Chapter- I

INTRODUCTION

Background of 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” (Betler and Wren, 1941).

Geometry concept were developed from the beginning of the civilization. It is evident that the Egyptians must have the knowledge of many geometric principles.

Application of these principles were found in the buildings of pyramids and the great sphinx (400-3000BC). The irrigation system 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 may 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 treaties "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

Geometry is integrals component of mathematics with containing more verbal and abstractive problems related to triangle, quadrilateral, similarity and congruence

of triangle which are directly related to our daily life problems and further study, Geometry is essential branches of mathematics in primary level up to higher level. The major cause behind leaving this chapter in school and failing in this subject is due to the poor performance in mathematics.

In mathematics geometry is the subject which responsible behind failure and law performance of the students. Most of the students thought geometry is the boring and difficult chapter of mathematics subject. So, it is well appropriate to research about problems of Teaching and Learning Mathematics in geometry at grade nine. The research question of this works are as follows:

- Howmathematics in geometry is the current problem of teaching and learning at grade IX?
- Why teachers and students are facing problemsin teaching-learning Geometry?

Objectives of the Study

The main objective of this study as follows:

- To explore the problems faced by students in learning geometry.
- To explore the problems faced by teachers in teaching geometry.

Significance of the Study

Geometry is one of the most important part 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 Government school. The researcher had tried to explore the problems being faced by teachers and students in teaching and learning geometry at grade nine by observing the class when the geometry was teaching. The following are the significance of the study:

- This study would help to students and teachers for improvement in teaching and learning geometry.
- It helps in designing a revised mathematics curriculum at secondary level.
- 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

Each study is no rigorously perfect and free from limitations. So there are lots of factors affecting the teaching and learning geometry. So this study had following delimitations:

- This study was limited at Shree RajajiTulshilalJonchheJanta Higher secondary school Siswa-Belhi inSaptari district.
- This study concerns with only the problems faced by the students and teachers of secondary level in teaching learning geometry.
- The study was concerned with only those students who were studying and those teachers who were teaching compulsory mathematics at grade nine in the academic year 2072.

Definition of the Terms

Problems

Problems means any obstacles that may difficult to deal with or understand during the period of learning mathematics.

Learning Problems

Learning problems are the obstacles of the students which mostly influenced by unfavorable environment, understanding level, assimilation and pre-knowledge of students.

Teaching Problems

In this study, teaching problems means obstacles of the teacher's when he is faced in mathematics classroom,Such as material, administration.

Teacher's Activities

In this study teacher's behaviors performing in their mathematics classroom are called teacher's activities.

Students Activities

In this study, students performing behavior in mathematics classroom are taken as students' activities.

School Environment

In this study, School environment means the environment of the mathematics classroom.

Trained Teachers

Trained Teacher means those teachers who obtained training from NCED.

Chapter- II

REVIEW OF THE RELATED LITERATURE

It is an essential to review the related literature to compare the study which provides strong knowledge about the related topic. Number of books research reports papers and other booklets can be concerned with curriculum, teaching materials, methods and so on. However, the researcher could not find any investigation on the problems faced by teachers and students inteaching and learning geometry in mathematics at grade IX. The researcher has reviewed some related literature as follows:

Empirical Literatures

Lamichhane (2001), did a descriptive survey type research on "A study of problems faced by the secondary level mathematics teacher's in teaching mathematics "with the main objective to identify the problems being faced by the secondary level mathematics teacher's in teaching mathematics and to compare those problems in the rural urban areas. He concluded that several problems proposed up in the eyes of the teachers such as in an inadequacy of textbook and teacher's guide, lack of instructional materials, teacher training, lack of supervising, lack of physical facilities and lack of motivation to learn mathematics is poor on the part of students are the key problems faced in Teaching mathematics.

Bhattarai(2005), made a study entitled "A study on problems faced by the mathematics students in existing curriculum". He concluded that learning mathematics in secondary level was distributed by so many factors such as: lack of teacher’s involvement in curriculum planning, deferential and instructional facilities and aids students with weak background in the subject matter, student’s defective

promotion. Policylack of opportunity given to upgrade their knowledge and huge number of personal problem of the students and teachers.

Poudel(2007), did a study on "problem faced by lower secondary mathematics teacher in teaching geometry" with the aims to identify the problems faced by lower secondary level mathematics teacher in teaching geometry related to curriculum. He concluded that the geometry teaching learning isn't effective because of curriculum, textbook, physical facilities, teaching learning activities, materials, methods and students evaluation techniques. Moreover, both trained and untrained teachers are similar problems like crowded numbers of students, lack of math's lab, poor evaluation process. Negative attitude toward geometry is also psychological problems.

KC (2009) concluded a thesis "A study of problem faced by students in compulsory mathematics at secondary level". The nature of this study was quantities as well as qualitative. This study followed 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 class observation from and interview schedule were used. The obtained data was analyzed and interpreted with the help of mean weight age.

Shah (2008), conducted his research on the topic "A study on problems faced by students and teachers in teaching -learning of vector " then the concluded that government schools don't have sufficient mathematical materials, lack of protection topics, lack of motivation and encouragement to student. These are the causes that makes teaching learning vector in effective.

Gyawali (2009) did a thesis on the title “Effectiveness of Van Hiele approach in teaching Geometry at Secondary Level”. He selected the sample consisting of forty students purposively from Nawalparasi district. He taught the experimental group by employing Van Hiele approach and the control group by conventional approach. His result also revealed that the mean score of the students of the students of the experimental group was greater than that of the control group. Thus he concluded that Van Hiele approach is effective in teaching geometry than the conventional approach.

Chaulagai(2005),in his study "A study on problems faced by secondary level mathematics teacher in teaching geometry."He concluded that mathematics teachers are facing many problems in geometry teaching due to background characteristicsof students, curriculum and text evaluation techniques and so on.

Bhatta (2013), did a survey study on "problems faced by the students in geometry at secondary level of Kailali district." The researcher developed the questionnaire, observation from and interview schedule under the guidance of supervisor and researcher added some problems himself with advice of experienced mathematics teacher. The main purpose of the study is to identify the problems faced the mathematics students in geometry at secondary level of Kailali district. The researcher has presented recommendation that will be benefited to the concerned authority further improvement in the geometry teaching. The problems aroused teaching learning activities, instructional materials, and evaluation system. From the above stated findings of this study, it can be concluded that teaching and learning of geometry was not satisfactory in Kailai district.

After studying overall literature, the researcher found many more problems related to teaching mathematics. But researcher found that no researcher has been done regarding teaching learning problems in mathematics due to geometry. To find

the gap, this study was focused on teaching and learning mathematical problems in geometry.

Theoretical Review

Two Dutch educators, Dina and Pierre Van Hiele, suggested that children may learn geometry along the lines of a structure for reasoning that they developed in the 1950s, educators in the former Soviet Union learned of the Van Hiele research and changed their geometry curriculum in the 1950s. during the 1980s there was interest in the united states in Van Hieles' contributions of the National Council of Teachers Mathematics (1989) bought the Van Hiele model of learning closer to implementation by stressing the importance of sequential learning and an activity approach

The Van-Heiel'stheory (1986) is a learning model that describes the geometric thinking of students through as they move from holistic perception of geometric shapes to a refined understanding of geometric proof. Van-Hiele's and his wife Dina M. Van-Hiele's developed this theory out of the frustrations both they and their students experienced with the teaching and learning of geometry. Van-Hiele(1986) explains that when teaching his students geometry. It always seemed as thought I were speaking a different language.

Van-Hiele wanted to know why students experienced difficulty in learning geometry and how he could remedy those difficulties. The solutionsVan-Hiele found for students that frustration was the theory of different levels of thing. . The five learners of geometry thought did 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'sTheory were given below.

Level (1): Visualization

In this phase the students identify, names, compares and operates on geometric shapes.

Level (2): Analysis

In this stage the students analyze the attributes of shapes and the relationship among the attributes shapes and discovers properties and rules through observations.

Level (3): Informal Deduction

In informal deduction the student discover and formulates generalizations about previously learned properties and rules and develops informal arguments to show these generalizations to be true.

Level (4): Formal Deduction

In this stage the students prove the theorems deductively and understand the structure of the geometric system.

Level (5): Rigor

In this stage the student establishes in different systems of postulates and compares and analyzes deductive system.

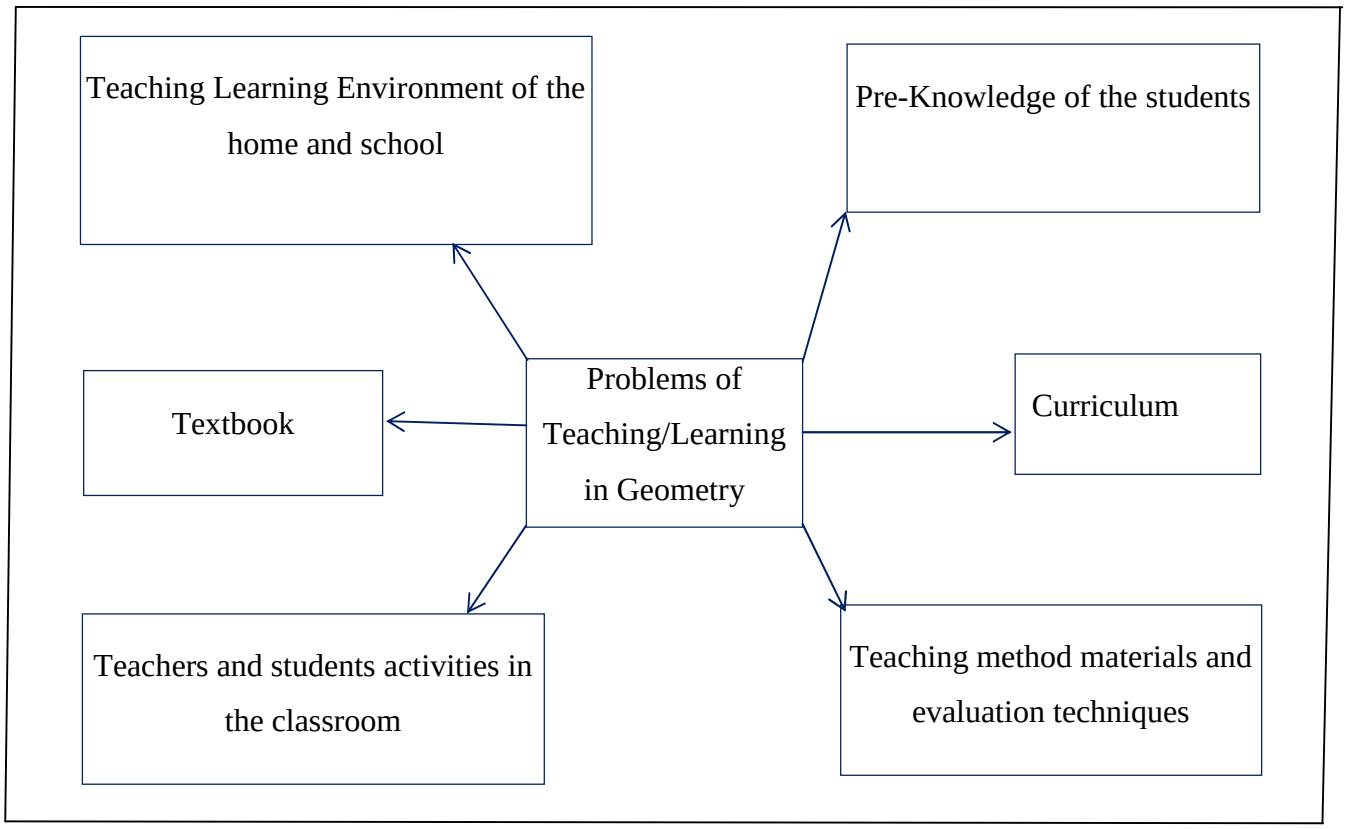
The best known part of the van Hiele model are the five levels which the van Hieles postulated to describe how children learn to reason in geometry. Students cannot be expected to prove geometric theorems until they have built up an extensive understanding of the systems of relationships between geometric ideas. These systems cannot be learned by rote, but must be developed through familiarity by experiencing numerous examples and counterexamples, the various properties of geometric figures, the relationships between the properties, and how these properties are ordered. The five levels postulated by the van Hieles describe how students advance through this understanding.

Conceptual framework

A conceptual framework is an analytical tool with several variations 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.

Fig:2.1

Conceptual Framework of the Study



Source: Shah, D.P. (2008)

From above discussed point of views in related literature, problems of teaching and learning mathematics in geometry may depend upon different variables. These variables affecting students learning process in geometry are teachers and students interaction, students involvement, curriculum, textbook, teachers and

students behaviors homework, class work regularity, the major factor of teachers and students activities, pre-knowledge, environmental variables.

Such as study time at home, attitude of parents, physical, surroundings, adequate, furniture, appropriate room, significant on teaching and learning, it analyzes teaching method, use of instructional materials, use of teachers guide lesson plans and unit test, class test, etc.

Likewise, theories help for systematic research on problems of teaching and learning geometry. The van Hiele model suggests that learners advance through levels of thought in geometry. Van Hiele characterized these levels as visual, descriptive, abstract and formal deduction. At the first level, students identify shapes and figures according to their concrete examples. At the second level, students identify shapes according to their properties. At the third level, student can identify relationship between classes of figures and can discover properties of classes of figure by simple logical deduction. At the fourth level, student can produce a short sequence of statements to logically justify a conclusion and can understand that deduction is the method of establishing geometric truth according to this model, progress from one of Van Hiele's levels to the next is more dependent upon teaching method than one age.

The student learns by rote to operate with relations that he does not understand, and of which he has not seen the origin. Therefore the system of relations is an independent construction having no rapport with other experiences of the child. This means that the student knows only what has been taught to him and what has been deduced from it. He has not learned to establish connections between the system and the sensory world. He will not know how to apply what he has learned in a new situation.

Geometry teaching cannot be learned by rote, but must be developed through familiarity by experiencing numerous examples and counterexamples, the various properties of geometric figures helps the relationships between the properties, and how these properties are ordered. Therefore Van Hiele model helps to improve learning geometry but structural change must be necessary in classroom environment, administrative authorities, and curriculum.

Chapter - III

METHODS AND PROCEDURES

This chapter presents the research method of study which was determined how the research becomes complete and systematic. This study was concerned with the problem faced by teachers and students teaching and learning geometry in mathematics at gradenine. The major procedures followed in this study were as follows:

Design of the Study

This study is based on case study designing in qualitative approach.Qualitative research methodology deals with the collection of information formally and informally and using themes to draw conclusion about the views and attributes of people. This approach to research involves the exploration and interpretation of the perceptions, opinions, aspirations, behaviors, concerns, motivation, culture, or lifestyles of small samples of individuals. Hence qualitative research analysis explores the issues from the existing environment, understands and interprets the ongoing phenomenon and answers the aroused questions.

This study is concerned on problem of teaching and learning mathematics in geometry at grade nine. The data for my research were in descriptive from rather than numerical or inferential. Teachers, students, head teacher, parents views and and mathematics classroom observation were the prime data for my research. Therefore, the researcher tried to explore the interaction between teacher and students teaching - learning activities and students, pre knowledge regarding geometry in mathematics classroom in Shree Rajaji Tulshi lal Jonchhe Janta Higher secondary school Siswa-Belhi, saptari.

Selection of the Study Area

There are 58 government secondary schools in saptari district. For the purpose of complete myresearch, the research site was Shree Rajaji Tulshi lal Jonchhe Janta Higher secondary school Siswa-Belhi, Saptari at grade nine. Therefore, this study focused on exploring the problems of teaching and learning mathematics in geometry in grade IX.

Sample of the Study

For the purpose of this research, I had purposively select and interview 1 head-teacher, 2 mathematics teachers, 5 parent and 5 students from a school, who studied compulsory mathematics at grade nine. The selection sample of the study were different ethnic, castes, genders etc.

Tools for the Study

The main tools used in to collect primary data were observation and interview formats:

Observation

During the five days classroom observations, I observed seating structure, teacher activities, students response and activities. In this period the considerations were made not to disturb the natural setting inside the classroom. The main purpose of the classroom observation was to find out the problems of geometry teaching and learning in the context of mathematics. I requested to teacher for observe their class but I didn't clarify about my research purpose to ensure the trustworthiness of my study. To get required information, the researcher used the diary and observational notes.

Interview

Discussion of qualitative research interviews have centered on promoting an ideal interactional style and articulating the researcher behavior by which this might be realized. Interview with stakeholders are one-to-one conversations about a specific topic or issue. The main aim of this interview is to explore the problems faced by students in learning geometry as well as to explore the problems faced by teachers in teaching geometry.

In my research, before the interview open-ended and semi-structured question sets are prepared. The interviews of teachers, students and parents participants are one-one in-depth and conducted at multiple levels until the data are saturated.

I interviewed 5 students,5 parents, 2 mathematics teachers and 1 head teacher from Shree Rajaji Tulshi lal Jonchhe Janta Higher secondary school Siswa-Belhi in saptari. Through interviews I tried even the student participants and the data from the field observations justified that they used such practices and activities.

Data Collection Procedures

At first the researcher went to the selected qualitative data on the basis of the observation from the students of grade nine were observed for five days. In that period researcher observed carefully and noted and every activity of students and teachers in dairy. Also, the researcher interviewed the head-teacher, the mathematics teachers, students and the parents of case students with help of guidelines of open structured interview formats. The researcher listened to the replies of respondents curiously and noted actually. Therefore, the researcher recorded the behaviors and activities of the teacher and students during teaching -learning activities, mathematics teacher, parents and students were interviewed; all the answers noted during the course of interview with teaching -learning environment were analyzed.

Data Analysis Procedures

The researcher had used the primary data collected from the field observation and interview schedule. The collected data was categorized according to the class observation and interview. Therefore, the problems of teaching and learning mathematics in geometry at grade nine. Therefore, the content geometry by teacher and students were analyzed and interpreted on the basis of the frame work that the researches had already developed in the review of related literature section. The data collected from interview, classroom observation and school record were analyzed by grouping the similar information in descriptive method. Theneach theme was analyzed with the theory in literature review the objective of the study and to recommend relevant finding problems of teaching and learning geometry at grade nine.

Chapter - IV

ANALYSIS OF DATA INTERPRETATION OF THE RESULT

This chapter describes the analysis and interpretation of the collected information from case study school. The researcher collected qualitative data from the Shree Rajaji Tulshi lal Jonchhe Janta higher secondary school, Siswa-Belhi, Saptari carefully each notable activity of students and teachers. The researcher took face-to-face interview with head teacher, mathematics teachers, and the parents of the case students with the help of the guidelines of open structured and semi-structure interview formats. The researcher listened carefully the responses of respondents curiously and noted them properly. By reviewing the school's recorded documents as surrounding environment of school; cause of becoming problems on geometry learning be analyzed. At first, data was categorized according to the category of the respondent and different themes were given in the text of interview or the observation note.

Introduction about Case Study School

Shree Rajaji Tulshi lal Jonchhe Janta Higher secondary school is a government school situated in Siswa VDC, ward no. -5, saptari district mainly in this school Mandal, yadav, Chaudhary, Sah, Goshai, Sadai, Ram etc, are the castes found. Initially the school was established as a primary school in 2018 B. S. This school is situated inside river, so the environment situation is very pleasant and peaceful. The school has located within the area of two bigha eight katha of land. In this school 917 students are studying currently. The educational product of this school is good no excellent, 18 members are including in the set of teaching and working staffs. Most of the teachers and students come from neighboring community by walking 15 minutes' paths. Most of the parents of students are found less economic status, lack of

education. Hence, the school community is looking as multicultural and multi-ethnicity.

Physical Facilities

Shree Rajaji Tulshi lal Jonchhe Janta Higher secondary school two bigha eight katha of land, compound of school is bounded by walls. It has two buildings and four blocks. Rooms of school are large, plastered, well ventilated with full desks and benches. Out of 21 rooms, there are only 13 class rooms for teaching purposes. There is no library room. The school has not enough land for playing different games. Staffs room is well furniture. The facility of toilet isseparated for boys, girls and staffs. There are 917 students and 20 staffs in school. Only one optional subject: mathematics is taught in secondary level.

Table no. 4. 1

Physical Facilities of the School

Land of school	2-bigha, 8Katha
No. Of buildings and blocks	2, 4
Types of building	Plastered
No. of rooms	21
Size of rooms	Large
No. of Teaching rooms	13
No. of other rooms	8

Furniture in the School

No. of desks and benches	177
No. of tables	5
No.of chair	13 (woods)+ 8 (plastics)
No. of racks	5
No.of daraj	2

Teaching Materials

No. of microscopes	2
No.of globe	2
Geometry box	1 (set)
Graph board	1

Games Materials

Volleyball	1
caram board	1
Football	2

The physical facilities maintained above in the Table 4. 1 shows that land and furniture of the schools has sufficient but teaching materials, games materials and especially playgrounds are required to maintain at any cost. Since, the facilities available in the school are component of creating learning environment of school.

Demography of Case Teachers

Teachers are important input in teaching learning process for the better functioning of the school including other input as physical facilities and educational materials. Different literature andresearch have given important place for to teach effectively. Teacher's number, qualification training and experiences are the important factors for better performance in the classroom teaching and school holdings.

There are 20 members of staffs and 917 students in this school. Among them 127 students studying at grade nine; all students read optional mathematics. There are two mathematics teachers in this school and they have taught optional mathematics one

year by one teacher and next year by another teacher respectively. Hence, according to number of students; there are sufficient mathematics teachers at secondary level.

Table 4. 2

Demography of Respondents Teachers

Teachers Name	post	Qualification	Training	Teaching Experience	Remarks
Ram Narayan sah	Head teacher	B. Sc.	Trained	33	permanent
Motilalsah	Math teacher	B. Sc./B. Ed	Trained	17	permanent
Dev Narayan yadav	Math teacher	B. Ed	Untrained	3	unpermanent

Table 4. 2 shows all the respondents, teachers are permanent and have experienced in secondary level. The teachers have at least Bachelor degree in their related subject. The major tools of school improvement are teachers' quality and adequacy. The present status of this school shows that there were adequate numbers of experienced and qualified teachers. The head teacher is qualified, highly experienced and able to run administration of the school. One mathematics teacher of this school is trained, qualified and experienced, whereas another teacher is untrained but qualified and experienced in the teaching field.

Problem faced by Teachers and Students in Teaching -Learning Geometry

Mathematics teaching and learning itself is a greater challenge inside the Nepalese classroom. Nepalese classroom and mathematics learning are often affected by various factors. It is challenge for the teachers to teach a subject, most of the students have phobia withgeometry, lengthy curriculum and textbook, lack of physical facilities and materials as well as crowded numbers of students, lack of math's lab, poor evaluation process negative attitude toward geometry is also psychological

problems. The main problems faced by teachers and students in teaching geometry are as follows:

Teaching Learning Environment of the Home and School

Mathematics teachers often complain their school administration and the guardians, as the hindrances for implementing different newer teaching methodologies in their teaching geometry. They often complain that, school administration usually disturbs them in bringing structural changes in mathematics teaching and often does not make the arrangements of the necessary equipments and facilities. The unhealthy competition in between the schools promotes just marks achievement.

> *"I use different methodologies like constructivism, paper cutting and material development, using ICT and collaborative approaches. Different methods can be used for constructing knowledge inside the classroom and for making students conceptually clear. But I mostly use problem solving method. It is somewhat mandatory because of class time-length and guardians' and administrative pressure and other affecting factors."*(Teachers)
>
> *"The students are much more interested in technology and I know a little bit about integrating ICT in mathematics teaching. But school administration is not ready to manage the required resources inside the classroom and forces me to carry on my teaching in the usual manner. The administration sends me to several mathematics teachers' trainings but I don't get proper environment to implement my learning"(Teachers)*

From above view mathematics practices in different schools seem to worry on, how students obtain more not upon, how the students construct knowledge and make meanings. Mathematics teachers regard administrative reluctance as the major affecting factor. Lacking continuous assessment system, huge numbered classroom, unnecessary upgrading of the students and marks based evaluation system are the different aspects that the school administrations need to ponder over for successful implementation of geometry teaching in mathematics.

Environment of home depends on the location of home behavior of family, economic condition of family, the nature of studying room, religions, culture and political impact in society. It is the major theme of child development because home is the first school and parents are the first teacher of child. There is full impact nature, society and family to the child.

> *"We have separated study room where we are studying together with two brother and one sister. Parents provide sufficient time to studying; sometime parents call to work in farm. "(Students)*
>
> *"We provide sufficient time to child; we are careful their study. They are reading but they have not gained satisfactory result from school. We fulfill all the requirement of our child, instead of poor economy. " (Parents)*

The above view of students and parents indicate a student has separated studying room and fully support from his family members to studying. There is no weakness from the parent's duties and home environment. But the parents are not satisfied from the achievement of child.

When researcher went to home of students for interviewing with parents; researcher saw television in studying room of students. Then researcher raised

question to student, are you studying by watching television? and he replied that some time only. There we can see clearly child cheated his uneducated parents. They were playing volleyball beside the tap. Then the researcher asked students why he playing. He replied that he would feel bored. He wouldn't understand. He enjoys playing lot. In the same way.

When the researcher visited another students home, he helping his parents. It was his regular work after school in the evening. He had to do lot of work in every morning before going to school. He even didn't have time to do his homework. Unlike above mentioned students, another student had different kind of problem. There is always argument in his home because of his drunken father. He said that he would have been excellent student, if he hadn't had such kind of trauma.

The above views show that the main problems in teaching-learning at home are not spending sufficient time for the studying, involvement of housework with their parents, lack of qualification of parents, students preference in playing rather than studying, parents argument, the lack of supervision of parents etc.

Teachers and Students Activities in the Mathematics Classroom

Teacher, students and learning environment in class room play important role to shape knowledge and understanding the subject matter. Students' performance and perception depend upon how the teacher presents subject matter.

> *"Teacher always emphasis their own method and they also choose the lesson according to their interest" (Students)*
>
> *"Teacher always emphasis on bookish knowledge and not give many examples for concept in mathematics classroom". (Students)*

> *"Teacher does not use materials except geometry box and daily used materials and they always emphasis talent student centered teaching only" (Student)*

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

Similarly, the researcher observed five mathematics classes observation the researcher concluded that some classes are not good. Teacher did not give the clear concept in the classes' observation the teacher did not care to all students in the classroom. The teacher did not provide good opportunity for weak students. It was seen that the teacher had not good command over the subject matter.

> *"I am not using any fixed teaching method for geometrical teaching, but my aim is to how children receive the knowledge and children pass in the examination" (Teacher view)*
>
> *"There is large number of students in classroom, teaching period is short, to finish the course on time but that is impossible with child centered teaching" (Teacher view)*

From above views we can say that most of the teachers are facing various teaching learning problems such as large number of students, different learning capacities of students in a classroom etc. Besides these problems, teacher was again argued that we did hard labor to provide quality education but students were not interested for their study.

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

- It was very difficult to prepare and implemented the lesson plan.
- More emphasis should be given to finish the course rather students' learning.
- To motive students towards learning mathematics was very difficult.
- Class control and students motivation was the difficult task for the teacher.

Van Hiele's says that geometric systems cannot be learned by rote, but must be developed through familiarity by experiencing numerous examples and counterexamples, the various properties of geometric figures, the relationships between the properties, and how these properties are ordered. From the classroom observation and interview researcher cannot find this system.

The cause of above problems are; lack of motivation in the class, lack of practical knowledge about geometry, Teacher behavior is not as friendly; sometime he abuses students, lack of awareness of teachers and parents duties to his/her child at home, not well participatory approach of both students and teacher in geometry teaching at class room, lack of preparation and confidence of teacher about the geometry manipulation, due to the lack of training and knowledge about child psychology to mathematics teachers.

Required Pre -Knowledge of Students for GeometryLearning

The knowledge and skills of mathematics is the regular ongoing process. In this process, the previous knowledge and skills are the sources of improving current mathematics. In this process, the previous knowledge and skill are ethic source of improving current mathematics. In this sense, mathematics is to be taught by applying the former skills and knowledge. The concept (the knowledge of understanding) is

helped to learn the new topic is called pre knowledge. Students should have the well concept of geometric terms.

> *"We study geometry in earlier classes. In that class we did not study geometry well and teacher also did not encourage to us to learn geometry. They did not tell about importance of geometry in higher classes. So, we are very weak in geometry portion. Even we can't distinguish perpendicular, angles, related terms for the theorem of the circle.* (Students)
>
> *"We are feeling geometry is hard subject because in the class our teacher never uses the teaching materials and he always uses the lecture methods. He also follows the summative evaluation system and he is unknown about the using and constructing the local teacher materials. (Students)*
>
> *"Only a few number of students solved the geometry parts in the examination. Some students solved geometric parts with the memory work of the rote learning."* (Math'sTeacher)

The above views indicate that pre knowledge of students played most important role in the learning of new concept. But constructivist learning theory states that it should also be recognized that a person's prior knowledge may help or hurt construction of meaning. People's prior knowledge comes from their past experiences, culture, and their environment.

> *"Most of the previous academic year, Teacher taught geometry at the sessions of the year.Due to the final examination, Teacher finished the geometric part fast."(Students*)

> *“We are feeling that Geometry is the hardest subject cause of my pre-knowledge and teacher does not care us he used to forward lesson according to talent students only” (Students)*
>
> *"Generally, most of the students feel geometric portion of any topic is hard, and so they should be able should by heart easy but they are not. So, the background of students is weak. Also, I face trouble to teach geometry."* (Math's teacher)

From the above views, it could be seen that must of the students face problems in geometry portion of mathematics. Due to the poor pre- knowledge and basic knowledge of students in geometric portion; teacher has also faced problems to teach geometry. The main serious problem of students is to the bad feeling toward geometry that; it is hard subject we should be able heart in the terms of geometry.

Due to the poor pre knowledge of students in geometry; teacher has faced problem to teach geometry. Most students have faced problem in geometric portion of mathematics. The main cause of students is the bad feeling toward geometry, that it is hard subject, so we should be able by heart in the terms of geometry. The reasons behind those problems are; students and teacher students and teacher are not using extra book beside textbook. In addition, there is lack of motivation and encouraging to students are not well participated in extra classes due to low fee.

The van Hiele theory indicates that effective learning takes place whenstudents actively experience the objects of study in appropriate contexts, andwhen they engage in discussion and reflection. According to the theory,using lecture and memorization as the main methods of instruction will notlead to effective learning. Teachers should provide their students withappropriate experiences and the opportunities to discuss them.Teachers can assess their students’levels of thought and

provide instructionat those levels. The teacher should provide experiences organized accordingto the phases of learning to develop each successive level of understanding. But this process is hardly found in the period of research.

Teaching Materials and Evaluation Technique

Teaching methods and instructional strategies are main ways for meaningful teaching and learning of particular topic. Teachers are the main agent of the instructional strategies. In the class room activities teachers and students have vital role for the use of materials. The method of teaching should be based on the knowledge understandings, skills and application. Evaluation is process by which the values of enterprise are ascertained. Evaluation is a process to measure the achievement, quality and behavior of the students. The participatory approach of teacher should be child centered in classroom and evaluation should be helpful to provide feedback to students.

For evaluation teacher can use informal evaluation that are placement test, formative test, diagnostic test, achievement test, oral test, homework etc. and formal evaluation that are placement test, achievement test, monthly test, unit test, terminal test etc.

In the period of observation classroom environment is controlled by teacher according to his method or strategies in the classroom mostly in the process of teaching teacher used method and strategies was lecturer method in the teaching of geometry. Teacher is not active and not well prepared about geometry. Thus, it can be concluded that traditional type of lecture method is one of the causes of teaching-learning problems in geometry. But teacher told about the method;

> *"I am not using any fixed teaching method for geometry teaching, but my aim is to how children receive the knowledge, in that way I go. I*

initialize geometry by discussion method with students. Our teaching is child centered."(Math'steacher)

The above view of teacher mostly uses lecturer method in geometry teaching. But according to policy statements of NBPTS, accomplished Teachers display a readiness to work collaboratively, participate in collaborative efforts to improve the effectiveness of the school and cultivate a critical spirit in appraising the schooling. In modern senses, Teacher should use the child centered method, co-operative and more collaborative learning in the classroom teaching that makes more effectiveness of learning.

"Teacher doesn't use materials expectgeometry box and graph board at teaching. Teacher doesn't take unit test." (Students)

"I am planning to make unit tests regularly. Here are not sufficient teaching mathematical materials; beside geometry box, text book and some referenced books are provided by the school. We are not using audio, visual materials. Here is the lack of protection audio visual materials also."(Math's Teacher)

The above mathematics teachers view shows that he is planning to takes unit tests. School always focused the summative form of evaluation rather than formative form. Teacher did not apply formative assessment techniques to construct the strong educational background. There are no sufficient mathematical materials due to economic Crisis of school; administration cannot add mathematical materials. Also there is lack of protection from available materials for further use because materials are kept in office room randomly and not repairing the damage materials. There should be separated mathematics lab, but it is not found in this school.

From above discussion, it is concluded that there is lack of teaching materials in geometry teaching. The mathematics teacher always promotes lecture method in geometry teaching. There is lack participation of teachers and students at geometry classes. There are few number of students in the class of geometry but teacher do not use child centered approaching and do not evaluates students work properly, which is also a problem of geometry teaching. The cause of becoming above problems in geometry teaching are teacher applied traditional teaching methods, not using materials, not using teachers guide of geometry teaching and lack of formal training to teacher etc.

The cause of above problems is; teacher has not well knowledge about use of locally available teaching materials and built the teaching materials, not prepared with lesion plan, not confident about the chapter because teacher ordered to student look the answer key, not well participatory approach of both students and teacher in geometry teaching at class room, lack of diagnostic test and oral test. Teacher mostly uses lecture method in geometry teaching. Evaluate students by giving class work and home work.

Problems Related to Curriculum and Textbook

While interviewing the teacher participants and the mathematics professionals, they complained about the complex and larger syllabus in Nepalese secondary level mathematics curriculum. Teachers argued that, though they want to conduct their mathematics teaching in different teaching methodologies, curriculum forces them to follow traditional Problem Solving Approach. They put forward several reasons for that.

They argue that as most of other teaching methodologies are time consuming than Problem Solving Approach, they would be unable to complete their course on

time. The syllabus usually is very vague and teachers often feel problem to construct mathematics knowledge on students inside the classroom and relate their learning with daily life experiences. Similarly, they even complained about the central tendency of curriculum in which the teachers hardly find their space to contextualize mathematics teaching inside the classroom.

Teachers even hardly get opportunities to build their own syllabus on their own and to choose the textbooks according to the students. Usually the term-wise syllabus breakdown and textbooks are imposed by the different examinations boards and different clusters of schools. In these situations, it becomes harder for the teachers to implement modern approach in mathematics classroom.

Also often examinations are held from the external authorities and mathematics learning achievements are usually evaluated by the external authorities, mainly based upon marks achieved. Similarly, the evaluation systems primarily focus on Problem solving methods. In these situations, the mathematics teachers feel harder to run their class so as to construct mathematics knowledge in students.

Chapter - V

SUMMARY, FINDING, CONCLUSION AND RECOMMENDATIONS

This chapter consists of summary of findings, conclusion and recommendation. Findings of the research are based on analysis and interpretations of data obtained through the use of various tools. Implications are given to improve and uplift the teaching learning process of geometry in secondary level.

Summary

This is the case study about facing problems by teacher and students on geometry teaching and learning at grade nine. It is qualitative research as well as descriptive in nature. The main objective of this case school is to identify the problems on geometry teaching and learning and the cause of problems on geometry teaching and learning faced by teacher and students. For this purpose, researcher selected only one government school from the village area as case school of saptari district. The respondents are mathematics teacher, students, head-teacher and parents. The tools used in data collection procedure are class observation, face-to-face interview and recorded history about the school.

Finding

On the basis of data analysis and interpretation of the results, the summaries of major finding are as follows:

- Lack of physically well equipment class, modern technological material and continuous assessment system in teaching geometry.
- The students neglected the daily assignments and the teacher did not check homework in the daily basis.
- Lack of motivation in the classroom and practical knowledge about geometry were majoring role of the above problems.

- Most of the teachers were not able to teach their students in the basis of Van Hieles five levels thought of geometry.
- Teachers'behavior is not friendly at all the time.
- Time factor hinder uses of instructional materials due to short time period of mathematics have not been because of large number of class size.
- The students and teachers were not using the extra books beside the text books prescribed by CDC, which was the main reason for attempting geometry questions.
- The poorpre-knowledge and base of students in geometry, teacher had faced problems to teach geometry.
- Different dimensions had played the role to occur the problems in the teaching learning process such as not using the locally available teaching materials, difficult to convert geometry question in mathematical language.
- Complex and larger syllabus in secondary level mathematics curriculum also forces teachers to follow traditional problem solving approach in teaching geometry.

Conclusions

The major finding of this study shows that there were myriads of problems which had made both teacher and students passive agent in dealing with geometry teaching -learning. One componentsof arising problem on teaching -learning process in geometry was the pre-knowledge and poor geometrical background. The traditional teaching strategies in geometry class by both trained and untrained teachers had remained as a main problem. Teachers had not implemented the modern techniques, methods and materials for geometry teaching -learning. It seems to be exam oriented rather than its application.

There was lack of students project work on geometry learning. Most of students had less interest in geometry learning. It was difficult to create interest on students because geometry was regarded as abstract subject matters. The students and teacher had faced problems on geometry teaching -learning process because of the poor evaluation system, negligence of homework, lack of instructional materials, non-effective teaching -learning management, qualification of parents, home environment to study were some examples. To minimize these problems, there should be continuous communication among students, parents, and teachers and the teaching strategy must be student centered.

Recommendation for Further Research

The case study was about the cause of facing problems of teachers and students on geometry teaching -learning in Saptari district. The findings and conclusion of this case study were based on the low performer government school. So, it couldn't be generalized. But this study can bring new avenue to diagnosis the problems of geometry teaching -learning of other low performer government schools. This study will certainly help to reduce the occurring problems of teachers and students in geometry teaching -learning in future. This case study recommendsfor further research as "A study on problems in teaching -learning for geometry ". Similar studies can be done in the private sectors school too.

REFERENCES

Basnet, B.B. (2003). *Teaching problems faced by mathematics teachers in existing curriculum of Grade – VIII*.An unpublished Master Thesis, Department of Mathematics Education, T.U. Kirtipur.

Bell, F.H. (1978). *Teaching and learning Mathematics*, USA: W.M.C. Brown company publisher.

Bhatta, K.P. (2013). *Problems faced by students in Geometry.* An unpublished master thesis, department of mathematics education, T.U., Kirtipur

Bhattrai, T. (2005).*A study of problems faced by the secondary level mathematics students in existing curriculum*.An unpublished master thesis, department of mathematics education, T.U., Kirtipur.

Brooks, J. and Brooks, M. (1993).*In search of understanding: The case for constructivist classrooms*; ASCD.

Brunner, J. (1966).*The word a theory instruction*. Cambridge, MA: The Harvard University press.

Chaulagain, R.K. (2005). *A study of problem faced by secondary school mathematics teachers in teaching geometry*.An unpublished master, thesis, Department of Mathematics. Education, T.U., Kirtipur

Chaudhary, S. (2014).*Difficulties faced by students in learning Geometry at lower secondary level*. An unpublished master thesis, Department of Mathematics Education, T.U. Kirtipur.

Devi, K. (2013). Teaching and learning problems in mathematics. An unpublished master's thesis Department of mathematics Education, T.U., Kirtipur

Jay,P. (2011). Retrieved from(http:// www.Presexvearticles.Com/ 2011052068/meaning- of – learning – process. Html)

KC, N. (2009).*A study of problems faced by students in compulsory mathematics at secondary level*.An unpublished Master's Thesis Department of Mathematics Education T.U.

Lamichhane, H. (2001). *A study of problems faced by the secondary level mathematics teachers in teaching mathematics*. An unpublished master Thesis, Department of Mathematics Education T.U. Kirtipur

Limbu, D.P. (2007). *A study of problem faced by students in geometry at secondary level*.An unpublished master.Thesis, Department of mathematics Education T.U.,Kirtipur.

Poudel, D.P. (2007). *A study on problems faced by lower secondary mathematics teachers in teaching Geometry*. An unpublished Master Thesis, Department of Mathematics Education, T.U. Kirtipur

Shah, D.P. (2008).*A study on problems faced by students and teachers in teaching learning of vector*.An unpublished Master Thesis, Department of Mathematics Education, T.U., Kirtipur

Singh, S. (2011). Retrieved from(http: www. India study channel. Com / forum / 79268 – what – definition Teaching.aspx)

Vandebrouck, F. (editor).*Mathematics classroom:students; Activities and Teachers practice*. Sense publication.University Paris Diderot, France.

Appendix -A

CLASS OBSERVATION NOTE

The classroom observation note will be prepared on the basis of following indicators being participated with mathematics teacher during teaching learning in geometry.

S.N.		Yes	No	Remarks
1	Classroom size			
2	Availability desks and benches			
3	seat planning of students			
4	Arrangement of blackboard			
5	Student's behavior in classroom			
6	Teachers and Students interaction in the classroom			
7	Regularity of students in mathematics class			
8	Motivation to the students			
9	Homework and class work practicing /checking conditions			
10	Coordination with peers and teacher to solve the problems			
11	Participating in classroom discussion and extra activities of mathematics			
12	Teaching Methods			
13	Teaching Planning (lesson plan)			
14	Guidance of teacher during class work			
15	Students evaluation			

APPENDIX -B

Interview Guideline for Head-Teacher

The interview with head teacher was conducted on the basis of following topics:

- Teaching and learning environment of school.
- Instructional material and strategies.
- Techniques and policy of the school
- Parental involvement in school
- Training to mathematics teacher
- Evaluation Techniques learning environment of the school

APPENDIX -C

Interview Guidelines for Mathematics Teachers

The Interview with teachers was conducted on the basis of following main topics:

- Lesson plan, teaching strategies, materials for geometry teaching
- Encouragement and motivation in geometry class
- Requirement of pre knowledge of students for geometry teaching
- Initializing geometry teaching faced problems on geometry teaching
- Class work and home work
- Reinforcement, feedback provided by mathematics teacher to students in geometry class
- Teacher relations with students
- Evaluation Techniques in geometry class
- Learning environment of classroom
- Other special techniques, strategies, activities of teacher while teaching geometry.

APPENDIX -D

Interview Guidelines for students

The interview with students was conducted on the basis of following main topics:

- Punctuality and dedication of teacher and students.
- Encouragement provided to students.
- Pre-knowledge, understanding of students on geometry.
- Teachers' behavior in the teaching learning period.
- Faced problems on geometry learning.
- Class work and home work.
- Punishment and reward etc. Provided by mathematics teacher to students.
- Student's relations with mathematics teacher.
- Participant's students to mathematical exhibition or other activities.
- Evaluation Techniques.
- Learning environment of classroom.
- Learning environment of home.

APPENDIX -E

Interview Guidelines for Parents

The interview with parents was conducted on the basis of following main topics:

- Involvement in school.
- Learning environment of the school, image towards school.
- Interaction, behaviors with teacher.
- Evaluation system of school.
- Responsible and duties for child.
- Learning environment of home.