

## **Chapter I**

### **Introduction**

#### **Background of the Study**

Mathematics has played a vital role in development of all human civilization. It was originated together with the origin of human civilization. So, the study of mathematics is originated from practical experience of means, needs and it continued to develop along with the development of civilization. Mathematics is creation of human mind concerned with ideas, process and techniques of research. Mathematics gives us insight into the power of human mind and becomes a challenge to intellectual curiosity.

Geometry is one of the most useful and important branch of mathematics. Geometry includes an enormous range of ideas and can view in many different ways. It has been interlocked with many other subjects and different views of human activities. The basic ideas of a mathematical system originated in geometry. Kelly and Ladd (1986) write, "it is not certain who first had seen of trying to prove a mathematical rule by reasoning rather by testing it in different ways". The word geometry is derived from the Greek words, geo metria which means measuring of earth. On the other hand, in the east this subject was called „Rekhaganit. About the development of geometry Butter and Wren say, "primitive people obtained their first knowledge of geometry from natural objected and later on from arts as well the needs that arose to understand and came to further the legacy of art, architecture, surveying, measurement etc. provides the stimulators the development of science of geometry".

Geometry concepts were developed from the beginning of the civilization. It is evident that the Egyptians must have the knowledge of many geometric principles. Applications of these principles were found in the buildings of pyramids and the great

9 sphinx (400-3000BC). The irrigation systems devised by the early Egyptians indicate that they had an adequate knowledge of geometry as it may be applied in land surveying. The Babylonians were using geometric figures in the tiles walls and decorations of their temples.

Geometry is the study of the properties of shapes. Since the shape of the object is something visible we begin to acquire geometric knowledge and understanding in early childhood. The importance and essentiality of geometry was felt with the development and utility of geometrical concepts, which is proved in the fourth century BC by the great and popular Greek philosopher Plato (427-347BC) who ordered carved of inscription "Let no one ignorant of geometry enter my doors". Euclidean Geometry developed by Euclid (300BC) took revolutionary change in the field of geometry, which collected all the geometrical development before him and his period. At this time, Euclid brought together and unified this knowledge by constructing the first definitely formal system of mathematics in the treatise "Elements ". It is probable that Euclid's Elements is a highly successfully complication and systematic arrangement of work of writers. Euclid's Elements is not devoted to geometry alone but also contains much number theory and geometric algebra. The work is composed of 13 books which 465 propositions (Limbu, 2007).

Teaching can be defined as interaction between the teachers and the students as far as it is related to imparting of the knowledge to the students, to cover almost each and every aspect of education in which the students are expected to learn from the teachers and which teachers will teach them using all the teaching techniques and aids available to teach. This includes motivation, encouragement and character building of the students. A good teacher must understand each and every trait of the students to deal them.

Problems relating to teaching and learning geometry in grade IX. This is a great threat to the mathematics teacher. Some problems of learning mathematics in students might directly relate to the teachers academic background, classroom practices, school and management and leadership. Other problems on learning mathematics are concerning with pre-knowledge of students. Generally, students may feel learning geometry problems related to understanding the new concept and relations. The teacher's readiness enthusiasm and interesting teaching also are important of effective mathematics teaching and for developing the positive attitude in the children towards Mathematics subject. There are supplementary factors to increase the efficiency of mathematics teaching learning in the secondary schools. They are grouped as mathematics library, mathematics laboratory teaching aids, specialized equipment, guidance as part of mathematics teaching etc.

From the above, it is usually seen that those students and teachers who have been teaching learning mathematics; they are facing with the number of problems to deal with. The problems which are occurring to mathematics are also the problems of geometry teaching and learning. The present position of the learning mathematics can only be understood and mathematics can be properly taught and learned if the study is to explore problems and interpret their links in the teaching of given mathematical content and corresponding students learning. So, researcher selected Geometry as researcher study as geometric problems and already been observed.

### **Statement of the Problems**

A problem of statement is clear description at the issue which includes a vision or issue of a statement. The new curriculum of mathematics (geometry) in secondary level has been implemented in Nepal since 2055 B.S. and the students in average has become under the achievement. According to National Assessment of

Students Achievement (NASA), Nepal stated that student achievement in algebra and geometry is remarkably low when compared with another content area of mathematics. Furthermore, NASA report 2013 shows that students' creativity is ebbing away. Students were weak in proving theorems or formulas and constructing geometric shapes and figures (NASA, 2011). In Mathematics, students are able to do basic calculations, but are weak in reasoning, problem solving, plotting, proving theory or formula, and in constructing shapes and figures. In many cases, the students did not even attempt to complete the open-ended questions. Though the results are obtained by using a good number of linking items to the international item bank, there are mitigating factors, such as the poor level of India in the TIMSS 2011 survey, so more rigorous studies are needed to confirm the results (NASA, 2013). Students are much better at recalling the type of questions (46%). While analyzing further the dataset of NASA (2013), the performance of a large number of Nepalese students was found relatively low in higher cognitive abilities in Mathematics. For example, about 53% of the students in mathematics could not solve more than 15% of the tasks requiring the higher skills. Students are good in fundamental operations, the basic manipulation of data and numbers, and calculations with few steps. They are much weaker in reasoning, problem solving, plotting, proving the theory or formula, and constructing the shape and figures (NASA, 2013). It seems that students' ability to solve complex problems in Mathematics is low. The teacher's ability to recognize students' strengths and weaknesses is imperative in all subjects, especially more difficult subjects such as geometry. Geometry is second weakest areas in mathematics for Nepalese students (NASA, 2013). Many students, due to their inadequate training and exposure to geometric principles from early childhood, are ill equipped by the time they reach secondary school (Corley, 1990). Subsequently, geometry is a

difficult subject for many students (Fuson, Clements, & Beckmann, 2006). Since there is relationship between teaching and learning (Vijayalakshmi, 2004), it was necessary to identify the problem of teachers and students in teaching learning geometry and also to explore the causes of such problems. This study was answered the following research questions:-

- ) What are the current problems which are faced by teachers and students in teaching and learning geometry?
- ) What are the cause of problems which are faced by teachers and students in teaching and learning geometry?

### **Objectives of the Study**

The objectives of the study as follow:-

- ) To identify the problems faced by teachers and students in teaching and learning geometry at grade IX.
- ) To explore the causes of the problems which are faced by teachers and students in teaching and learning geometry at grade IX.

### **Significance of the Study**

Geometry is one of the most important parts of mathematics dealing with surface, plain dimensions, triangles, rectangles, squares, circles, etc. giving visual shape to mathematics. Most of the students are weak in geometry. However, it is also felt that most of the students' dislike mathematics very much and afraid of geometry as the sisterly wing of mathematics. Most research papers, books, and publication have dealt with other aspect such as achievement, methods, learning environment in mathematics, classroom rather than problems in teaching and learning mathematics in geometry. Therefore, this research was focused to identify the problems in teaching and learning mathematics in community school. The researcher had tried to

identify the problems being faced by teachers and students in teaching and learning geometry at grade IX and to explore the causes of such problems which are faced by teachers and students in teaching learning geometry. The following are the significance of the study:

- ) This study would help to students and teachers for improvement in teaching and learning geometry.
- ) This study could provide some logical and valuable information about the current problems of teaching learning geometry.
- ) This study could help to increase the confidence level of mathematics teachers and learners towards teaching learning geometry.
- ) It helps in designing a revised mathematics curriculum at grade IX.
- ) It helps to create sound environment to parents as well as concern administration.
- ) This study would help to the teacher to bring appropriate change in teaching behavior.
- ) This study would also open the door for the further study about separate geometrical concept.

### **Delimitation of the Study**

Delimitation is the boundary of the research created by the researcher which under control in the research.

- ) The study was limited in the Rautahat districts.
- ) The study conducted only for the mathematics (geometry) subjects.
- ) The study was also included five mathematics teachers of selected schools.
- ) This study was consisted 125 students from selected schools.

- ) The data of this study were generated through the questionnaire, observation form and interview schedule.
- ) This study was limited to the classroom management, teaching activities, instructional materials, administration, proving and verifying theorem, methods and evaluation techniques.

### **Operational Definition of the Key terms**

An operational definition is the articulation of operationalization (or statement of procedures) used in defining the terms of a process (or set of validation tests) needed to determine the nature of an item or phenomenon (a variable, term, or object) and its properties such as duration, quantity, extension in space etc. Since the degree of operationalization can vary itself, it can result in more or less operational definition. The procedure included in definition should be repeatable by anyone or at least by peers.

**Problems.** Those statements which have solution are said to be problems. In this study problems in mathematics are the difficulties of mathematics teacher and students.

**Geometry.** The science that treats of the shape and size of things, the science of properties and relations of lines and solids.

**Teacher.** Teachers who are teaching mathematics at grade IX in community school which are governed by Nepalese government.

**Students.** The students who are studying at grade IX in community school.

**Community School.** The school that are governed by the Nepalese government and managed by school management committee.

**Administration.** It is related to the arrangement of teacher, routine, class observation and plan for extra activities. Management of instructional materials, math

lab, refreshment training and smooth school environment were the responsible factor related to school administration that affected on teaching learning activities.

**Classroom Management.**It is the process by which teaches and schools create and maintain appropriate behavior of students in classroom setting.

**Evaluation Techniques.**Evaluation informs about the present position and determine the points to be improved. It further gives the feedback, suggestion and motivates the learner and also the teacher for better progress.

**Teaching Learning Activities.**An activity done inside or outside of classroom for gaining and sharing of knowledge based on a fixed curriculum.

**Teaching Method.** A teaching method comprises the principles and methods used by teachers to enable students learning. These strategies are determined partly on subject matter to be taught and partly by the nature of learner. The approaches for teaching can be broadly classified into teacher centered and student centered.

**Teaching Materials.** Teaching learning materials are the tools, which are used by teachers to help learner to learn concept of geometry with ease and efficiency.



## Chapter II

### Review of Related Literature

Literature review is a scholarly works such as thesis, research report, article, etc. Marrian(1998) describes that the literature review is an interpretation and synthesis of published work.' A literature review is an evaluative report of information found in the literature related to your selected area of study. The review should describe, summarize, evaluate and clarify this literature. A literature review is more than the search for information and goes beyond being a descriptive annotated bibliography.(Marrian, 1998). For instance, imagine you are building a house and you have decided to observe a few houses in your community before finalizing the blueprint of your construction is the example of literature review. This is not only explain what other have done in the related field, but also to explore how they are helpful for your study and how your study is unique and different than other works and how your study adds to the existing literature.

In general, the literature review should: provide a context for the research, justify the research, ensure the research hasn't been done before, show where the research fits into the existing body of the knowledge, enable the research to learn from previous theory on the subject, illustrate how the subject has been studied previously, highlight flaws in your previous research, outline the gaps in your previous research, show that the work is adding to the understanding and knowledge of the field, help refine, refocus or even change the topic, identify the different methodologies, show the relation and help us to provide the contemporary issues.In this session we ensure about empirical literature, theoretical literature and conceptual framework.

## **Empirical Literature**

The empirical study of literature is an interdisciplinary field of research which includes the psychology, sociology, philosophy, the contextual study literature and history of reading literary texts. Empirical research is based on observed and measured phenomena and derives knowledge from actual experience rather than from theory or belief.

Paudel (2009) did a study on the topic “A study on the problems faced by grade VIII students in mathematics”. Objective of the study was to identify the problems faced by students in learning mathematics at grade eight. He took eight schools for study. Among them three schools were selected from urban area and five were selected from rural area. From each school six students and one mathematics teacher were for the study. Both the boys and girls students were equally selected. The study followed the 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 following major findings were derived, the major problems were as the involvement of student in house work more than study, illiteracy of parents, lack of pre-requisite knowledge on the students of mathematics, irregularity of students in school, congested classroom, unavailability of physical facilities and lack of trained and experienced teachers.

Similarly, KC (2009) conducted a research on the topic “A study of problems faced by students in compulsory mathematics at secondary level”. Objective of the study was to identify the problems faced by students in learning compulsory mathematics at secondary level. The nature of this study was quantitative as well as qualitative. This study followed by survey design. He selected six schools from urban

area of Lamjung district 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 observation form and interview schedule were used. The obtained data was analyzed and interpreted with the help of mean, weight and age. The major findings of this study were illiterate parents, poverty of parents, lack of encouragement for study, the gap of low achievement and high achievement students, unavailability for teaching learning materials, lack of mathematics lab, lack of trained teacher, lack of physical facilities and sufficient budget for school. It concluded that there had been significant problems in learning geometry at secondary level.

Thakuri (2011) conducted on the topic “Problem faced by students in geometry at secondary level in Jajarkot district”. Objective of the study was that to identify the problems faced by students in geometry at secondary level. The researcher was used descriptive survey design research procedure. The researcher prepared questionnaire and interview schedule to collect data. The researcher selected sample students and teachers randomly from selected school. The researcher obtained data analysis by calculating mean, percentage, and t-test of sample students and teachers. The major finding of this research was students are facing numerous problems of geometry teaching in the classroom at secondary level. Lack of sufficient time period, there were difficulty in checking homework, economic crisis in school and there were problems in managing the weak students in the classroom

Poudel (2014) conducted on the topic “Problem faced by mathematics teacher in teaching mathematics at secondary level in Arghakhachi district”. Objective of the study was to identify and analyze the problems faced by teachers and students in mathematics class at secondary level. The researcher was used descriptive survey

design followed by both quantitative and qualitative approach. He used questionnaire, observation and interview tools to collect data. The researcher used percentage and mean in data analysis procedure. The major findings of the study were that the teachers' qualification, training and teaching experience were strong in the average. There was a lack of few number of students' participation in the mathematics classroom, lack of motivation to the students. Students were utilized by political programmer, difficulties to the teacher in the sense of result oriented system and physical, economical crisis of the college.

Puri (2016) conducted on the topic "Problems faced by secondary level mathematics teachers and students in geometry". Objective of this study was to identify the factors that contribute to the difficulty in teaching and learning geometry. The researcher used descriptive survey design research approach. The researcher prepared questionnaire, interview schedule and observation form to collect data. He selected sample students and teachers randomly from selected schools. The obtained data was analyzed and interpreted with the help of mean and percentage. The major finding was that the administration and the teacher should be equally responsible to create constructive and sound instructional environment. Some teachers seemed to focus only talented students it is due to their ignorance rather than the intended bias, discrimination and prejudices in math teaching. There was problem on solving parallel question related to exercise due to large volume of book and short teaching period. Available materials also were not used, teacher only discussed about them without showing practically. Only the written tests as evaluation tools are in practice.

Sah (2016) conducted on the topic "problems of teaching and learning mathematics in geometry at grade IX". Objective of this study was to explore the

problems faced by teachers and students in teaching learning geometry. The researcher was used case study of qualitative research approach. The researcher collected data by using interview schedule, observation form and focus group discussion. The researcher analyzed the collected data by grouping the similar information in descriptive method. The major finding of the study was that the students neglected the daily assignments and teacher didn't check homework in the daily basis, lack of motivation in the classroom. Difficulties to the teacher in the sense of result oriented exam system. Most of the teachers were not able to teach their students in the basis of Van Hiele's five levels of thought of geometry. Teachers had not implemented the modern technique, methods and materials for teaching and learning geometry.

After studying overall literature, the researcher found that desired significant steps have not been made to study the problems of mathematics teachers and students at grade IX. Hence this study was concentrated in the problems faced by teachers and students in geometry at grade IX of Rautahat district. Not only empirical literature completed that the research the theoretical literature is also necessary to explain in the research. So the theoretical literatures are explained as below.

### **Theoretical Literature**

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 the Van Hiele research and changed their geometry curriculum in the 1960s. During the 1980s there was interest in the United States in Van Hiele's contribution of the National Council of Teachers Mathematics (1989) brought the Van Hiele model of learning closer to implementation by stressing the importance of sequential learning and activity

approach. The five level of geometry thought (Numbered levels 0-4 or 1-5) do not correspond with students' 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 figures as total entities (Triangle, Square) but do not recognize properties of these figures (right angles in a square)

**Level 1: Analysis(drawing and verbal skills)**

Students analyze component part of the figure (opposite angle of parallelograms are congruent) but, interrelationship between figures and properties cannot be explained.

**Level 2: Informal deduction(verbal skills)**

Students can establish interrelationship 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 of has all the properties of a rectangle) informal proofs can be followed but students do not see how the logical order could be altered not do they see how to construct a proof starting from different or unfamiliar premises.

**Level 3: Deduction(logical skills)**

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

**Level 4: Rigor(applied skills)**

This level of geometric thinking most often applies to college level geometry classes, where students use formal logic to compare abstracts system often without

concrete model. Students reason formally about mathematical system. The product or their reasoning is establishment, elaboration and comparison of axiomatic systems.

### **Conceptual Framework**

Conceptual framework is a mental map. A conceptual framework is a representation, either graphically or in narrative form, of the main concepts or variables, and their presumed relationship with each other(Punch K.F.2005 p.53). A conceptual framework is an analytical tool with several variation and contexts. It is used to make conceptual distinctions and organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply.

### **Conceptual Framework of the Study**

*Source: Paudel, (2011)*

As illustrated above related literature, problems of teaching and learning geometry depended under different aspects. Generally, problems of teaching and learning geometry which are faced by teachers and students may be affected from teaching methods, instructional materials, classroom management, proving and verifying theorem, school administration, learning activities and evaluation technique.



## **Chapter III**

### **Methods and Procedures**

Research methods and procedures are the scientific process which determines how the researcher completes the research systematically. Research method does not only mean to collect data/information but also means to use appropriate research method. As method and procedures are the root of the research, the researcher should be clear about the design of the study, population of the study, sample of the study, nature and source of data, selection of respondents, data collection tools and techniques, data collection procedures and data analysis and interpretation procedures.

#### **Design of the Study**

The survey design is the research technique in which data are gathered by asking questions of a group of individuals called respondents (Ary et al, 2002). The survey research is a method for collecting and analyzing data obtained from large number of respondents through highly structured questionnaire schedule. The qualitative aspect was used to analyze information explicitly and descriptively.

#### **Population of the Study**

The population of the study consisted all students and teachers of grade IX of community schools of Rautahat district during academic year 2073 B. S.

#### **Sample of the Study**

Sample means a portion of the population which represents all the population of the study. One hundred twenty five students and five teachers were selected as a sample of the study from five selected community schools of Rautahat district. I selected those students who had 25 percent above attendance.

### **Sampling Strategy**

Random sampling is the methods of drawing a portion (or sample) of a population or universe so that each number at the population or universe has an equal chance of being selected (Kerlinger, 1983). The teachers and students were selected randomly from sample of the selected school. Random sampling method belongs to probability sampling which is basically used in quantitative research design.

### **Data collection Tools and Techniques**

Every study needs tools to collect data. In this study, one set of observation, one set of questionnaire schedule and one set of interview schedule were designed as main tools of the study.

**Observation Form.**At first researcher constructed an observation form with checklist based on the theme of conceptual framework to access the problems which were faced by students and teachers. The researcher evaluated activities and their problems and causes of such problems. The non-participation observation was done in the natural setting where researcher watched and listen the essential data from the subjects.

**Questionnaire.**Questionnaire refers to a device for securing answers to a series of questions by using a form which the respondent fills in himself(Goode and Hatte,1952). In order to meet the research objective of the study, a set of questionnaire was used to find the problems of teaching learning geometry which were faced by teachers and students in grade IX. The questionnaire was developed on the basis of elements given in conceptual framework of the study and then questionnaire was administered to all sample students. Also the questionnaire was developed in Likert scale point techniques. Both positive and negative statements were included in the questionnaire.

**Interview Schedule.** The interview is a face to face interpersonal role situation in which one person, the interviewer, asks a person being interviewed, the respondent, questions designed to obtain answers pertinent to the research problem (Kerlinger, 1983). There are many types of interview, among them direct interview was conducted with respondents in this study. After conducting the questionnaire and observation the researcher prepared an interview schedule and applied this schedule on selected students and teachers. Based on contradictory, information was obtained through questionnaire and observation and theme of conceptual framework. This interview guideline was also applied in order to encapsulate information regarding affecting domain to analyze the problems of teaching learning geometry and cause of such problems which were faced by both mathematics teachers and students at grade IX.

#### **Data Collection Procedure**

For this purpose, the researcher took permission letter from Department of Education TU Kirtipur. After selecting the sample schools with random sampling method, the researcher visited the schools with tools/instruments to collect data. Before the administration of the questionnaire the researcher met the authorities of sampled schools and explained the purpose of the study in detail. When the authorities of the schools agreed to allow the study to be carried out, the researcher arranged the teacher assembled ready to participate in the study. The research tools were administered in group with direct supervision. In the beginning, the data was achieved by administering the observation schedule. The non-participant observation was done in the natural setting where researcher was watched, listened and record the essential data carefully.

The researcher prepared set of questionnaire for students and teachers. This questionnaire was developed with many statements capturing the themes of conceptual framework. Also the questionnaire was developed in Likert scale point techniques to collect data from students. After tabulating the information from that questionnaire and observation schedule the researcher was administered interview schedule for selected students and teachers.

### **Scoring Procedure**

For the analysis of items, weightage of 5, 4, 3, 2 and 1 were assigned to statement and state "strongly agree, agree, undecided, disagree, and strongly disagree" respectively. For the statement opposing to the point of view, the item had taken in the opposite order. Mean weightage was calculated, 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 concluded that the statement was in strong favor to the problem if the index measure is less or equal to three then it is weak favor to the problems.

**Table 3.1: Likert-Scale Point Used in Techniques of Scoring**

<b>S.N.</b>	<b>Rating</b>	<b>Marks of positive statement</b>	<b>Marks of negative statement</b>
1.	Strongly Agree	5	1
2.	Agree	4	2
3.	Undecided	3	3
4.	Disagree	2	4
5.	Strongly Disagree	1	5

### **Data Analysis an Interpretation**

After collecting data, the researcher analyzed and interpreted using quantitative approach. At first, the researcher analyzed the quantitative data by using table and simple statistical method, descriptive statistics to deliver the meaning of the data and this result analyzed with quantitative techniques to some extent for the validation of data using by Likert scale.

Mean, frequency and percentage were used to find whatever the statement is problematic or not. It was used to locate the central position of response to the statement of teacher and students as a whole in rating scale. If the calculated index is greater than three then it is concluded that the statement is problematic and if the calculated index is less or equal to three then it is concluded that the statement is not problematic. The information and interview were analyzed in descriptive method.

## **Chapter IV**

### **Analysis and Interpretation of Data**

This chapter deals with the analysis and interpretation of collected information of the study. Analysis is detailed examination of the elements or structure of something. A systematic examination and evaluation of data or information were breaking it into its component parts to uncover their interrelationship. An examination of data and facts were uncovered and understand cause effect relationship. Interpretation is the act of explaining, reforming or otherwise showing your own understanding of something. Moreover, the collected information from the informants was analyzed and interpreted to find out the problems of teaching and learning geometry. It had already been mentioned that statistical device mean were used to find out the problems faced by teachers and students in teaching and learning geometry and to explore the cause of the problems which are faced by teachers and students in teaching and learning geometry.

#### **Problems Faced by Teachers and Students in Teaching and Learning Geometry**

The first objective of the study was that to find the problems faced by teachers and students in teaching and learning geometry. In order to find the problems faced by teachers and students in teaching and learning geometry at grade IX, the researcher obtained information from questionnaire with 57(33 for students and 24 for teachers) questions related with classroom management, teaching and learning activities, instructional materials, methods, evaluation, school administration, proving and verifying theorems. The question contained both positive and negative statements. The information obtained from questionnaire and interview schedule is analyzed and interpreted in this part.

### Analysis and Interpretation of the Responses on Teaching Learning Activities

Teaching activities play important role to shape knowledge and understanding the subject matter. Students' performance and perception depend upon how the teacher presents subject matters. Students centered teaching methods are now highly appreciated. The students' responses on teaching learning activities are given below as:

**Table 4.1: Students' Responses on Teaching Learning Activities**

S.N.	Statements	SA	A	U	D	SD	Mean	
1.	The class starts from interesting way.	43	46	8	9	19	3.68	
2.	Teachers give extra parallel problems related with exercise.	42	36	8	23	16	3.52	
3.	Teachers provide opportunity for weak students.	19	21	6	41	38	2.54	
4.	The teachers feel difficulty while participate with you in classroom.	52	35	6	23	9	3.78	
5.	We feel difficulty while proving theorem.	66	29	8	10	12	4.01	
	Aggregate mean							3.51

This table shows the different statements on teaching learning activities which were given in consideration of problems in teaching learning geometry.

From the table, it can be seen that the aggregate mean score of teaching learning activities is 3.51 which is greater than neutral mean. It means that teaching learning activities were not satisfactory in most community school. The mean score of

item number 1 is 3.68 which indicate that students are in favor of statement. It means the classes start from interesting way. Similarly, the mean score of item number 2 is 3.52. It shows that teachers always give extra parallel problems related with exercise. Also from class observation what I found that teacher starts the class in effective way. Before touching the topic, teacher warm-up of the students and some time ask questions related to the topic in process of teaching period.

Moreover, the mean score of item number 3 is 2.45 which is less than neutral mean. It shows that students are in less favor of statement. It means teachers do not provide extra time for weak students. The mean score of item number 4 and 5 are 3.78 and 4.01 respectively, which are greater than neutral means. It shows that the teachers feel difficulty while participating with students in classroom and also students feel difficulty in proving or verifying theorems that created problem in teaching learning geometry. Regarding this some students and teachers answered in the following ways.

*"When teacher comes in to the classroom, he feels hurried and asked about homework, have you done or not? He does not check homework individually because of over population and short period of time. After that he starts teaching by using the same old or traditional lecture method. He does not use any new modern technology or methodology in teaching learning process". (Student)*

From the above response, the students in community school faced the problem of traditional methodology and absence of modern technology. Similarly, when I asked another student then he also responded in following ways.

*"Teacher has to finish the course, content or syllabus in time. In course of finishing the content in time, they do not get chance to introduce with topic in details. Consequently, we feel difficulty for solving all exercise related to the topic".*



But, regarding this when I interviewed to the subject teachers about above problems then they responded in the following ways.

*"There is no facility of modern technology in the school and school has not so much income that school can afford for these materials. In spite of these problems, we have to finish the course in time. If we could not finish the course in time, we would ill-treated by administration. In comparison of students' proportion, we are a few and we do not give extra time to the students because all period is always packed".*

By analyzing the above responses, we can say that though we are living in the world of science and technology, still some teachers are using the same old traditional method (lecture method) for teaching learning activities. They do not use any latest materials, technology, mathematical software like goegebra or mathematica and student centered method in the classroom because of overloaded students, short period of time and low income of school.

In conclusion, teaching learning activities of the most community schools were seen to be poor and traditional because of insufficient of time, overload of students and low income of schools.

### **Analysis and Interpretation of Responses about Classroom Management**

Educations have been aware that the quality of classroom management is an important factor for student 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 managers in commerce and industry avoid dispute which disturb production. Therefore, in the classroom, successful teachers have the capabilities to provide remarkable learning activities so that students can develop their conceptual thinking. The overall situation concerned with classroom management is given in following tables:

**Table 4.2: Teachers' Responses on Classroom Management**

S.N.	Statements	SA	A	U	D	SD	Mean
1.	There is problem of crowded of students.	2	1	1	1	0	3.8
2.	There is lack of proper space to demonstrate instructional materials.	0	1	1	1	2	2.2
3.	The unsystematic arrangement of chair created problem to observe the students individuality.	0	0	0	3	2	1.6
4.	The classroom is not well lighted and ventilated.	0	1	1	1	2	3.8
5.	The noise come from outside creates problems in teaching learning process.	1	2	1	0	1	3.4
6.	The classroom is not neat and clean.	1	0	1	2	1	3.4
	Aggregate mean						3.03

This table shows the different statements on classroom management which were given in consideration of problems in teaching and learning geometry.

From the table, it can be seen that the aggregate mean score of classroom management is 3.03 which is greater than neutral mean. This indicates that most of teachers are in favor of problems. It means teachers do not use their skills and techniques to create learning environment in the classroom. The mean score of item number 1 is 3.8 which is greater than neutral mean. It means teachers are facing problems with crowded of students.

Furthermore, the mean score of item number 2 is 2.2 which is less than neutral mean. This indicates that most of teachers are in less favor of problem. It means there

is proper space to demonstrate instructional materials. Also the mean score of item number 3 is 1.6. It means arrangement of furniture is good which helps teachers to observe students individually. But it is not enough for well classroom management. It is also included more things likes make positive phone calls with parents, demonstrate the behavior you want to see, celebrate hard work, create group contracts, make class engaging, build relationship with students. If these are implied properly in classroom management will be effective which create well environment for teaching learning geometry.

The mean score of item number 4 is 3.8 which is greater than neutral mean. In this statement most of teachers are disagree with problem. It means classroom is well lighted and ventilated. The mean score of item number 5 is 3.4. It means teachers are facing problems with unnecessary noise which come from outside. Similarly, the mean score of item number 6 is 3.4. It shows that maximum teachers are in less favor with problem. It means the classrooms of most community school are neat and clean.

In conclusion, the classroom management of the most of the community schools was seen to be disorganized because of crowed of students.

**Table 4.3: Students' Responses on Classroom Management**

S.N.	Statements	SA	A	U	D	SD	Mean	
1.	We feel difficulties while participating in the congested classroom.	36	46	6	14	23	3.46	
2.	We have no any problem of blackboard or whiteboard and other furniture in our classroom.	58	17	0	33	17	2.47	
3.	Anything written on blackboard is visible.	66	17	5	26	11	3.81	
4.	We are not affected from noise which comes from another classroom and vehicles.	29	25	14	28	29	3.02	
5.	Teacher has no idea how to manage the classroom.	29	26	29	9	32	2.91	
	Aggregate mean							3.13

This table shows the different statements on classroom management which were given in consideration of problems in teaching and learning geometry.

From the above table it can be seen that the aggregate mean score of classroom management is 3.13 which is greater than neutral mean. It means students are facing problems in classroom management. The mean score of the item number 1 is 3.46 which indicate that maximum students are in favor of problem. It shows that they feel difficulty while participating in congested classroom. The mean score of

item number 2 is 2.47 which show this statement is not problematic. Students have no any problem of blackboard, whiteboard or other furniture in classroom.

The mean score of item number 3 is 3.81 which indicate that students are in favor of statement. It means anything written on blackboard or whiteboard is visible. Also the mean score of item number 4 is 3.02. It means students are affected from noise which comes from another classroom and vehicles. Similarly, the mean score of item number 5 is 2.91 which is less than neutral mean. It shows that teachers have good skills about managing the classroom. However, which are not sufficient for teaching and learning geometry. Regarding this some teachers and students answered in the following ways.

*"It takes 20 minutes to reach in the school, but I leave home before an hour for school because there are many students in my classroom. If I get late for school, I have to sit behind of the classroom and I do not hear clearly teacher's voice due to the noise of students, sound of other class and vehicle's horn. As a result I do not understand what the teacher teaches in the classroom". (Student view)*

From above response, the students in community school face the problem of their seats, distance and noise made by other things. Regarding this when I asked other students then they also responded me in the following ways.

*"There are accesses of physical facilities in the classroom such as blackboard, furniture, fans. However, teacher do not create learning environment in the classroom".*

Again, I asked to the subject teacher about above problem then they also responded me in the following way.

*"There are more students than the necessity of the classroom. In other words, there are more students in the comparison of teacher and classroom proportion and*

*we have to teach in such classroom where the populations of students are from 60 to 70 where, the classroom can only sustain from 40 to 50 students. That is why, it is very difficult to control students in such classroom".*

But, taking these problems in to consideration when I asked to the head master about certain idea or techniques to solve these problems, then he suggested/answered in the following way.

*"Classroom management is one of the essential factors of teaching learning activities. We can't maintain well managed class while teaching in the classroom. Teachers and students are not only responsible person for well classroom management, but administration is also responsible person. And we give attention on physical management of classroom. We do not care about mental management of students or mentally preparation of students, whereas it is very important for teaching learning activity. When students come in school, at that time we have to arise such of feeling in students' mind that they feel like hunger of learning. Students think that today we learn some new, today the class is important. Then, there will create learning environment in the classroom and students can learn without making any noise in the classroom."*

By describing above mentioned responses, what we can say that there are greater number of students in the comparison of teachers and classroom proportion. Being physical management is not sufficient for teaching learning activity, students' mental management is also necessary. There cannot be creating learning environment in school, in spite of having all types of physical infrastructures because students' mental management is also necessary. Different types of noises and congested classroom were problems for creating learning environment.

In conclusion, the classroom management of the most community school was seen to be weak because of overload of students and weak school administration.

### **Analysis and Interpretation of Responses Related to Instructional Material**

To make teaching learning activities affective and meaningful, instructional materials are indispensable. Different kinds of teaching materials can be used in teaching geometry such as audio visual aids, models, textbook and computer and so on. These materials could 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 affective. Following tables show the situation of problems related with instructional materials.

**Table 4.4: Teaches' Responses on Instructional Materials**

<b>S.N.</b>	<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>	<b>Mean</b>	
1.	There is math lab facilities in school (visual manipulative objective chart model and computer projector)	0	1	0	2	2	2	
2.	Schools have lack of sufficient concrete teaching materials.	3	2	0	0	0	4.6	
3.	Problems to construct and collect lesson wise appropriate materials.	1	0	0	2	2	2.2	
4.	Lack of appropriate knowledge to use the teaching materials.	0	1	0	2	2	2	
5.	It is difficult to complete the whole course if teach by using teaching materials.	4	0	1	0	0	4.6	
	Aggregate mean							3.08

This table shows the different statements on instructional materials which were given in consideration of problems in teaching learning geometry.

From the table, it can be seen that the aggregate mean score of instructional materials is 3.08 which is greater than neutral mean. It shows that teachers do not use all kinds of teaching materials or suitable materials in classroom that creates problems in teaching learning activities. The mean score of item number 1 is 2 which indicate that most of teachers are in less favor with this statement. It means science lab, library and computer room seemed as they were not made for practical mathematics. No separate math lab was found even in single school of concerned area.

Moreover, the mean score of item number 2 is 4.6 which indicate this statement is problematic. It shows that most of schools have insufficient number of concrete teaching materials. Also the mean score of item number 3 is 2.2 which is less than neutral mean. It means there are easy to construct and collect lesson wise appropriate materials. But, from class observation, I found that teachers do not construct and collect lesson wise teaching materials.

It was observed that the mean score of item number 4 is 2 which is less than neutral mean. It means teachers have good knowledge about use of teaching materials. But, they do not use instructional materials properly in teaching geometry only discussion about them without showing practically. Also the mean score of item number 5 is 4.6 which indicate that there is difficult to complete the whole course if teach by using teaching materials.

In conclusion, the most of community school had sufficient of instructional materials but these materials were not used properly because of insufficient of times and incompleteness of course.



**Table 4.5: Students' Responses on Instructional Materials**

S.N.	Statements	SA	A	U	D	SD	Mean	
1.	Text books and practice books are available in time.	27	15	5	40	38	2.62	
2.	Our teachers use locally available and low cost materials in teaching geometry.	28	52	15	18	12	3.53	
3.	Manipulative geometrical materials are not available in our school.	49	19	6	26	25	3.33	
4.	Teachers use instructional materials while teaching geometry.	33	16	4	29	43	2.74	
5.	It is difficult to complete the whole course if taught by using teaching materials.	21	22	19	38	25	2.81	
6.	Lack of appropriate knowledge how to use teaching materials.	36	29	11	13	36	3.13	
	Aggregate mean							3.03

This table shows the different statements on Instructional Materials which were given in consideration of problems in teaching learning geometry.

From the table, it can be seen that the aggregate mean score of Instructional Materials is 3.03 which is greater than the neutral mean. It means that students are facing problems in the field of instructional materials. The mean score of item number 1 is 2.62 which show that students are in less favor of statement. It means text books and practice books are not available in time. The mean score of item number 2 is 3.53 which indicate that students are in favor of statement. It means teachers use locally available and low cost materials in teaching geometry but, sometime only.

Moreover, the mean score of item number 3 is 3.33 which indicate that it is problematic. So, I concluded that manipulative geometrical materials are not available in most of community school. Also the mean score of item number 4 is 2.47 which is less than neutral mean. It shows that students are less favor with this statement. So, teachers do not use instructional materials while teaching geometry.

The mean score of item number 5 is 2.81 which indicate that there is no problem with this statement. It means it is easy to complete the whole course if thought by using teaching materials. The mean score of item number 6 is 3.13 which is greater than neutral mean. It shows that teachers have not so much idea about teaching materials that how to use it appropriately. Regarding this some students and teachers answered in the following way:

*"There is hardly availability of teaching materials in school, however, available materials are not used in a right time, in right place and in a right way. Teacher only describes about materials orally. He does not demonstrate teaching materials explicitly". (Student)*

From above response, I can say that available materials were not used appropriately. Teacher only describes it orally. Regarding this when I asked another student then he answered as follows.

*"Teachers only keep on using the same old teaching materials (daily used materials), we look for new style, methods, techniques and materials. We expect for something new, however, our teachers do not use any latest techniques, method and technology in teaching learning process".*

Similarly, when I asked to the subject teaches about above problems then they responded in following ways.

*"The students are interested in modern technology and I know a little bit about integrating ICT in teaching mathematics. But, school administration is not ready to manage the require resources inside the classroom and force me to carry on my teaching in the usual manner. The administration sends me to several mathematics teachers' training but, I do not get proper environment to implement my learning".*

From the interpretation of above responses, we can say that instructional materials are tools which help to achieve learning objective and may aid a student in concretizing a learning experience so as to make learning exciting, interesting and interactive. But there is no access of new materials and technology in schools. Students look for new style, method, techniques and materials, however, teachers do not use any materials like audio and visual materials, flash card and picture cards because schools have not so much income that can afford for these materials.

In conclusion, Instructional Materials was not available in the most of community schools; if it is available it happens late. As a result, the effective use was not done in teaching learning geometry.

### **Analysis and Interpretation of Responses Related to teaching methods**

Teaching methods play vital role in meaningful teaching and learning. This is the method chosen to achieve a teaching goal. This is normally defined by the teacher of a given subject, so that the student can then follow it. It should be designed in such

a way that students acquire the knowledge and skills for which the subject was included in the curriculum. Following tables illustrates the responses on problems of teaching method.

**Table 4.6: Teachers' Responses on Teaching Methods**

S.N.	Statements	SA	A	U	D	SD	Mean
1.	Every topic is teaching by using daily lesson plan.	1	0	2	1	1	2.8
2.	I confused which method is used in which lesson or units.	1	1	2	1	0	3.4
3.	Lack of training and modern technology.	2	0	1	1	1	3.2
4.	Exam oriented teaching is also created problems in teaching learning geometry.	1	1	2	0	1	3.2
5.	It is difficult to complete the whole course by students centered teaching approach.	0	1	0	2	2	2
6.	Lack of knowledge about psychology of students.	1	0	0	3	1	2.4
7.	Problem based learning (PBL) method is used in teaching learning geometry.	1	0	1	1	2	2.4
	Aggregate mean						2.75

This table shows the different statements on teaching methods which were given in consideration of problems in teaching learning geometry.

From detail study of table, it can be seen that the aggregate mean score of teaching method is 2.75 which is less neutral mean which significance less problem.

But, indivisibly there are problems in many statements. It means there are only

focuses on traditional teaching method or teacher centered method. Teachers do not use any modern methodology to improve teaching learning activities.

The mean score of item number 1 is 2.68 which indicate that teachers are less favor with this statement. It shows that every topic of mathematics is not teaching by using daily lesson plan. The mean score of item number 2 is 3.4 which is greater than neutral mean. It means teachers are confused which method are used in which lesson or units. Thus, it is problematic. Also the mean score of item number 3 is 3.2 which show strong favor on problem schools do not care about training and modern technology.

The mean score of item number 4 is 3.2 which is greater than neutral mean. it means teachers focus only on exam oriented teaching. They do not deal the topic in details. Thus it is problematic. The mean score of item number 5 is 2 which indicate that it is easy to complete whole course by students centered teaching approach. But, from class observation mostly lecture method was used in teaching learning geometry.

Moreover, the mean score of item number 6 is 2.4 which is less than neutral mean. It means teachers have good knowledge about psychology of students. Thus it is not problematic. Also the mean score of item number 7 is 2.4 which show that teachers are in less favor on statement. It means problem based learning method is not used in teaching learning activities.

In conclusion, the teacher of most of community school was not used modern technology and methodology in teaching and learning because of lack of technology and training which is given by school or related sector. ICT plays a great role in teaching learning process but most the community schools are not used ICT for teaching learning process. In the case of teaching geometrical figure and its

construction play vital role to improve teaching learning process. Due to lack of ICT teaching learning process was not most effective in the most of community schools.

**Table 4.7: Students' Responses on Teaching Method**

S.N.	Statements	SA	A	U	D	SD	Mean	
1.	Our teachers ask questions individually while teaching geometry.	55	41	6	10	13	3.92	
2.	Teachers do not solve the problem which is given by students.	54	13	1	16	41	2.82	
3.	Teachers use only lecture method in teaching geometry.	48	15	17	24	21	3.36	
4.	Teachers have no idea, how to use different method in different topic of geometry.	32	21	20	25	27	2.95	
5.	Teachers are confused which method is used in which lesson or unit.	22	20	20	39	24	2.81	
6.	Lack of knowledge about psychology of students.	38	45	7	14	21	3.52	
7.	Problem based learning (PBL) method is used in teaching learning geometry.	46	30	5	13	31	3.38	
	Aggregate mean							3.25

The table shows the different statements on teaching methods which were given in consideration of problems in learning geometry.

From the table, it can be said that the aggregate mean score of teaching method is 3.30 which is greater than neutral mean. It means traditional and unsuitable teaching methods create problems in teaching learning geometry. The mean score of item number 1 is 3.92 which show strong favor on the statement teachers always ask questions to students individually in teaching period. The mean score of item number 2 is 2.82. In this statement most of students are in favor of problem. It means teachers do not solve the problems which are raised by students in the class.

Furthermore, the mean score of item number 3 is 3.36 which is greater than neutral mean. It means teachers use only lecture method in teaching process. They do not use any kind of student centered method in teaching geometry. Thus, it is problematic. The mean score of item number 4 is 2.95 which is less than neutral mean. It means teachers have good idea how to use different method in different topic. But, I found that most of teachers are not use suitable method in teaching learning activities.

The mean score of item number 6 is 3.52 which indicate that students are in favor of problem. It means teachers have not good knowledge about psychology of students which create problem in understand the feeling and interest of students. Also the mean score of item number 7 is 3.38 which is greater than neutral mean. It shows that problem based learning method is not used in teaching learning geometry. Regarding this some students and teachers answered in the following ways.

*"We are living in 21<sup>st</sup> century where the use of modern technology and methodology are quite important for teaching activities, though, our teachers are using traditional methods. As a result, I am not interested in learning geometry and it becomes as a hard subject for me". (Student)*

Similarly, regarding this, other students responded in the following ways.

*"We always come in school with the hope of learning something new, but teacher use the same old techniques and style. They do not use any modern methodology, style and technology. Because of these, we feel bored in geometry class".*

But, when I interviewed to subject teachers on the basis of above problems then they answered in the following ways.

*At any cost, students should pass the examination otherwise we should have to defense with the guardians and administration. We have to complete the bulky textbook having extremely more content. Moreover, there is no certainty of teaching day because of several reasons (schools' extra activities and political strikes). If we use any other methodology like students centered methods, we do not finish the course in time. So, we have more tension than students in case of exam result. The job security depends upon the percentage of students passed in examination.*

From the above responses, it can be concluded that modern methodology and technology play vital role in effective teaching learning, but most of teachers use traditional method or style in teaching. They do not update themselves with new methodology. They do not use the learning skills in teaching learning activities which they gain from refreshment teachers' training.

In conclusion, teaching learning methods was not used effectively in the most of community schools because of lack of teacher training.

### **Analysis and Interpretation of Responses about Proving and Verifying Theorems and Construction**

Teaching theorems is not an easy task at all. It is abstract and challenging task because of its 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.

Van Hiele (1957) noticed the difficulties that their students have in learning geometry. His theory explains why many students' encounter difficulties in their geometry course especially with formal proof. Van Hiele believed that writing and that many students need to have more experiences in thinking at lower level before learning formal geometric. Following table illustrates the students' responses on problems of proving and verifying theorems and construction.

**Table 4.8: Students' Responses on Proving and Verifying Theorems and Construction**

S.N.	Statements	SA	A	U	D	SD	Mean	
1.	Teaching materials are used in teaching theorem and construction.	33	19	6	26	41	2.82	
2.	Our teachers use geometrical instruments while teaching construction.	52	11	9	28	25	3.29	
3.	Geometrical theorems of grade IX are related with life.	26	26	8	26	39	2.79	
4.	Examples and exercise of theoretical topics are correlated.	48	45	9	10	13	3.84	
	Aggregate mean							3.18

This table shows the different statements on proving and verifying theorems and construction which were given in consideration of problems in learning geometry.

From the table, it can be seen that the aggregate mean score of proving and verifying theorems and construction is 3.18 which is greater than neutral mean. This shows that the maximum number of students is in favor of 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 level geometrical thought.

The mean score of item number 1 is 2.82 which is less than the neutral. It shows that students are in less favor of statement. It means teachers do not use teaching materials while teaching theorem and construction. Also the mean score of item number 2 is 3.29 which indicate strong favor on problem. It means geometrical instruments are not used in teaching construction. So, the students have no idea how to construct geometrical figure exactly.

Moreover, the mean score of item number 3 is 2.79 which is less than neutral mean. It shows that students are less favor on statement. It means geometrical theorems of grade IX are not related with life. The mean score of item number 4 is 3.84 which indicate that students are in favor of statement. It means examples and exercise of theoretical topic are correlated. Regarding this some students and teachers answered in the following way.

*"We want to study any topic in depth especially theoretical topic, but our teachers make us memories the theorem by parrot learning. They tell that theorem will be understandable slowly and gradually. So, we feel difficulty to prove theorem".*  
(Student)

Again I asked to other students on the basis of difficulty in proving and verifying theorem and construction then they answered in the following ways.

*"We do not feel so difficulty while studying construction topic. But, teachers do not use any materials in construction. So, we feel difficulty for drawing construction".*

*"Teachers only teaches selected theorem. They do not teach other theory except selected theories. Thus, we feel strenuous to prove the left theory without feedback of teacher".*

Moreover, the researcher asked to the teacher about above problems which faced by students in proving and verifying theorem then they answered in the following ways.

*"We want to describe the topic in details. It is not our desire to explain the topic surfacely. It is our compulsion, because we have short period of time and we have to finish the course anyway in time. Thus, we do not be teaching the topic in details".*

According to the above responses, teaching process of teachers is based on parrot learning. They do not use geometrical materials in teaching construction. In case of finishing the course at a time they do not deals the topic in details.

In conclusion, most of the community school had given less importance to proving and verifying theorem and construction.

### **Analysis and Interpretation of Responses about Evaluation Techniques**

Evaluation is systematic process that involves a variety of activities. Teachers gather information about student achievement informally and formally. Informal evaluation is used by the teacher to provide feedback to students and to check for understanding in the teaching learning process. Evaluation helps to build an educational programme, assess its achievement and improve upon its effectiveness. Thus evaluation plays a significant role in any educational programme. It plays an

enormous role in teaching learning process. It helps teachers and students to improve teaching and learning. Following tables illustrates the responses on problems of evaluation techniques.

**Table 4.9: Students' Responses on Evaluation Techniques**

S.N.	Statements	SA	A	U	D	SD	Mean
1.	It is difficulty to check daily homework.	37	39	12	22	15	3.48
2.	The teachers do not take the test at the end of unit.	39	26	13	10	43	3.08
3.	Our teacher takes different types of test except final exam.	17	21	6	38	43	2.45
4.	Teaching is only exam oriented.	47	4	11	27	36	3.01
5.	The teachers do not focus on our creativity and curiosity.	23	47	7	19	29	2.87
6.	Teachers give the feedback.	58	42	5	15	5	4.06
	Aggregate mean						3.16

This table shows the different statements on evaluation technique which were given in consideration of problems in learning geometry.

From the table, it can be seen that the aggregate mean score of evaluation technique is 3.16 which is greater than neutral mean. It means the most of students are in favor of the problems of evaluation techniques. The mean score of item number 1 is 3.48 which indicate that students are in favor of problem. It means there is difficulty in checking daily homework. Also the mean score of item no 2 is 3.08 which shows

that students are in favor of problem. It means teachers do not take the test at end of unit.

The mean score of item number 3 is 2.45 which is less than neutral mean. It shows that students are less favor of statement. It means teachers do not take different types of test except final exam. They focus only on summative evaluation system. The mean score of item number 4 is 3.01 which indicate that students are in favor of problem. It shows that teaching learning process is mostly based on exam oriented.

Furthermore, the mean score of item number 5 is 2.78 which is less than neutral mean. In this statement most of students are agree with problem. It means teacher do not focus on curiosity and creativity of students. Also the mean score of item number 6 is 4.06 which indicate that most of students are in favor if statement. It means teachers give feedback to students at end of unit or topic. Regarding this some students and teachers answered in the following way.

*"Teachers use such type of evaluation system which evaluates our bookish knowledge. They do not assess our internal and external potential, value, skill and quality". (Student)*

Similarly, regarding this, another student responded in the following ways.

*"Teachers mostly use summative evaluation system which only evaluate our fail or pass capacity. They use formative evaluation only for name and they do not give feedback after the formative evaluation. So, we do not recognize our strong and weakness aspect".*

Again I asked to subject teacher about above problems then they responded in following ways.

*Evaluation is such type of system which uses to evaluate all internal and external activities of students, but we evaluate the students on the basis of obtained*

*score. Thus, we do not be evaluating students appropriately. It is quite necessary to change evaluation system to deprive such evaluation problems.*

From the interpretation of above responses, teachers focus only on summative evaluation. They do not give the feedback after the formative evaluation. There is no any connection between the classroom evaluation and final evaluation of students. It indicates that the poor students could also pass the final evaluation by cheating and defective promoted policy.

In conclusion, the evaluation techniques of the most of the community schools were seen to be poor as well as they didn't use both(formative and summative) evaluation techniques properly and systematically because of untrained teachers and large number of students.

### **Analysis and Interpretation of Responses about School Administration**

School administration is all about the planning, directing, organizing and controlling human or materials resources in an educational setting. But if it seems to be passive and irresponsible then teachers and students may face problems on teaching learning process. Following table illustrates the teachers' responses on problems of school administration.

**Table 4.10: Problem Related to School Administration**

S.N.	Statements	SA	A	U	D	SD	Mean
1.	Lack of teacher involvement in curriculum planning.	3	2	0	0	0	4.6
2.	Physical infrastructure is sufficient for teaching learning activities.	2	2	0	1	0	4
3.	Lack of opportunity to participate in interactions workshop and refreshment training to teach difficult and rigor topic.	2	3	0	0	0	4.4
4.	Unavailable of mathematical journal, dissertation and new books.	1	0	0	2	2	2.2
5.	Low salary is one of the causes of problem in teaching mathematics.	2	1	1	1	0	3.8
6.	School administration is less responsible to manage instructional materials.	1	2	0	1	1	3.2
	Aggregate mean						3.7

This table shows the different statements on school administration which were given in consideration of problems in teaching and learning geometry.

From the table, it can be seen that the aggregate mean score of school administration is 3.7 which is greater than neutral mean. It shows that school administration is not serious about the planning, directing, organizing and controlling human or materials resources in an educational setting. The mean score of item number 1 is 4.6 which indicate strong favor of problem. It means teachers do not involve in curriculum planning. Thus, it is problematic. The mean score of item number 2 is 4 which show that teachers are in favor with this statement. It means physical infrastructure is sufficient for teaching learning activities.

The mean score of item number 3 is 4.4 which is greater than neutral mean. It shows that teachers are in favor of problem. They do not get opportunity to participate in all kinds of training that creates problem in teaching difficulty and rigor topic. The mean score of item number 4 is 2.2 which indicate that there are good facility of mathematical journal, dissertation, and new books.

Moreover, the mean score of item number 5 is 3.8. It means low salary is one of the causes of problem in teaching mathematics. Thus it is problematic. The mean score of item number 6 is 3.2 which indicate that school administration is less responsible to managing instructional materials. . Regarding this some students and teaches answered in the following ways.

*"Most of the teachers in our school are local. They reach late in school. They leave school as they get any household work at their home. Due to this, our classes remain vacant. Regarding this, our school administration does not take any action. Teachers and administrative stay in leave without any reasons co-operating each other". (Student)*

Similarly, when I asked another student then he answered in following ways.



*"Teachers and administrative do not care about our attendance. They do not take any charge either we become absent or present in school. Similarly, our parents are not called on result day to see our good or bad result".*

Again, when I asked to head teacher about above problems which were faced by students and parents then he responded in following ways.

*"In reality, our school teachers and I are local here. We have to live together in society. But, it is not good to be present late in school and leave the school in our own small work. We have already made our decision to provide students' result to their guardians from coming session. And this will make students' parents aware about their strong and weak point".*

From the interpretation of above responses, it can be concluded that most of teachers are local in concern area. They present late in school and leave the school in their own small works. As a result classes remain vacant. There is no any importance of students' attendance in class. Parents were not called on the result day to see strength or weakness of their child.

### **Causes of Problems which are faced by Teachers and Students in Teaching**

#### **Learning Geometry**

The second objective of the study was to find the causes of Problems which were faced by teachers and students in teaching and learning geometry. In order to find the Problems faced by teachers and students in teaching and learning geometry in grade IX, the researcher obtained information from class observation and interview schedule related with classroom management, teaching and learning activities, instructional materials, methods, evaluation, school administration, proving and verifying theorems. The researcher was described collected information and found the causes of such problems as: overload of students, untrained teachers, insufficient of

time, lack of physical infrastructures, weak leadership, paper pencil test, unsuitable teaching materials, traditional methodologies, books are not available in time, lack of motivation, lack of friendly relation with teachers and students, lack of proper supervision and lack of meaningful training for mathematics teachers.

## **Chapter V**

### **Summary, Findings, Conclusion and Recommendations**

Summary may refer to abstract (summary), shortening a passage or a write-up without changing its meaning but by using different words and sentences.

Abridgement is the act of reducing a written-work, typically a book into a shorter form. A summary is a short version of something for instance, a movie or a book or an article. It tells us the main theme of your work. Finding is conclusion reached after examination or investigation, a piece of information that is discovered during an official examination of a problem. In academic writing, a well-crafted conclusion can provide the final word on the value of your analysis, research or paper.

Recommendation is a suggestion that something is good or suitable for a particular purpose.

This chapter is basically concerned in deriving some findings and conclusion from the discussion of the previous chapter. Besides findings and conclusion, it has some recommendations which will be useful for further studies and educational implications.

#### **Summary**

This study was based on survey study. The study design has utilized both quantitative and qualitative research approach. The main purpose of the study were to find the problems faced by teachers and students in teaching and learning geometry at grade IX and to find the causes of problems faced by teachers and students in teaching learning geometry at grade IX. The population of the study consisted of all students of grade IX in the academic year 2073 of Rautahat district. For the survey purpose, the researcher employed random sampling techniques to select the sample school in the first stage. Among all community schools of Rautahat district, five community

schools were selected as the sample schools. Altogether 125 students and 5 mathematics teachers were selected for sample from the selected samples schools of Rautahat district.

The researcher used set of observation schedule, set of questionnaire and interview schedule for collecting information. Questionnaire was used to find the problems faced by teachers and students in teaching learning geometry and observation and interview were used to find the causes of problems which faced by teachers and students in teaching learning geometry. The questionnaire was developed on basis of Likert scale point techniques. The collected data from questionnaire scale were analyzed by using statistical device mean.

While analyzing this study, all the data and information gathered together and interpretation, analyzed by cross tabulation method.

### **Finding of the Study**

From field survey and statistical analysis of collected data, it was found that the teachers and students have been facing lots of problems in teaching and learning geometry at grade IX. Different types of internal and external forces play role to continue the problems. These problems are created by different types of causes. On the basis of analysis and interpretation of data and interview guidelines the findings are stated below:

### **Problems related to learning activities**

- ) Most of the teachers were not used modern technology and methodology in teaching learning activities as a result the courses were not finished in time and students are not interested in learning activities.
- ) Weak students were not got extra opportunity to improve their learning capacity also they feel difficulty in proving and verifying theorem.

- ) Due to lack of sufficient time, there were difficult in checking daily home work.
- ) The lessons of textbooks were not finished in time because of untrained teachers and weak leadership of school administration.

**Problems related to classroom management**

- ) The study found that the teachers and students were affected from noise which comes from another classroom and vehicles that effect concentration of both teachers and students.
- ) The teachers were not able to manage the students due to crowd of students and small size of classroom.
- ) Teachers only focused on physical infrastructure to manage the classroom. They did not focus on mental management of students.

**Problems related to instructional materials**

- ) The study found that the available mathematical instructional materials were not used, teachers only discuss about them without showing practically.
- ) Science lab, library and computer room seemed as they were not made for mathematics practical. No separate math lab was found even in single school of concerned area.
- ) Textbooks were not available in time also manipulative geometrical materials are not available in the most of community school that creates problems in teaching learning geometry.
- ) Due to lack of skills about using teaching materials, teaching learning activities were not effective.

- ) There were economic crisis in the most of community school. Therefore they do not manage all kinds of instructional materials.

**Problems related to teaching methods**

- ) The study found that the teachers of most community school were not up to date with modern technology and methodology like as ICT, problem based learning (PBL), problem solving method etc.
- ) Teachers were solved those problems which they want to do, they neglected student's side problems because of large number of students.
- ) Teachers' qualification, training and teaching experience were strong in average but they were not applying their skill and knowledge gained from training in classroom.
- ) Teachers have not good knowledge about psychology of students which creates problems in understanding the feeling and interest of students.
- ) From analysis, the study found that the teaching learning activities was based on exam oriented as a result students are not able to learn in details.

**Problems related to proving and verifying theorem and construction**

- ) Most of the teachers were not able to teach their students in the basis of Van Hiele five level of thought of geometry.
- ) In the most of community school geometrical instrument and teaching materials are not used in teaching geometrical theorem and construction.
- ) Process of proving ideas were highly based on theoretical and parrot learning system which does not catch up the Van Hiele five level of thought of geometry.

### **Problems related to evaluation techniques**

- ) The study found that the teachers were not checked daily homework because of large number of students and over work load of teachers.
- ) Only the written test as the evaluation tools couldn't measure the verbal capacity, experimental talent and logical manipulative idea of solid objects of students which resulted fail to the more students.
- ) From the study, the teacher used only summative evaluation like paper pencil test which is based on result oriented.

### **Problems related to school administration**

- ) From the study, the most of community schools were not managed refreshment training to teach difficult and rigor topic and also the teacher guide and curriculum are not available in time.
- ) Leisure period of teacher also were packed with proxy classes in the most of community schools because number of teachers were limited.
- ) Salary also could be the cause of less energy while making teaching plan (opinion of some math teacher).
- ) Weak leadership of school administration is also created the problems in teaching learning geometry.

The cause of above problems are overload of students, untrained teachers, insufficient of time, lack of physical infrastructure, weak leadership of school administration, lack of motivation, unsuitable teaching materials, traditional methodology, books are not available in time, lack of friendly relation with teachers and students, lack of supervision, lack of meaningful training for mathematics teacher etc.

## **Conclusion**

Most of the community schools in Rautahat district contain multicultural diverse classroom and also the students of various level and aim. Diverse classroom have diverse expectation and diverse ability of learning. Geometry itself has complex structure so it is challenging to teach in such classes. The teacher should be aware of all the differences; well habitual about innovation related to modern methodology and technology and also the practices of school and society. The administration and teacher should be equally responsible to create constructive and sound instructional environment. They can manage the proper content, methods, materials, evaluation, and physical environment and can promote the positive discrimination and inclusive participation. Some teachers seemed to focus only talented students and ignore the poor students. These drawbacks or ignorance caused by a math teacher due to the lack of training and experience to handle the classroom. The teacher should encourage the average and poor students and follows various techniques of teaching to minimize the learning difficulties. Classwork checking, homework correlation, interaction in the classroom, good relation between teacher and students, role play and active participation in mathematics classroom is the key point to promote instructional strengths.

Taking mathematics subject as an interesting and teaching it with fun, suggesting students for solving problems in pair, individual support to the weak students, division of the students in group according to their talent and equal treatment from teacher were good example forencouragement that was fructifying the geometry instruction.



## **Recommendations**

After analyzing the conclusion of the study some recommendation were made for problems of teachers and students in teaching and learning geometry. Researcher would like to recommend as follows:

- ) This study is limited only in the geometry classroom of grade IX. Similarly study can be done in other level.
- ) Parallel researches in junior or senior level, in other topic or in other locality by taking large sample of population can be carried out.
- ) Teacher should make lesson modulo of each and every chapter before teaching.
- ) Teacher should be honest to their job and responsible for the academic progress of each and every student.
- ) CDC should provide perfect training, advance instruction materials related to content, also should observe implementation.
- ) Teacher should always update with modern technology and methodology.
- ) Students should always stay in discipline.
- ) Administration should be responsible and sound regarding salary payment, materials management and their effective uses.
- ) Motivational orientation program should be conducted.
- ) Teachers should be honest to their job and responsible for the academic progress of each and every student.

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## Appendix A

### Students- Openionnaire Form set A

Dear Students,

I am Umashankar Chaudhary, students of M.Ed. 2071 Batch specialization in mathematics education from Tribhuvan Univercity, Faculty of Education, Kirtipur, Kathmandu, Nepal. I have tried to prepare a thesis on "problems faced by teachers and students in teaching and learning geometry at secondary level." This research is a part of M.Ed. field research in order to submit the Department of Mathematics Education as a partial fulfillment for the Master's Degree in Education.

There are 33 statements concern with Geometry. Read the statements carefully and give your own opinion about the intensity of putting tick mark ( ) on any one of the five rating of each statements.

Here,

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

Name of Students: .....

Date:

.....

School's Name: .....

Sex:

.....

Class: .....

Roll No:

.....

Address: .....

Ward No: .....

<b>S.N.</b>	<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
1.	We feel difficulties while participating in the congested classroom.					
2.	We have no any problem of blackboard or whiteboard and other furniture in our classroom.					
3.	Anything written on blackboard is visible.					
4.	We are not affected from noise which comes from another classroom and vehicles.					
5.	Teacher has no idea how to manage the classroom.					
6.	The class starts from interesting way.					
7.	Teachers give extra parallel problems related with exercise.					
8.	Teachers provide opportunity for weak students.					
9.	The teachers also participate with you in classroom.					
10.	We feel difficulty while proving theorem.					
11.	Text books and practice books are available in time.					
12.	Our teachers use locally available and low cost materials in teaching geometry.					
13.	Manipulative geometrical materials are not available in our school.					
14.	Teachers use instructional materials while teaching geometry.					

15.	It is difficult to complete the whole course if taught by using teaching materials.					
16.	Lack of appropriate knowledge how to use teaching materials.					
17.	The geometry class starts from interesting way.					
18.	Our teachers ask questions individually while teaching geometry.					
19.	Teachers solve those problems which he will.					
20.	Teachers do not solve the problem which is given by students.					
21.	Teachers use only lecture method in teaching geometry.					
22.	Teachers have no idea, how to use different method in different topic of geometry.					
23.	Teachers are confused which method is used in which lesson or unit.					
24.	Lack of knowledge about psychology of students.					
25.	Problem based learning (PBL) method is used in teaching learning geometry.					
26.	Teaching materials are used in teaching theorem and exercise.					
27.	Our teachers use geometrical instruments while teaching construction.					
28.	Geometrical theorems of secondary level are related with life.					

29.	Examples and exercise of theorem are correlated.					
30.	The teachers check our homework daily.					
31.	The teachers do not take the test at the end of unit.					
32.	Our teacher takes different types of test except terminal exam.					
33.	Teaching is only exam oriented.					
34.	The teachers do not focus on our creativity and curiosity.					
35.	Teachers give the feedback.					

## Appendix B

### Teachers- Openionnaire Form set A

Respected teacher,

I am Umashankar Chaudhary, students of M.Ed. 2071 Batch specialization in mathematics education from Tribhuvan Univercity, Faculty of Education, Kirtipur, Kathmandu, Nepal. I have tried to prepare a thesis on "problems faced by teachers and students in teaching and learning geometry at secondary level." This research is a part of M.Ed. field research in order to submit the Department of Mathematics Education as a partial fulfillment for the Master's Degree in Education.

There are 25 statements concern with Geometry. Read the statements carefully and give your own opinion about the intensity of putting tick mark ( ) on any one of the five rating of each statements.

Here,

SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree

Name of Teachers: .....Date:

.....

School's Name: .....

Sex:.....

Address: ..... Ward No:

.....



<b>S.N.</b>	<b>Statements</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
1.	Lack of teacher involvement in curriculum planning.					
2.	Physical infrastructure is sufficient for teaching learning activities.					
3.	Lack of opportunity to participate in interactions workshop and refreshment training to teach difficult and rigor topic.					
4.	Unavailable of mathematical journal, dissertation and new books.					
5.	Low salary is one of the causes of problem in teaching mathematics.					
6.	School administration is less responsible to manage instructional materials.					
7.	There is problem of crowed of students.					
8.	There is lack of proper space to demonstrate instructional materials.					
9.	The unsystematic arrangement of chair created problem to observe the students individuality.					
10	The classroom is not well lighted and ventilated.					

11.	The noise come from outside creates problems in teaching learning process.					
12.	The classroom is not neat and clean.					
13.	There is math lab facilities in school (visual manipulative objective chart model and computer projector)					
14.	Schools have lack of sufficient concrete teaching materials.					
15.	Problems to construct and collect lesson wise appropriate materials.					
16.	Lack of appropriate knowledge to use the teaching materials.					
17.	It is difficult to complete the whole course if teach by using teaching materials.					
18.	The geometry class starts with interesting way.					
19.	Every topic is teaching by using daily lesson plan.					
20.	I confused which method is used in which lesson or units.					
21.	Lack of training, modern technology and methods of teaching.					
22.	Exam oriented teaching is also created					

	problems in teaching learning geometry.					
23.	It is difficult to complete the whole course by students centered teaching approach.					
24.	Lack of knowledge about psychology of students.					
25.	Problem based learning (PBL) method is used in teaching learning geometry.					
26.	Teaching is only exam oriented.					
27.	Result oriented exam is in practice.					
28.	Practical evaluation is in practice.					
29.	Evaluation is democratic on equity.					

## **Appendix C**

### **Guideline for Interview with teachers and students**

Date of Interview:

Sex:

Name of Teacher:

Age:

Qualification:

Address:

Trained / Untrained:

Teaching Experience:

The interview with mathematics teacher was taken in the basis of following topics.

Teaching learning activities

Classroom management

Instructional materials

Teaching methods

Proving and verifying theorem and construction

School administration

Evaluation techniques

## **Appendix D**

### **Checklist for Classroom Observation**

School's Name: .....

Class : ..... Date : .....

**Related to classroom management**

- ) Students have sufficient space to sit.
- ) The class is not crowded.
- ) Arrangement of desk and bench are good.
- ) There is noise outside the classroom.
- ) Classrooms are well lighted and ventilated.
- ) The class has good decoration.
- ) Management of blackboard, whiteboard and other furniture are sufficient in classroom.

**Related to teaching learning activities**

- ) Teachers move in the classroom.
- ) Teachers provide clear instruction for new concept.
- ) All students involve in all activities.
- ) Teachers encourage all students.
- ) Teachers solve problems which are given by students.
- ) Teachers show positive behavior on difficult question.
- ) Teachers have good command over subject matter.
- ) Teachers provide opportunity for weak students.
- ) Teachers use teaching materials while teaching geometry.
- ) Teachers use appropriate methods in teaching learning activities.