lack of financial resource.

By analysis and interpreted response related to the instructional materials it concluded that there were some problems related to the availability of textbook andother related materials in times, constructing and using of local teaching materials availability of audio and visual aids availability of experienced and trained teacher, economic poorandlack of well management of classroom according to the numbers of students.

Analysis and Interpretation of Responses about proving and Verifying Theorem and Construction

Teaching theorems is not an easy task at all. It is abstract and challenging task because of it s abstract nature. Construction is also appears as a great problems

because of less skill of students in manipulating the instruments. Many students face difficulties in proof type geometry problem solving.

The Van Hiele (1957) noticed the difficulties that their students had in learning geometry . His theory explains why many students' encounter difficulties in their geometry course especially with formal proofs . Van Hiele believed that writing and that many students need to have more experiences in thinking at lower level before learning formal geometric concepts. Table No. 6 illustrate the student's responses on problems of proving and verifying theorems and construction.

Table 6: *Proving and Verifying Theorems and Construction*

S.N.	Statements	SA	A	U	DA	SDA	Mean Score	Remark
1	Teaching materials are used in teaching theorems and exercise	45	66	9	13	67	3.04	Favorable
2	Our teacher uses geometrical instruments while teaching construction	27	45	29	88	11	2.94	Less Favorable
3	Geometrical theorems of secondary level related with life	58	103	13	21	5	3.94	Favorable
4	Examples and exercises of theorems are highly correlated	54	100	17	23	6	3.86	Favorable
	Total						3.44	Favorable

Inspection of the table reveals that the total mean score is 3.44 , means maximum numbers of students are in the favour of the problems and signify the problems. Process of proving ideas are highly based on theoretical and parrot learning system which does not catch up the Van Hiele's five levels of geometrical thought. Teaching construction and verifying the theorems are less priority in maximum schools . Using the mean score of no. 1,2, 3and4 claims that most of the students are facing problems when proving theorems and construction .

For the justification the above qualitative result researcher did interaction to the students and teacher which is given below:

Which method do you use for teaching geometry?

"I am not using any fixed teaching method for geometrical teaching , but my aim is to how children receive the knowledge and children pass in the examination" (Teacher view)

The above excepts indicated that the teacher mostly used lecture method or another method but not use child oriented method in mathematics classroom.

"Teacher always emphasis their own method and theyalso choose the lesson according to their will" (students)

"Teacher always emphasis on booking knowledge and not give many examples for concept in mathematics classroom". (Students)

The above views of students shows that for the selection of method and lesson teacher always dominated the students but the modern views of learning emphasized more collaborative and co-operative method for teaching and learning geometry and students indicated that the mathematics teacher in the classroom did not try to extra mathematics activities such as did not give many examples and did not try to manage extra mathematical activities

Researcher took a class test which makes computational difficulty for the students in geometry. Where question was $\overline{AB} + \overline{AC} = 2 \ \overline{AM}$ or $= \dfrac{\overline{AB}\Gamma\overline{AC}}{2} X \overline{AM}$

Prove that $\overrightarrow{AB} + \overrightarrow{AC} = 2\overrightarrow{AM}$ or $\overrightarrow{AB} + \overrightarrow{AC} = \overrightarrow{Am}$ in the given triangle ABC where BC is the mid point of m

Here,

Given: in triangle ABC,
m is the mid point of M

Prove: $2\overrightarrow{Am} = \overrightarrow{AB} + \overrightarrow{BC}$

Now, in triangle ABM
$$\overrightarrow{AM} = \overrightarrow{AB} + \overrightarrow{MB} \quad\text{——(i)}$$

Again In $\triangle ACM$
$$\overrightarrow{AM} = \overrightarrow{AC} + \overrightarrow{mc} \quad\text{——(ii)}$$

Now from (i) and (ii)
$$\overrightarrow{AB} + \overrightarrow{mB} = \overrightarrow{AC} + \overrightarrow{mc}$$

where BC is the mid point of m
$$\therefore \overrightarrow{CM} = +\overrightarrow{mB} = \overrightarrow{Bm}$$

Now $\overrightarrow{AB} + \overrightarrow{mB} = \overrightarrow{AB} + \overrightarrow{AC}$
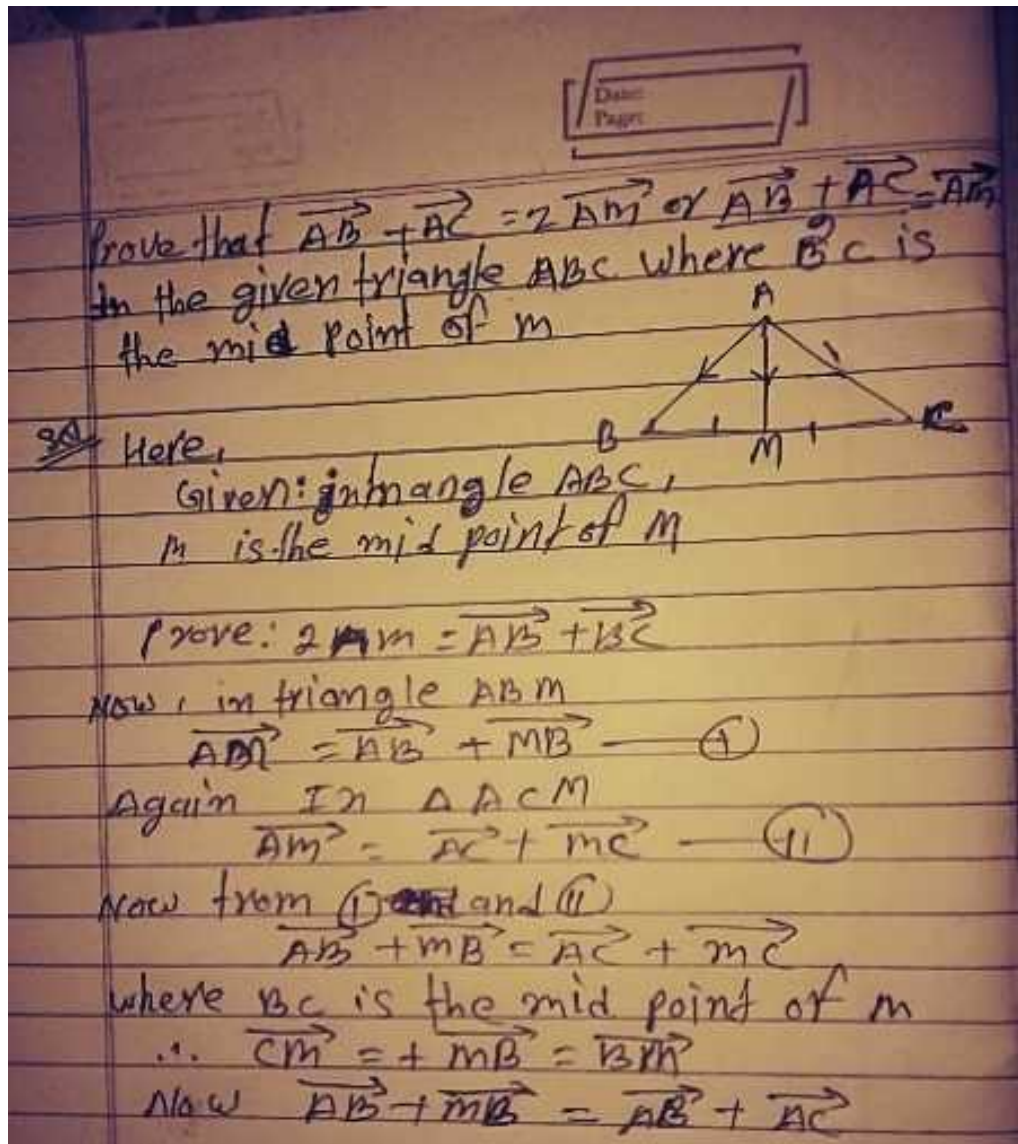
The above example was one of the class test question which was solved by one boy of grade nine. Form this example we analyzed that the students had so many computational difficulties despite good understanding of vector concept , he inconsistent at computing. He makes errors because he did not write numerals in the Solution. He wrote first $\overrightarrow{AM} \times \overrightarrow{AB} \Gamma \overrightarrow{MB}$ which was wrong also he wrote

$\overrightarrow{AM} \times \overrightarrow{AC} \Gamma \overrightarrow{MC}$ which was also wrong. He wrote $\overrightarrow{CM} \times \overrightarrow{MB} \Gamma \overrightarrow{BM}$ which was also wrong. In spite of startinghe was write something correct form but the process of proving step was wrong.

Form the above we conclude that, despite a good understanding of vector concept, students are inconsistent at computing. Those students often struggle, especiallyin primary level where basis computation and right answers are stressed.

Often they end up in remedial classes, even through they might have a high level of potential for higher - level mathematical thinking.

The researcher took another class test which likes difficulty for thestudents ingeometry. The question was, The sum interior angles of any triangle is equalto180°

©N. त्रिभुजका तीनी कोणहरुको योगफल 180° हुन्छ।

1) यहा दिइएको : △ ABC या तीन वटा कोणहरु ∠ABC, ∠ACB ∠BAC छन्

2) रचना : BC भुजा संग समान्तर DE रेखा खिने

3) सिद्ध गर्नु पर्ने : ∠ABC + ∠ACB + ∠BAC = 180°

$$D - - A - - - E$$

(triangle with vertices A at top, B and C at base)

4) प्रमाण

तर्कपथरू	कारणहरू
1) ∠BAD = ∠ABC	1) DE // ED
2) ∠CAE = ∠ACB	2) 1) जस्तै
3) ∠BAD = ∠BAC + ∠CAE = 180°	3) सरल कोण = 180° भएकोले
4) ∠ABC + ∠ACB + ∠BAC = 180°	4) ①·② ②, र ③ जस्तै

प्रमाणित भयो

The above example was one of the class test question which was solved by one girl of grade 9. From this example we can analyzed that the students had recognized problems related to the kind of Angle. In above example, it was seen that there is lack of sequencing in the proof of steps.form the observationthe student donot

know which and which line are parallel and literature in the limited time span students have many difficulties in learning geometry. Students, who did not managethe time. They were Proving difficulties in learning geometry .

Analysis and Interpretation ofResponses about classroomManagement

Educationshave been aware that the quality of classroom management is an important factor for student's achievement and teaching success. We have written about management rather than control in classroom because management emphasizes that learning and teaching are complementary activities just as successful mangers in commerce and industry avoid dispute which disturb production. Therefore, in the classroom, successful teachers have the capabilitiesto provide remarkable learning activitiesso that students can develop their conceptual thinking. The overall situation concerned with classroom management is given in Table No.7

Table 7: *Students' Responses about Classroom Management*

S.N.	Statements	SA	A	U	DA	SDA	Mean Score	Remarks
1	We feel difficulties while participating in the congested classroom	44	75	15	22	44	3.26	Favorable
2	Problems of the text books are not related to the daily life of students	30	60	22	47	41	3.04	Favorable
3	We have no any problems of whiteboard and other furniture in our classroom	21	40	25	80	34	2.67	Lessfavorable
4	We solve our mathematical problems in group.	43	57	22	31	47	3.09	Favorable
5	Anything written in Whiteboard is visible	87	69	12	16	16	3.97	Favorable
	Total						3.20	Favorable

However, during the research period it had been found that students were disagreed about the classroom management in teaching geometry mean score of item 3 and 2.67which follows that students agreed only about the whiteboard and furniture the classroom but which are not sufficient for learning geometry. Item number 1 , 2 ,4and5have mean score 3.53, 3.04,3.09 and 3.97 respectively which follows that students are in favor of the problems with congested classroom, group work activities and visibility ofwhiteboard. The total mean of the statement is 3.20 which show that most of schools have problems in classroom management because of the overload of students in government schools.

The table given below was record form classroom observation related to the classroom management

Table 8: *Classroom Observation Record Related to Classroom Management*

S.N.	Statement	Yes		No		Remark
		NR	%	NR	%	
1	The class is not crowded	2	40	3	60	
2	Students have sufficient space to live	4	80	1	20	
3	Arrangement of desk and benches are good	2	40	3	60	
4	There was noise outside the classroom	1	20	4	80	
5	Classroom are well lighted and ventilated	3	60	2	40	
6	The class has good decoration	1	20	4	80	
7	Whiteboard and furniture management are sufficient in classroom.	2	40	3	60	

Table No. 8 shows that there were too crowded. Similarly, classrooms were not properly arrangement. The classroom decoration was not properly managed and there was the problem of whiteboard ,drinking water, playground and furniture. The maps, posters and other charts were not properly hanged. However, the classroom was well ventilated and lighted.

Did you agree to your administration about well management of classroom ?

"School administration do not provide good whiteboard and well classroom for the students, due to congested classroom there is no sufficient passage in the class. There is no provision of demonstration table and separate classroom for weak students, but they are always passive and they do not participated in class activities which creates the problem for the teachers" (Teacher)

By the analysis and interpretation of response about the classroom management there obtained some problems which were related to decoration and proper arrangement of furniture ,placement of blackboard and is smoothness , size of classroom according as the number of students , alternative management for weak students.

Analysis and Interpretation of Responses on Evaluation Techniques

` The primary responsibilityof a teacher is to using about the maximum degree of students achievement in learning , Evaluate devices such as examination of various types, oral quizzes and different class activities are essential evaluation process of evaluation techniques. The main purpose of the evaluation program may be to help more intelligent guidance in learning. Table No.9 presents the situation related withtheproblems in evaluation techniques.

Table 9: *Students Responses of Evaluation Techniques*

S.N.	Statements	SA	A	U	DA	SDA	Mean Score	Remarks
1	The teacher checks our homework daily	58	100	14	15	13	3.87	Favorable
2	The teacher does not take the test at end of each unit	25	41	13	34	87	3.58	Favorable
3	Our teacher takes different types of test except terminal exam	29	50	20	24	77	2.65	Less Favorable
4	Teacher is only exam	34	80	15	42	29	3.24	Favorable

	oriented							
5	The teacher do not focus on our creativity and curiosity	38	58	20	34	50	3.00	Favorable
6	Contents in the given text book are related to lower classes	67	89	17	15	12	3.92	Favorable
7	Teachers give the feedback	54	67	12	23	44	3.32	Favorable
8	All geometrical problems aren't included in exam.	80	68	16	23	13	2.10	Less Favorable
9	The first priority is not given to teach geometry	65	69	14	38	14	2.33	Less Favorable
10	Teacher use different kinds of text book	50	70	23	26	31	3.41	Favorable
11	Teacher gives the basic conceptof previous chapter of geometry	47	76	20	30	27	3.43	Favorable
	Total						3.16	Favorable

The total mean score 3.16 indicates the most students are in favor of the problems of evaluation techniques, During research andanalysis of table no. 9 ,It had been found that most of students especially in items 1, 2,4, 5 ,6 ,7,10and11with mean score 3.87, 3.58, 3.24,3.00, 3.92,3.32,3.41and 3.43 respectively are in favor of the problems . The items 3, 8and 9 with mean score 2.65, 2.10 and 2.33 respectively are not favor of the problems of evaluation techniques. Students agreed about the unit tests, terminal tests, problems included in exam of geometry and given priority in teaching geometry and teacher use different kind of text book and also give the previous concept related to teaching geometry in the classroom.

Many students claimed that there in not a connection between the classroom evaluation and final evaluation of the students. It indicates thatthe poor students could also pass the final evaluation by cheating and defective promoted policy.

Allthe teacher involved in the study replied that there is a problem in daily homework checking due to the large number of students in the class and overload of teachers and not more attention towards students.

To justify the above result the researcher used interview schedule related to the students which are given below:

Analysis of Date Obtained from Interview

For this purpose I selected ten students, two-two students from each school and asked same question and Responses were given below:

Do you feel Geometry as hard subject? And Why?

"Yes I am feeling mathematics is hard subject but lower level my favorite subject was math . Now a dayI don't get sufficient time to practice mathematics so I feel it is hard"(RamnatanPrajapati)

"YesI feel geometry is a hard subject because I must engage in household work like making foods, cutting grass etc. These works are daily routine."(Soniyadav)

"Geometry becomes hard subject to me because I use the evening time by playing footballand listing folk song is mobile as well a watching TV every day as like." (MuniramYadav)

"Yes , I am also feeling that Geometry is the hardest subject because of my pre-knowledge and teacher does not care me ,Teacher only care to the first student in the class"(Bijay Kumar Harijan)

"Due to my family I can't read and write more I have to engage inother household work, Iused to be absent I can't understand while teaching by teacher in the classroom can't see all the thing which are written in the board. So I feel mathematics is hard subject." (SantiTharu)

" Our teacher does not check our homework daily and he also does negligence our creativity and curiosity. Teacher does not review the previous subject matter which

veryneed to know the geometrical ideas, so day by day I am feeling that Geometry is a hard subject" (SubashTharu)

"I am feeling mathematics as interesting and easy subject among all other subject because if we know the process and formula we can solve the problems easily" (SunitaKohar)

"I also feel geometry as an interestingand easy subject but some time if teacher does not give clear concept in proving and verifying the geometry theorems then I used to feel lazy" (NirmalaPasi)

"Yes, for me geometry is the hardest subject. I will not take mathematics after S.L.C. because of my economic condition I can't read tuition class, I don't get sufficient material, and our classroom also very congested. I have to sit backside always and friends are takingmore . So I don't understand mathematics." (PawanKausal)

"Yes, I am feeling geometry is hard subject because in the class our teacher never uses the teaching materials and he always uses the lecture method. He also follows the summative evaluation system and he is unknown about the using and constructing the local teacher materials." (AmodhYadav))

Study other problems related to evaluation techniques are as follows:

Yearly and half-yearly tests are not reliable due to cheating problems.

⟩ Record keeping evaluation system is tiresome job.

⟩ Poor students copy the homework of talents.

⟩ Weak students also pass the class and place new comers in class due to the defective promoted policy.

⟩ No use of any other evaluation other evaluation tools except paper pencil test exam.

⟩ The evaluation of classroom activities is not included into terminal examination.

In conclusion, various problems have appeared in evaluation system of mathematics learning.

Lack of involvement in curriculum planning ,lack of efficiency to conduct with their teachers such as why , hesitation produces, lack of books and journals and teaching facilities, lack of opportunities given to upgrade their knowledge, poor family environment in terms of financial and social prestige in society, involvement in their household work as child labor and various capacities.

In teaching learning mathematics there are no remarkable training opportunities for skill development to teacher as well as students which could help with teaching. Radio, television and mobiles play a mostly negative role in students. They spend time by watching serials and listing music while they have a little time saving from household works.

Long distance comes spend their valuable time to arrival and departure and at that they spend it by joking, singing and love affairs which are not related to study.

Analysis and Interpretation of Teacher's Responses

Ten questions were included in questionnaire for five teacher's related problems in teaching geometry in a class nine. These questionnaires were related to text book, subject matter, instructional materials and evaluation techniques and so on. The collected response were categorized in few columns and calculated by percent. The collected responses are shown in the table No.10

Table 10: *Analysis and Interpretation of Teacher's Responses*

S.N.	Statement	Yes		No		Remark
		NR	%	NR	%	
1	Are the subject matters included in the text book is the high spirit of curriculum?	4	80	1	20	
2	Are the subject matters appropriate with the level of students?	3	60	2	40	
3	Are you satisfied with your job?	4	80	1	20	
4	Are example and exercise correlated or not?	2	40	3	60	
5	Are the teacher training sufficient? If not what types of training doyou need?	2	40	3	60	

6	Are teacher's guide and other journals available in your school?	1	20	4	80	
7	Do you encourage students to use materials in solving of problems?	4	80	1	20	
8	Is there any obstacle to make and collect local teaching materials in teaching mathematics?	3	60	2	40	
9	There are fewer environments except third terminal exam through there are other means of evaluation system	4	80	1	20	
10	Are their exercise in the textbook, can solving the daily life mathematical problems?	1	20	4	80	

According to the above table following out comes may be discussed about the problems of teaching activities.

) According to the statement I, eighty present teachers are supported to the statement and only twenty present teachers are against it. It meant the subject matter included in the textbook has high spirit of curriculum.

) Sixty present teachers are supported to the statements and forty present teachers are not favor to the statement. It meant the teachers responses were not in the favor of problem on the subject matter.

) Eighty percent teachers were satisfied with their job and only twenty percent were dissatisfied with their and they were feeling burden in teacher's job.

) Form the above table, it was found that forty present teachers were agreed to the statement and sixty percent were against to it . It meant there are problems between the relation of examples and exercise.

) Form this study, It is found thatteacher training is not sufficient. Most of the teachers were untrained. Forty percent teachers were supported the statement and sixty percent were not supported to the statement. Also most of teachers demanded for refresher training according as changing curriculum and some teachers were full untrained although they were teaching mathematics since last one decade.

) From the study found that textbook was available in school rarely but except this other references books and required maternal were not available in schools. Responses percent is also indicated to it.

) According to the teachers responses they encouraged to the students for using teaching materials while solving the mathematical problems.

) Most of teachers accepted that there arose problems in makingcollecting local teaching materials . Teaching period were overloaded and no time for collecting and using locally availablematerials.

) Eight percent teachers were supported to the annual examination and twenty percent teachers appeared to the support of unit test.They gave more importance to the halfannual and annualexamination than unit test.

) At last only twenty percent teachers were favor to the statement andeighty percent were not favor to the statement. It meant there were great problems in the subject matters which was included in the textbook of mathematics.

Researcher tries to justify the teacher'sresponses that are in numerical status by using interview.

What kinds of problems do you face in your professional life?

"*I Know it is my duty to diagnose each child' s exact deficiencies and treat themaccording to their needs to improve mathematicalachievement .Also I knowthat local teaching materials are more useful to teach geometry to the students.But it is impossible of because of the overcrowded classroom. Over load of periods upon me ,short time of per periods and no any evaluation for extra labour.'(Teacher)*

This shows that teacher did not want to do extra labour in the Classroom to improvemathematical achievement.

"*I do not get teacher training so unable to effective method of Teaching and learning.*" *(Teacher)*

The above view of teacher shows that there is need of teacher training to make effective teaching learning activities

"If I provide long time for class work taking weak student into mind it is Impossible for me to complete the course in one academic year. If I don't complete the course,it will be injustice for the good students. "(Teacher view)

Although the teacher provided home work to the students everyday but checked the home of a few students only randomly.

Explore the problem faced by rural and urban mathematics student in learning geometry

The researcher would be collected the data from the questionnaire, observation form and faced to faced interview from rural and urban areas student and teacher in each five schools. After that the researcher find out that some similarity and difference problem faced by student and teacher in teaching and learning geometry in rural and urban school which are follows as:

-) Text book and practices book are available in time of urban school but the rural school it is not available in the time.
-) Teachers do not use instructional materials while teaching geometryboth areas school.
-) Teachers do not use geometrical instruments while teaching construction in both areas school.
-) Some teaching materials are available in the urban school but the teacher does not know how to use this.
-) The urban school teachers are trained but the rural areas maximum teachers are untrained. Therefore, they do not how to use effective teaching method.
-) Both schools the teacher know that local teaching material are more useful to teach geometry to the student but it is impossible because over crowded classroom.
-) The rural areas school school are engage in household work like as making food, cutting grass, so they could not more practice in geometry therefore they

like geometry is hard chapter of mathematics but the urban area student take many time to expand in practices of geometry.

) From the responses of teacher in both areas school. The subject matter included in the textbook has high spirit of curriculum.

) Sometimes the urban area teachers take the test at end of unit but the rural area. Teachers do not take the test at end of each unit.

) Teachers do not focus the students creativity and curiosity they only focus on exam oriented on both schools.

) No use of any other evaluation tools except paper, pencil test exam on both areas school.

) Arrangement desk and benches had good in the urban school but in the rural school some bench had break.

From the above, we conclude that few difference between urban area school from rural area school because, the maximum same problem faced by student and teachers in teaching learning geometry such as matter included in the textbook has high spirit of curriculum on both area. Only oriented paper pencil test exam do not use teaching materials, do not use any fixed method, large number of student in classroom therefore so many crowded etc. on both areas school.

Chapter v
Summary, Finding, Conclusion and Recommendations

This chapter deals with the summary, major finding , conclusion and recommendation.

Summary

The main purpose of the study was to identify the problems faced the mathematics students in geometry in class 9 of Rupandehi district.

The specific objectives of the study were.

-) To identify the problems related to teaching learning activities .
-) To identify the problems related to prove and verifying theorem and construction.
-) To identify the problems related to the students evaluation techniques.
-) To compare the problems faced by urban learning geometry at secondary level.
-) To suggest some measures for the solution of the problems.

For further convenience of the study the problems were categorizedinto different five areas visateaching learning activities ,instructional materials, proving and verifying theories, classroom management and evaluation techniques.

This study was entirely survey type. The population of this study consisted of entire mathematics students, teachers of government school situated in both urban and rural of Rupandehi district. The researcher himself developed the questionnaire, observation from and interviewunder the guidance of supervisor and researcher added some problemshimselfwith advice of experienced mathematics teacher. Thequestionnaire, observation from, Test and interview were tools of study. The responses were collected from different students and teachers selected from simple random sampling method. The collected data were mixed method based on Likertfive point scales. Questionnaire, observation form, test and interview were included in each category of problems and descriptive analyses of collected responses were carried out. Statistical indicators such as mean score, t- test and percentage were used for analysis of problems.

Findings

From the field survey and statistical analysis of the collected data it was found that students and were facing numerous problems of Geometry teaching and learningin class nine in Rupandehi district. Different types of internal and external factors are affecting to arise these problems.

Problems related to Teaching Learning Activities are as follows:

) Misconception of students to mathematics as a hard subject has become a problem students are found not be laborious . Hence there alsogreat problems form students side.

) Discipline problems some time arosefrom student's side.

) Problems on finishing the lesson of textbook due to untrained teachers and lack of monitoring part form school administration.

) Problems on solving parallel problems related with exercise due to the large number of students and time boundary.

) Problems on teacher guidance for solving problems

) Due to the lack of sufficient time, there were difficulties in checking homework.

) Besides problem related to good performance of teacher, lack of guiding encouragement, motivation etc are equally problems.

) Regarding the problems of teaching method and technique, there seems to be confusion in selecting appropriate teaching methods, Lack of time to use various methods.

) Lack of time to use various method,lesson plan appropriate examples to make clear concept of its difficulties.

) There arose the problems in class evaluation system.

Problems related to Instructional Materials are as follows:

) Problems related with textbooks and other reference books due to the difficulties of transportation and remoteness and also the some error into textbook.

) School had a few quantity teaching materials but there was no facility to store and place rightly.

) Time factor hinder use of instructional materials due to short time period of mathematics class.

) Teaching materials have not been used because of the large number of class size.

) Problems on construction and use using locally available and low cost materials in teaching geometry.

) There was economic crisis in schools therefore, school could not manage the proper environment of teaching learning.

Problems related to Proving and Verify Theorems and Construction are as follows:

) Problems on using geometrical instruments in teaching construction.

) There was the problem that related to the theoretical and practical concept of proving theorem.

) Most of the teacher were not able to teach their students in the basis of Van Hieles five levels ofthought of geometry .

) Problems on using materials in teaching theorems and exercises.

) Teacher was unknown about the current teaching methods and implication of it.

Problems related to Classroom Management are as follows:

) It was problem of managing the weak students in the classroom teaching learning.

) It was difficult to demonstrate and use the teaching materials because of the lack of space in classroom.

) There was problem related to decoration of classroom and proper arrangement of furniture.

) There was problem of placement and smoothness of white board.

) The teacher was not able to manage the students due to the small size of classroom.

Problems related to Evaluation Techniques are as follows:

) There was Problem related to evaluation of classroom activities.

- Daily homework correction was impossible due to the large class size and over work load of teacher.
- Maximum teachers claimed that there was not a connection between the classroom evaluation and final evaluation of the students. It indicated that the poor students could also pass the examination.
- There was Problem on fulfillment of student's creativity and curiosity.
- There wereproblems of utilization of time by students before and after the school time.

Conclusion

Form the above stated finding of this study, it can be concluded that

- Teaching and learning of geometry was not satisfactory in Rupandehi district.
- There had been significant problems in teaching learning activities, instructional materials, theorems and construction, classroom management and evaluation technique.

Recommendations

Observing the above study , the researcher has presented the recommendation which will be benefited to the concerned authority for farther improvement in the geometry teaching. The problems aroused in teaching learning activities, instructional materials and evaluation system.

The contents and methods of teaching should be influenced by some practical motives. Using of lesson plans should be encouraged.

- Government of Nepal should supply the essential teaching materials and should encourage the school administration to purchase such teaching materials.
- Teacher should be encouraged for making and using the teaching materials.
- Evaluation system should be more precise and scientific.
- The teacher should motivate the weak students and praise them to participate in teaching learning activities.
- The demonstration materials should be fit the classroom size and situation.
- School need to make mathematics laboratory.

⟩ The teacher shouldn't make students only busy copy the solved problems form the whiteboard check them whether they are comprehending or not.

⟩ The classroom should be well arranged that the students can equality and easily participate in the classroom activities.

⟩ The school administration should interact to the students, teacher, guardians and other related persons to discuss the problems and come to the solution.

⟩ Innovative and refreshment training , orientation and supervision should be provided to the teacher time to time

Recommendation for Further Study

⟩ This Present study may not be completed for all situation further researchercan apply the different tool and methods related to the some problems. For this, the researcher has presented the following recommendations for further studies.

⟩ Similar study should be carried out with a large sample and various school of different parts of Nepal.

⟩ This kind of studies should also be conducted at all levels of schools and in other subjects as well.

⟩ The similar study should be done in other districts of Nepal as well.

The District Education office should manage the inter resource center visiting and observing the mathematics classes and also should play vital role of organizing the inter district level mathematical conference.

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Appendices

Appendix-A
Questionnaire

Name of Students………………………. Class……………

Address……………………………………..

Direction: Please check ( ) and rateyourselfhonestly based on what you actually do given the statement using the following scales:

SA=Strongly Agree ,A=Agree,U= Undecided, DA= Disagree, SDA=Strongly Disagree

Statement Related to Teaching Learning:

S.N.	Statements	SA	A	U	DA	SDA
1	The class starts from interesting way					
2	Teacher gives extra parallel problems related with exercise					
3	Teachers provide opportunity for weak students					
4	Theteacher also participate with you in classroom activities					
5	We do not feel difficult while proving theorem					

Statement Related to Instructional Materials:

S.N.	Statements	SA	A	U	DA	SDA
1	Text book and practices books are available in time					
2	Our teacher uses locally available and low cost materials in teaching geometry					
3	Manipulative geometrical materials are not					

	available in our school					
4	Less use of teaching materials					
5	Teacher uses instructional materials while teaching geometry					

Statement Related to Proving and Verifying Theorem and Construction:

S.N.	Statements	SA	A	U	DA	SDA
1	Teaching materials are used in teaching theorems and exercise					
2	Our teacher uses geometrical instruments while teaching construction					
3	Geometrical theorems of secondary level related with life					
4	Examples and exercises of theorems are highly correlated					

Statement Related to Classroom Management:

S.N.	Statements	SA	A	U	DA	SDA
1	We feel difficulties while participating in the congested classroom					
2	Problems of the text books are not related to the daily life of students					
3	We have no any problems of whiteboard and other furniture in our classroom					
4	We solve our mathematical problems in group.					
5	Anything written in whiteboard is visible					

Statement Related to Evaluation Techniques:

S.N.	Statements	SA	A	U	DA	SDA
1	The teacher checks our homework daily					
2	The teacher does not take the test at end of each unit					
3	Our teacher takes different types of test except terminal exam					
4	Teacher is only exam oriented					
5	The teacher do not focus on our creativity and curiosity					
6	Contents in the given text book are related to lower classes					
7	Teachers give the feedback					
8	All geometrical problems aren't included in exam.					
9	The first priority is not given to teach geometry					
10	Teacher use different kinds of text book					
11	Teacher gives the basic conceptof previous chapter of geometry					

Appendix-B

Responses and Attitude score obtained by all students on each statement

Statement Related to Teaching Learning:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The class starts from interesting way	55	85	22	33	5	752	3.76
2	Teacher gives extra parallel problems related with exercise	60	80	21	9	30	731	3.65
3	Teachers provide opportunity for weak students	20	64	16	40	60	544	2.72
4	Theteacher also participate with you in classroom activities	63	76	12	23	26	727	3.63
5	We do not feel difficult while proving theorem	0	34	19	101	46	759	3.79

Statement Related to Instructional Materials:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Text book and practices books are available in time	37	97	15	38	13	707	3.53
2	Our teacher uses locally available and low cost materials in teaching geometry	40	76	14	9	61	625	3.12
3	Manipulative geometrical materials are not available in our school	70	81	18	17	14	776	3.88
4	Less use of teaching materials	86	62	12	14	26	768	3.84
5	Teacher uses instructional	13	27	6	5	149	350	1.75

	materials while teaching geometry							

Statement Related to Proving and Verifying Theorem and Construction:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Teaching materials are used in teaching theorems and exercise	45	66	9	13	67	609	3.04
2	Our teacher uses geometrical instruments while teaching construction	27	45	29	88	11	589	2.94
3	Geometrical theorems of secondary level related with life	58	103	13	21	5	788	3.94
4	Examples and exercises of theorems are highly correlated	54	100	17	23	6	773	3.86

Statement Related to Classroom Management:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	We feel difficulties while participating in the congested classroom	44	75	15	22	44	653	3.26
2	Problems of the text books are not related to the daily life of students	30	60	22	47	41	609	3.04
3	We have no any problems of whiteboard and other furniture in our classroom	21	40	25	80	34	534	2.67
4	We solve our mathematical problems in group.	43	57	22	31	47	618	3.09
5	Anything written in whiteboard is visible	87	69	12	16	16	795	3.97

Statement Related to Evaluation Techniques:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The teacher checks our homework daily	58	100	14	15	13	775	3.87
2	The teacher does not take the test at end of each unit	25	41	13	34	87	717	3.58
3	Our teacher takes different types of test except terminal exam	29	50	20	24	77	530	2.65
4	Teacher is only exam oriented	34	80	15	42	29	648	3.24
5	The teacher do not focus on our creativity and curiosity	38	58	20	34	50	600	3.00
6	Contents in the given text book are related to lower classes	67	89	17	15	12	784	3.92
7	Teachers give the feedback	54	67	12	23	44	664	3.32
8	All geometrical problems aren't included in exam.	80	68	16	23	13	421	2.10
9	The first priority is not given to teach geometry	65	69	14	38	14	467	2.33
10	Teacher use different kinds of text book	50	70	23	26	31	682	3.41
11	Teacher gives the basic conceptof previous chapter of geometry	47	76	20	30	27	686	3.43

Appendix-C

Responses and Attitude score obtained by Rural School's students

on each statement

Statement Related to Teaching Learning:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The class starts from interesting way	43	68	18	27	4	599	3.74
2	Teacher gives extra parallel problems related with exercise	47	62	17	7	3	551	3.44
3	Teachers provide opportunity for weak students	13	42	13	36	56	400	2.5
4	Theteacher also participate with you in classroom activities	53	56	7	20	24	574	3.58
5	We do not feel difficult while proving theorem	0	26	14	84	36	610	3.81

Statement Related to Instructional Materials:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Text book and practices books are available in time	28	72	12	36	12	548	3.42
2	Our teacher uses locally available and low cost materials in teaching geometry	31	60	11	7	51	493	3.08
3	Manipulative geometrical materials are not available in our school	60	66	12	12	10	634	3.96
4	Less use of teaching materials	74	49	9	7	20	627	3.91
5	Teacher uses instructional materials while teaching geometry	8	15	4	3	130	248	1.55

Statement Related to Proving and Verifying Theorem and Construction:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Teaching materials are used in teaching theorems and exercise	36	52	7	8	57	482	3.01
2	Our teacher uses geometrical instruments while teaching construction	20	35	23	76	6	467	2.91
3	Geometrical theorems of secondary level related with life	46	82	9	18	4	625	3.90
4	Examples and exercises of theorems are highly correlated	43	78	14	20	5	614	3.83

Statement Related to Classroom Management:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	We feel difficulties while participating in the congested classroom	34	60	12	18	36	518	3.23
2	Problems of the text books are not related to the daily life of students	24	47	17	39	32	469	2.93
3	We have no any problems of whiteboard and other furniture in our classroom	17	31	20	64	28	535	3.34
4	We solve our mathematical problems in group.	34	45	18	25	38	492	3.07
5	Anything written in whiteboard is visible	71	55	9	12	13	639	3.99

Statement Related to Evaluation Techniques:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The teacher checks our homework daily	47	78	11	12	11	615	3.84
2	The teacher does not take the test at end of each unit	20	33	10	27	70	574	3.58
3	Our teacher takes different types of test except terminal exam	23	40	16	19	62	423	2.64
4	Teacher is only exam oriented	28	62	12	33	23	513	3.20
5	The teacher do not focus on our creativity and curiosity	31	47	16	26	40	477	2.92
6	Contents in the given text book are related to lower classes	53	71	14	12	10	625	3.90
7	Teachers give the feedback	42	52	12	18	39	529	3.30
8	All geometrical problems aren't included in exam.	64	52	11	21	11	340	2.25
9	The first priority is not given to teach geometry	52	55	11	30	12	375	2.34
10	Teacher use different kinds of text book	40	56	18	21	25	545	3.40
11	Teacher gives the basic conceptof previous chapter of geometry	36	60	16	24	24	540	3.37

Appendix-D

Responses and Attitude score obtained by Urban School's students

on each statement

Statement Related to Teaching Learning:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The class starts from interesting way	12	17	4	6	1	153	3.82
2	Teacher gives extra parallel problems related with exercise	13	18	4	2	3	156	3.9
3	Teachers provide opportunity for weak students	7	22	3	4	4	144	3.6
4	Theteacher also participate with you in classroom activities	10	20	5	3	2	153	3.82
5	We do not feel difficult while proving theorem	0	8	5	17	10	149	3.72

Statement Related to Instructional Materials:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Text book and practices books are available in time	9	25	3	2	1	159	3.92
2	Our teacher uses locally available and low cost materials in teaching geometry	9	16	3	2	10	132	3.3
3	Manipulative geometrical materials are not available in our school	10	15	6	5	4	142	3.55
4	Less use of teaching materials	12	13	3	7	6	141	3.52
5	Teacher uses instructional materials while teaching geometry	5	12	2	2	19	102	2.55

Statement Related to Proving and Verifying Theorem and Construction:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	Teaching materials are used in teaching theorems and exercise	9	14	2	5	10	127	3.17
2	Our teacher uses geometrical instruments while teaching construction	7	10	6	12	5	122	3.05
3	Geometrical theorems of secondary level related with life	12	21	3	3	1	160	4
4	Examples and exercises of theorems are highly correlated	11	22	3	3	1	159	3.97

Statement Related to Classroom Management:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	We feel difficulties while participating in the congested classroom	10	15	3	4	8	135	3.37
2	Problems of the text books are not related to the daily life of students	6	13	5	8	8	119	2.97
3	We have no any problems of whiteboard and other furniture in our classroom	4	9	5	16	6	131	3.27
4	We solve our mathematical problems in group.	9	12	4	6	9	126	3.15
5	Anything written in whiteboard is visible	16	14	3	4	3	156	3.9

Statement Related to Evaluation Techniques:

S.N.	Statements	SA	A	U	DA	SDA	Total Score	Mean Score
1	The teacher checks our homework daily	11	22	3	3	2	160	4
2	The teacher does not take the test at end of each unit	5	8	3	7	17	143	3.57
3	Our teacher takes different types of test except terminal exam	6	10	4	5	15	107	2.67
4	Teacher is only exam oriented	6	16	3	9	6	127	3.17
5	The teacher do not focus on our creativity and curiosity	7	11	4	8	10	123	3.07
6	Contents in the given text book are related to lower classes	14	18	3	3	2	153	3.82
7	Teachers give the feedback	12	15	3	5	5	144	3.6
8	All geometrical problems aren't included in exam.	16	16	5	2	2	81	2.02
9	The first priority is not given to teach geometry	13	14	3	8	2	92	2.3
10	Teacher use different kinds of text book	10	14	5	5	6	137	3.42
11	Teacher gives the basic conceptof previous chapter of geometry	11	16	4	6	3	146	3.65

Appendix-E

Classroom observation form related to Teaching/Learning Activities

S.N.	Statement	Responses	
		Yes	No
1	The teacher moves in classroom.		
2	Teacher provided clear instruction for new concept .		
3	All students involved in all activities		
4	Sufficient examples provides for new concepts.		
5	Teachers encourage all students.		
6	Teacher solves problems		
7	Teacher shows positivebehavioron difficult question .		
8	Teacher has good command over subject matter		
9	Teacher provides opportunity for weak students.		

Classroom Observation form related to Classroom management

S.N.	Statement	Responses	
		Yes	No
1	The class is not crowded		
2	Students have sufficient space to live		
3	Arrangement of desk and benches are good		
4	There was noise outside the classroom		
5	Classroom are well lighted and ventilated		
6	The class has good decoration		
7	Whiteboard and furniture management are sufficient in classroom.		

Appendix-F

Number of Respondents of Teacher in the Questionnaire related to Geometry

S.N.	Statements	Responses	
		Yes	No
1	Are the subject matters included in the text book is the high spirit of curriculum?		
2	Are the subject matters appropriate with the level of students?		
3	Are you satisfied with your job?		
4	Are examples and exercises corrected or not?		
5	Are the teacher training sufficient? If not what types of training do you need?		
6	Are teacher's guide and other journals available in your school?		
7	Do you encourage students to use materials in solving of problems?		
8	Are there any obstacle to make and collect local teaching materials in teaching mathematics?		
9	There are fewer environments except third terminal exam though there are other means of evaluation system		
10	Are their exercise in the textbook, can solve the daily life mathematical problems?		

Appendix-G

Sample Schools

S.N.	Name of Schools	Location	Rural/Urban
1	Shree shreeram secondary school Padarahawa-2 Kotahimai	Kotahimai Rural municipality	Rural
2	Shree Amwa Secondary School Amwa-2 marchwari	Marchwari rural municipality	Rural
3	Shree Jan Jagrit secondary school Gaidahwa -3 Gobdauri	Gaidahwa rural muncipality	Rural
4	Shree Malwar Devi Secondary School Jhargaira-3	Kanchan rural municipality	Rural
5	Shree Tinau secondary school Mayadevi-6	Mayadevi rural muncipality	Urban

Appendix-H

Sample Teachers Profile

S.N.	Name of Teachers	Age	Experience	Trained/Untrained
1	Dipendrayadav	28	1 year	Untrained
2	JwaharLalBaniya	30	2 year	Untrained
3	Balgobind Gupta	36	2 year	Untrained
4	PadamParsadAcharya	43	25	Trained
5	Anand Kumar Tripathi	36	5	Trained

Appendix-I

Guidelines for Interview with Compulsory Mathematics Students

Name: Age: Sex:

Father's Name: Qualification:Occupation:

Mother's Name: Qualification:Occupation:

School's Name:

Location: Rural/UrbanName: Government/Private

Time to reach School:

      The interview with compulsory mathematics students was taken on the basis of following main topic:

) Home environment of the students:

   Task, Help, Facility, Parents, Family

) Opportunity to learn to home

) Teaching learning activities

   Starting situation, Method, Response, management, Question evaluation system, Summarize

) School environment of classroom managements

) Instructional materials

   Nature of materials, effectiveness

) Relation between teacher and students

) Class behavior towards students

) Opportunity provided by school group work given in classroom

Appendix-J

Statistical Techniques used for Data Analysis.

$$\overline{X}\,X\frac{\phi X}{N}$$

N = Total number of students

$\overline{X}$ = Mean Score