PROBLEM FACED BY STUDENTS IN GEOMETRY AT SECONDARY LEVEL

A

THESIS

BY

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LETTER OF CERTIFICATE

This is to certify that Mr. Birendra Kumar Chaudhary a student of academic year 2072/73 with Campus Roll No. 448/2072, Thesis No. 1641, Exam Roll No. 7228263 (2072) and TU Registration No. 9-2-306-17-2010 has completed this thesis under my supervision during the period prescribed by the rules and regulations of Tribhuvan University, Nepal. The thesis entitled, "Problem Faced by Students in Geometry at Secondary Level" has been prepared based on the results of his investigation during the period of 2021-2022, I hereby recommended and forward that this thesis be submitted for the evaluation as the partial requirement to award the degree of Master Education.

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Prof. Bed Raj Acharya

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EVALUATION AND APPROVAL

This thesis entitled **"Problem Faced by Students in Geometry at Secondary Level"** submitted by Mr. Birendra Kumar Chaudhary in Partial Fulfillment of the Requirement for the Master's Degree in Education has been approved.

Viva Voce Committee	**Signature**
Prof. Dr. Bed Raj Acharya (Head)	...……
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Mr. Krishna Prashad Bhatt (Supervisor)	……

Date: 13 Feb. 2022

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RECOMMENDATION FOR ACCEPTANCE

This is to certify that **Mr. Birendra Kumar Chaudhary** has completed his M. Ed. thesis entitled **"Problem Faced by Students in Geometry at Secondary Level"** under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his thesis to the Department of Mathematics Education to organize the final viva-voce.

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Mr. Krishna Prashad Bhatt

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DEDICATION

Honestly dedicated

to

My parents

Daroga Prasad Chaudhary and Amrita Chaudhary

DECLARATION

This thesis contains no material which has been submitted for the award of other degree in any institution to the best of my knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

Date: .....

Birendra Kumar Chaudhary

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.....

Birendra Kumar Chaudhary

ABSTRACT

This study intended to find out the "Problems Faced by Students in Geometry at Secondary Level". For this study, the researcher divided Kapilvastu ditrict in two areas on the basis of developmental status. Two schools were selected from both areas. The participants of this study were two secondary level school and two hundred fourty secondary level students. Altogether 240 candidate were taken as participants from the population above by purposive sampling method. One compulsory mathematics teacher was also taken. Furthermore, the researcher had prepared questionnaire, class observation form and interview schedule. For the theoretical supports Van Hieles five level of geometrical thought also taken. After this, the researcher made an interview with concern the students and subject teachers. The collected data were tabulated, interpretation and analyzed with simple percentage, mean weightage. The finding of this study are as follows. Learning geometry in secondary level is affected by so many factors such as lack of encouragement for study. Congested and uncomfortable classroom for students, unavailability of teaching learning materials, lack of trained teachers are problem for students. Also lack of physical facilities and in properly arrangement, lack of good administration and negligence of students in learning geometry etc. are the main problems of students. By providing the above requirements, the problem faced by students may decrease in school to provide good opportunities for students in secondary level.

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ABBREVIATIONS

CDC	:	Curriculum Development Centre
CERID	:	Research Centre for Education Innovation and Development
MALATI	:	Mathematics Learning and Teaching Initiatives
NCTM	:	National Council of Teacher of Mathematics
NR	:	Number of Respondent
SN	:	Serial Number
SD	:	Standard Deviation

Chapter I

INTRODUCTION

Chapter Overview

This Chapter begins with its introductory part highlighting the background of the study, statement of the problems, objectives of the study, significant of the study, delimitation of the study and definition of the related terms.

Background of the Study

The word “Mathematics” is derived framework word “Mathema” which means knowledge, study and learning. Mathematics is the study of the topic such as quantity, number, structure, space, and change.

According to eves (1990) “Mathematics is a gate and key of science. Mathematics has played a vital role in the development of all human civilization. Mathematics holds the mirror up the civilization it has also been defined as the science of number and science of calculation. According to John Locke; “Mathematics is away to settle in mind a habit of reasoning. Mathematics has lead to the development of various subjects, vocations and Technology. It is science which is still playing and important role in various field of life. We must relate the mathematics to history, logic, science, daily life, social science, daily life, social science, arts music and literatures as well as to any other development.

The Mathematics may be defined in number of ways. It is the numerical and calculation part of man’s life and knowledge. According to Oxford Advanced Learners Dictionary, “Mathematics is the science of number and space” branches of mathematics include Arithmetic, Algebra, Geometry and Trigonometry.

Geometry is one of the most useful and important branch of mathematics. It includes an enormous range of ideas and can be viewed in many different ways. The

basic ideas of mathematical system originated in geometry some twenty-two or twenty-three hundred years ago. “The word geometry is derived from the Greek words, geo (meaning the earth) and metric size and other properties of figures and the nature of space are the area of geometry. It is the branch of mathematics that deals with the measurements and relationship of lines, angles, surface and solids. Geometry is the science of space and extends on the other hand; in the east this subject was called (Rekhaganit).

School mathematics curricula of Nepal have given emphasis on geometry learning from the beginning of schooling. The curricula have aimed to develop students understanding of intended geometric concepts at primary, lower secondary and secondary level. Similarly, geometry is one of the content standards of school mathematics, which aims at developing special reasoning, problems solving skills and communicating. Moreover, about the importance of thinking skills in geometry, a vision for school geometry (2005) writes, "reasoning is fundamental to mathematical activity." Active learner's questions, examine, conjecture and experiment. Thus, geometry is regarded as a core content area of school mathematics programme. It is the most important and integral part of school mathematics curricula showing the importance of geometry, Vance (1973) writes it is a way of modeling our physical environment and because there is a great abundance of models suitable for all levels.

About the development of geometry Butler and Wren says, “Primitive people obtained their first knowledge of geometry from natural objects and later on from arts as well as needs that arose to understand and came of further the legacy of art, architecture, surveying, measurement etc. provided the stimulator the development of science and similarly came into existence and provide a firm foundation for the science of geometry.

School mathematics curriculum faces. Serious dilemma when we come to geometry. Similarly, geometry is one of the content standards of school mathematics which aims at developing special reasoning, problems solving skills and communicating. To improve the existing situation of geometry teaching, it is necessary to know the existing condition of students thinking in geometry, more especially at secondary levels of school geometry. Geometry is a fertile source for interesting and challenging problems and geometrically methods are powerful tools in problem solving.

Teachers are the important agent for the successful implementation of mathematics curriculum only by hard work of the teacher. The mathematics curriculum can be successfully implemented successful teacher is who can influence upon the altitude of students to mathematics learning. There are various researchers about teachers and students' problem many governments and non-government official research indicates the investment of huge amount of time and money to find the problems of teachers and students. But satisfactory result was not found. Hence no successful solution can be found to address the students so many problems that are occurring frequently.

That is why the researcher decided to make a systematic study on the topic. “Problem faced by students in Geometry at secondary level of Kapilvastu District.”

From the above study, it is usually seen that those students and teachers who are the users of mathematics curriculum are facing with the following problems to deal other source of problems in the implementation of mathematics curriculum were:

- Teaching learning activities
- Physical facilities
- Classroom management

- Pre-knowledge/ background of the Pupil
- Unavailability of instructional materials and lack of knowledge of how to use it.
- Economic factors
- Evaluation system

Researcher Views on the van Hiele Theory

Based on their pedagogical experience and their teaching experiments the van Hiele (Husband and Wife) proposed a psychological pedagogical theory of though levels in geometry. For many researchers such as school field, this model of thought levels provides a useful empirical based description of what are likely.

To be relatively stable qualitatively different states or levels of understanding in learners, accompanying this model of though levels the van Hieles proposed a model of teacher that specifies five sequential phases of instruction.

About the modern mathematics classroom, (Bhatia and Bhatia) said that the teacher's tools have long consisted of Chalk, blackboard, pencil and textbook. However today teacher uses demonstration models of various shapes and size, drawing instruments, graph, and stencils, measuring instrument, many pictures pamphlets, books and mathematical magazines, films, slides, manipulative are being used in teaching mathematics in the modern classroom. But the learning in Nepalese schools is totally based on textbooks since the textbooks have been written in formal Nepali language. It is more difficult for those students who have other language speaking background than Nepali on the other hand the teachers and the textbooks as an ultimate means of teaching that do not provide the opportunity of relating their learning with local context because of financial problem.

Nepalese schools could not provide money to spend in materials and equipments. Some schools do not have enough classrooms. A large number of students are packed in a small classroom. Thus, the crowed classroom is one of the major problems of implementing interactive teaching and learning situation. Classroom is not well lighted and well ventilated. Physical facility such as teaching materials, mathematics lab, computer and collection of low cost and cost-free materials that are essential for teaching and learning activities are not organized properly by concerned agencies.

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 essentially of geometry was felt with the development and utility of geometrical concepts, which is proved in the fourth century B.C. by the great and popular Greek philosopher Plato who ordered carved of inscription "Let no one ignorant of geometry enter may doors." Euclidean Geometry developed by Euclid (300 BC) 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.

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.

Statement of the Problem

So the student's achievement low not meaningful understanding students in geometry teaching learning van Hiele's level of Geometric thinking among secondary school students in Geometry was attempt to assess the level of thinking in geometry of secondary school students 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 falling in this subject is due to the poor performance in mathematics.

In mathematics geometry is the subject which responsible behind failure and low 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 secondary level the research question of this works are as follows:

1. How mathematics in geometry is the current problem of teaching and learning at secondary level?
2. Why teachers and students are facing problems in teaching learning geometry?
3. What are the problems faced by the secondary students in learning Geometry?
4. What are the problems faced by the students in Geometry in rural area school differ from urban area school?

Objectives of the Study

The main objectives of this study as follows:

1. To find the problems faced by students in learning Geometry.
2. To explore the problems faced by the teachers in teaching Geometry.

Justification of the Study

Geometry is one of the most important parts of mathematics dealing with surface plain dimension triangles, rectangles, squares, circles etc. giving visual shape to mathematics. Most of the students are week 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 researcher papers, books and publication have dealt with other aspect such as achievement methods learning environment in mathematics, Classroom rather than problem in teaching and learning mathematics in geometry.

Therefore, this researcher was focused to identify the problems in teaching and learning mathematics in Government schools. The researcher had tried to explore the problem being faced by teachers and students in teaching and learning geometry at grade ten 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 also open the door for the further study about separate geometrical concept.

- This study would help to the teacher to bring appropriate change in teaching behavior.

Delimitations of the Study

Each study is no rigorously perfect and fee 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 Tauleshwarnath Sanskrit secondary level school in Kapilvastu District.
- This study concern with only the problems faced by the students and teachers of secondary level in teaching learning geometry.
- This study was concerned with only those students who were studying and those teachers who were teaching compulsory mathematics at grade ten in the academic year 2077.
- This study was limited to the class room activity teaching approach content and teaching materials assessment and feedback process.

Definition of the Terms

Problems. Problem means any obstacles that may different 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 problem means obstacles of the teacher's when he is faced in mathematics classroom such as material and administration.

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

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

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

Trained teachers. Trained teacher's means those teachers who obtained trained from NCED.

Physical facilities. The physical aspect of classroom is itself a physical environment of the classroom, which includes different variables such as classroom arrangement, seating pattern and materials and number of inhabitants.

Chapter II

REVIEW OF RELATED LITERATURE

This section includes review of related literature and focuses on the different aspects that create problems in instruction of mathematics furthermore; it deals with review of empirical literature, implication of the studies and conceptual framework. The review of related literature deals with the theories of research studies which have been conducted earlier; it helps to conduct the new research study in systematic manner by providing the general outline of the research study to avoid the unnecessary duplication. There are various literatures on teaching and learning mathematics, number of books, research reports, paper and other booklets can be found that concern with curriculum, teaching materials and methods and so on. The review of the related literature of this study and theoretical framework of this study deals with the books, theories, research studies and articles related to the study which were collected and studied by the researcher. In sum literature review accomplishes the following function.

- It reveals the areas of needed research.
- It avoids duplication of costly research report.
- It gives the specific framework for the study.
- It establishes a point of departure for new research.

The topic selected is completely new the parallel paper submitted by early researchers has raised physical problems gender difference and are depended on cast, achievement, enrollment and so on. In this study the actual classroom performance and its condition has been submitted for the paper different books by foreign writers have been read consulted with expert frequently and regularly.

Mathematical journals and articles of different researches have been consulted sufficiently. G-MAT, coordinate geometry various school and college level mathematics books, thesis papers of different colleagues and seniors have been read. Researcher also had involved in the workshop organized by Tauleshwarnath sanskrit secondary school in the leadership of mathematics teacher of Taulihawa. Each and every portion has been completed with hard labor and with kind honesty with the best of researcher's knowledge and belief with respect to available source and materials that one can understand on reading this paper.

Empirical Review

Each and every research work requires the knowledge of previous background to open the targeted objectives and to validate the study. Here this section is an attempt to review the related studies, articles and the reports. Some of the old thesis has been reviewed considering them as a related literature and also as evidence to the present study.

Bhattarai (2005) made a study entitled "the problem faced by the mathematics students in existing curriculum." This study being descriptive in nature. Twelve schools from urban in Illam district were selected by simple random sampling method as well, from each school one teacher and four students were chosen respectively. The main tool of the study was questionnaire. The questionnaire was developed into three-point likert scale. The collected data are analysed by calculating percentage. The major findings of this study are concluded that learning mathematics in secondary level is disturbed by so many factors such as lack of teachers' involvement in classroom planning.

Adhikari (2006). Conducted a research on cultural discontinuity and learning difficulties in mathematics, a case study of primary Dalit school children. The main

objective of this study was to identify the cause of difficulties in learning.Mathematics of Dalit children of school and to identify the influencing factor in learning mathematics for the Dalit children at school. This study was focus on all the grade five students of Banbilas secondary school of Chapagaun V.D.C in Lalitpur district. He used in depth interview observation for the data connection procedures. This study found that there is discontinuity between silence culture and forwarded culture. He also found that Dalit children have poor language ability and they cannot concentrate in their study due to their involvement in house hold works.

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.

Bhatta (2013) did a survey study on "problems faced by the students in geometry at secondary level of Kapilvastu 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 was 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 evaluations system from the

above stated findings of this study, it can be concluded that teaching and learning of geometry was not satisfactory in Kailali district.

Bhatta (2012) has completed an M.phil.Cases study research on the topic "classroom practice at primary level: a multicultural perspective." The site of the study was Gram Sewa Higher Secondary School of Kathmandu district. He selected participants by using purposive Random sampling method.

Bhatta (2014) has also conducted a research on the topic "Pedagogical process of mathematics teacher in ethnically plural classroom in secondary level." The objectives of this study were to explore the management practices of secondary teachers to management practices of secondary teachers to manage driver's classes and to investigate the learning needs of different groups of students. The study was limited in ten surrounding secondary schools in Kanchanpur district. He selected 50 secondary students and the ten teachers for his study, interview, observation and the questionnaire were the tools to collect the data for his study. He concluded that disconnected teaching activities and tradition-oriented teaching methods and materials were mostly applied by secondary teachers in their classrooms. He further found that lack of knowledge in mathematics teacher has also a barrier to make all the students equally involved in the classroom.

Acharya (2016) conducted a research study on "Effectiveness of inductive method in teaching geometry at secondary level" using experimental method. The main objective of this study was to compare the achievement of the student taught by deductive methods. He selected school purposively there were 36 students in grade ix of Samundra Higher Secondary School Nuwakot. Achievement test, observation and interview were the major data collection tools. From this research he found that the mean achievement score of the students taught by using deductive method. This study

revealed that the inductive method was higher than the students taught by using deductive method. This study revealed that the inductive method could be more effective thanthe deductive method in teaching geometry at secondary school level.

Kekana (2016) conducted a study entitled “using Geogebra in transformation geometry; investigation based on the van Hiele model” the aim of this study was to investigate on a small scale the potential of the use of Geogebra in teaching and learning of transformation geometry to grade 9 learners. Using mixed method for this research and 4 publics schools selected by purposive sampling method. Grades 9 learners were population for this study. Data collection tools were interviews, questionnaire, observation and survey paper and pencil test. The results were indicted as the effect of the use of Geogebra is concerned; improved performance in transformation geometry was demonstrated.

Rizo (2016) conducted a study entitled “the effect of using van Hiele’s instructional model in the teaching of congruent triangles in grade 10 in Gauteng high schools” the aim of the research work was to inquire the possible effect of teaching geometrical congruency using van Hiele’s instructional model. Grade 10 learners are population for this study and three randomly selected high schools in Gauteng formed the research field while intact groups of grade10 learners I these schools formed the study participants (136 learners) for the study. Using mixed method for this research. Data collection tool were classroom test, (preand post test) and video record and note pads. It was recommended that van Hiele learning and instructional model be adopted and applied in the teaching of other areas of mathematics.

Theoretical Review

Two Dutch educators, Dina and PiereVan 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 Hiele's 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 Hiele's theory (1986) is a learning model that describe the geometric thinking of students though as they move from holistic perception of geometric shapes to a refinded understanding of geometric proof. Van Hiele's and his wife Dina M. van Hiele's developed this theory out of the frustration both they and their students experienced with the teaching and learning of geometry. Van Hiele (1986) explains that when teaching these students geometry. It always seemed as though 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 solutions van Hiele found for students that frustration was the theory of different levels of thing. The five learners of geometry thought did not correspond with student 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 were given below.

Level (0) Basic Level: Visualization

In this phase the students identify, names, compares and operates on geometric shapes such as triangles, squares and rectangles in their visible form.

Level (1): Analysis

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

Level (2): Informal Deduction

In informal deduction the student discovers and formulates generalization about previously learned properties and rules and develops informal arguments to show these generalizations to be true. Children not only think about properties but also able to notice relationship within and between figures. At this level children are able to formulate meaningful definition and also children able to make and follow informal deductive arguments.

Level (3): Formal Deduction

In this stage, the students prove the theorem deductively and understand the structure of the geometric system. At this level children think about relationships between properties of shapes and also understand relationships between axioms definition theorems corollaries and postulates.

Level (4): Rigor

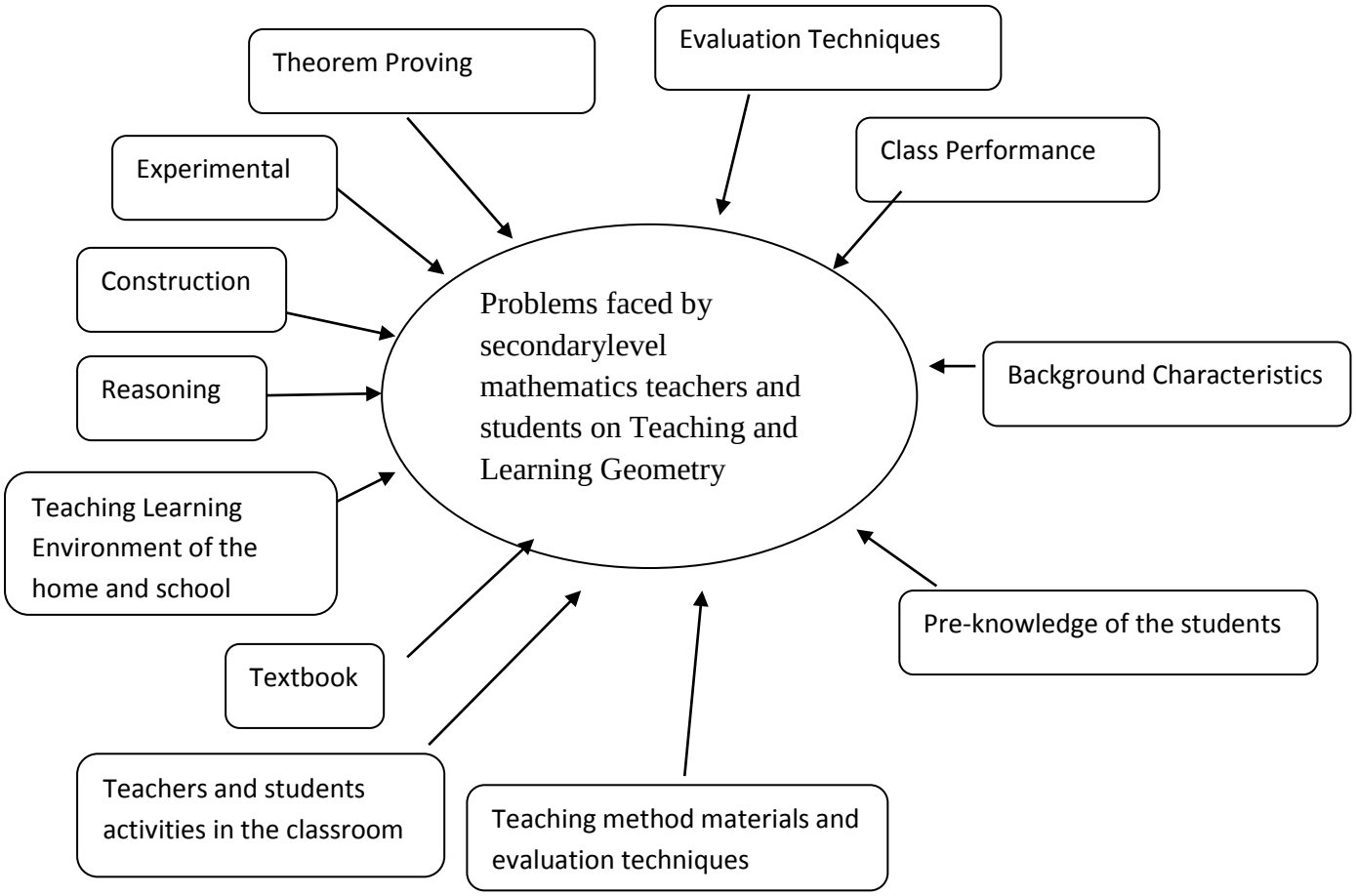
In this stage the student established in different systems of postulates and compares and analyzes deductive system.

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

Conceptual Framework

The analytical management or design which contains the factors affecting achievement of mathematics and hindrances that faced by teachers and students in class performance of geometry potion. By the help of literature review, expert consultation and peer discussion it had been constructed by the researcher himself including school related and out of school contextual factors to make the study specific, systematic and easy. A conceptual framework is an analytical tool with several variation and contexts. It is used to make conceptual distinction and organize ideas. Strong conceptual frameworks capture something real and do this is a way that is easy to remember and apply.

Figure 1: Conceptual Framework of the Study



From above discussed point of views in related literature, problems of teaching and learning mathematics in geometry may depend upon different variables. These variable affecting students learning process in geometry are teachers and students interaction, students involvement, curriculum, textbook, teachers and students behavior homework, class work regularity, the major factors of teachers and students activities, pre knowledge, environmental variables.

Chapter III

METHOD AND PROCEDURES

This chapter represents the methods and procedures of the study so as to achieve the objectives of the study. This chapter explains about the design of the study, process of sampling, construction and validation of tools, implementation of the tools and collection and interpretation of data.

Design of the Study

Research design is the plan, structure and strategy of investigation, according to selltiz (1969) a research design is arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy. The survey design is used when the population both large and information is needed from wider Sample. The designed in this study was survey designed under quantitative method. This survey design is applied to assess problems faced by students in Geometry at secondary level.

Population of the Study

The population of this study consisted of all the secondary level schools. Mathematics teacher and students of grade 10 of Kapilvastu who currently involved in teaching learning program directly or indirectly.

Sample of the Study

A sample is small proportion of the population that is selected for observation and analysis (Best and Kahn, 2014). According to district Education office Kapilvastu, fiscal year-2076, There are 143 secondary schools and 6435 students. The participants of this study were two secondary level schools and two hundred forty secondary level students. Altogether 242 candidates were taken as participants from

the population above by purposive sampling method. The selected schools were situated in different municipality of this district.

Data Collection Tool

The major means of collecting data were observation form, questionnaire and interview form to the teachers and guardians observation of schools discussion with principals and students also were the additional supports to collect data. The tools were modified and developed according to the suggestion and guidelines of the supervisor.

Observation

During the five days classroom observation, I observed seating structure, teacher activities, student's 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 interview have centered on promoting an ideal interactional style and articulating the researcher behavior by which this might be realized. Interview with stakeholders is one to one conversationabout a specific topic or issue. The main aim of this interview is to explore the problems faced by teachers in teaching geometry.

I interviewed 5 students, 2 mathematics teachers and 1 head teacher from Shree Tauleshwarnath Sanskrit secondary school Taulihawa in kapilvastu though

interviews. I tried even the student participants and data from the field observation justified that they used such practices and activities.

Questionnaire

Questionnaire is regarded as the main tool of this study which was developed by researcher herself with the help of the supervisor. The questionnaire constructed for students consisted of 28 questions concerning about teaching learning activities, instructional materials, evaluation techniques, classroom managements and proving and verifying the theorems. The validity of the questionnaire was checked and approved by supervisor. Reliability of questionnaire has been established by administrating the questionnaire into some students which is not sample students and validity has been established through criterion related validity.

Data Collection Procedures

The data had been collected by primary sources. For this purpose, the researcher visited each of the sampled school along with the questionnaire, interview and observation schedule and request letter from T.U. to render any help needed to the researcher from the school administration. After explaining the purpose of the visit the researcher requested each of the students of the schools included in the ample to fill the questionnaire honestly. The researcher explained and clarified the confusions that arose in understanding the statements. Researcher also used interview personally with students and required information were collected for the research study.

Scoring Procedure

For the analysis of the items, weightage of 5, 4, 3, 2, 1 is assigned to statement strongly agree, agree, undecided, disagree and strongly disagree respectively. For the statements opposing to this point of view, the items scored in the opposite order. Mean 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 is concluded that the statement contains in strong favor to the problems. If the index measure is less than or equal to three the it is week favor to the problems.

Table

Likert's 5 Points Scale

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

If the statement is positive, they give their opinion strongly agree than score is 5. In the similar manner agree, undecided, disagree, strongly disagree have scored 4, 3, 2 and 1 respectively.

If the statement is negative, they give their opinion strongly agree, then score is 1, in the similar manner agree, undecided, disagree, strongly disagree have scored 2, 3, 4, 5 respectively.

Table

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

At last the response of teacher were categorized in few columns and calculated by percentage. Interview schedule also used to justify the quantitative data that referred the problems.

Data Analysis Procedures

The researcher had used the primary data collected from the field observation, interview and questionnaire schedule. The collected data was categorized according to the class observation, questionnaire and interview. Therefore, the problems of teaching and learning mathematics in geometry at grade ten. Therefore, the content geometry by teacher and students were analyzed and interpreted on the basis of the framework that the researchers had already developed in the review of related literature section. The data collected from interview, classroom, observation, questionnaire and school record were analyzed by grouping the similar information in descriptive method. Then each 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 ten.`

Chapter IV

ANALYSIS AND INTERPRETATION

The responses of the 240 students from their questionnaire, face to face interview of 5 students, classroom observation of each 2 sampled school two times and the responses of interview with 2 teachers and 1 head teacher were used to analyzed data.

The data were collected for the study from 2 secondary schools selected from Kapilvastu district. The collected data were tabulated and analyzed according to objectives of study. The obtained data were statistically analyzed and interpreted by using statistical tools mean weightage, t-test and percentage. The interaction with the respondents was recorded and noted carefully. the collected information was categorized according to the category of the respondents and then different themes were given in the context of interview considered as a code and the similar code versions of respondents together and explained in their perspective.

The collected data were analyzed under the following main headings which relates to the developed questionnaires and correspondents to the objectives of the study.

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

Analysis and Interpretation of Student's Responses

Stepwise analysis and interpretation are given on the topics: Teaching learning activities, instructional materials, providing and verifying theorems, evaluation techniques and classroom management are given below.

Analysis and Interpretation of the Responses on Teaching Learning Activities

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

Table 1: Students' Responses on Teaching Learning Activities

Item No.	Statements	SA	A	U	DA	SDA	Mean weightage	Remarks
1	The class starts from interesting way	60	97	33	39	11	3.97	Favorable
2	Teacher gives extra parallel problems related with exercise	63	88	32	24	33	3.51	Favorable
3	Teachers provide opportunity for weak students	35	69	31	52	53	2.92	Less Favorable
4	Teacher also participate with you in classroom activities	73	79	27	39	22	3.59	Favorable

5	We feel difficult while providing theorem	60	108	31	41	-	3.78	Favorable
	Total						3.55	

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 providing theorem.

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

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

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

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

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

Analysis and Interpretation of Responses Related to Instructional Materials

To make teaching learning activities effective and meaningful, use of instructional materials are indispensable. Different kinds of teaching materials can be used in teaching geometry such as audivisual aids, models, textbook and computer and soon. 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 effective. Table no. 2 shows the situation of problems related to instructional materials.

Table 2: *Students' Responses on Instructional Materials*

Item No.	Statements	SA	A	U	DA	SDA	Mean weightage	Remarks
6	Textbooks and practice books are available in time	47	104	30	47	12	3.53	Favorable
7	Our teacher uses locally available and low cost materials in teaching geometry	47	85	29	24	55	3.18	Favorable
8	Manipulative geometricals materials are not	50	54	24	24	88	2.8	Less Favorable

	available in our school							
9	Less use of teaching materials	86	72	27	29	26	3.68	Favorable
10	Teacher uses instructional materials while teaching geometry	16	35	25	25	139	2.02	Less Favorable
	Total						3.042	Favorable

The analysis of Table No. 2 shows that total mean weightage of statements is 3.04 implies that students are facing problems on the field of instructional materials mean weightage of item 10 is 2.02 follows that students agreed only about availability of instructional materials but which are not sufficient for learning geometry. Items numbers 6, 7, 8 and 9 have weightage 3.53, 3.18, 2.8 and 3.68 respectively which followed that students were in favour of the problems with availability of textbook. Uses of locally materials, availability of manip8ulative materials and less use of teaching materials. Teaching facilities and teaching aids play an important role to improve mathematics education program. Taking this fact into account it could be argued that mathematics laboratory or mathematics resource centre.

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

researcher discussion to the head teacher of every sampled school. There was unavailability of materials like video-recorder, micro computer, overhead projector, film projector and photo copier. In order to improve the mathematics education program, finances must be found for keeping teaching materials, and in the mathematics laboratories and more emphasis should be given to produce and use local teaching materials it has been found that the teachers were unable to make necessary teaching materials due to lack of training and enough time some of them noted that economic aspect is another factor.

Time factor hinder use of instructional materials due to the short time period of mathematics class. Teaching materials had not been used because of large number of class size.

"Teacher does not use materials except geometry box and daily used materials at teaching". (Student)

"The classroom is so much crowded but the school neglect another section for mathematics". (Students)

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

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.

The Van Hiele (1957) noticed the difficulties that their students had in learning geometry. His theory exp0lains why many students' encounter difficulties in

their geometry course especially with formal proofs. Van Hiele believed that writing and that many students need to have more experiences in thinking at lower level before learning formal geometric concepts.

Table No. 3 illustrates the students responses on problems of proving and verifying theorems and construction.

Table 3: *Proving and Verifying Theorems and Construction*

Item No.	Statements	SA	A	U	DA	SDA	Mean weightage	Remarks
11	Teaching materials are used in teaching theorems and exercises	54	76	14	27	69	3.07	Favorable
12	Our teacher uses geometrical instruments while teaching construction	26	35	25	15	139	2.14	Less Favorable
13	Geometrical theorems of secondary level related with life	65	120	24	31	-	3.91	Favorable
14	Examples and exercises of theorems are highly correlated	61	117	25	37	-	3.84	Less Favorable
	Total						3.24	

Inspection of the table reveals that the mean weightatge is 3.24 means maximum number of students are in the favour of the problems and signify the

problems. Process of proving ideas are highly based on theoretical and parrot learning system which does not catch up the Van Hiele's five levels of geometrical thought. Teaching construction and verifying the theorems are less priority in maximum schools. Using the mean weight age of no. 11, 13 and 14 claims that most of the students are facing problems when proving theorems and construction.

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

"I am not using any fixed teaching method for geometrical teaching, but my aim is to how children receiver 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 of time but that is impossible with child centered teaching." (Teacher view)

"Teacher always emphasis their own method and they also choose the lesson according to their will". (Students)

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

The above views of students shows that for the selection of method and lesson teacher always dominate the students but the modern view of learning emphasize more collaborative and cooperative method for teaching and learning geometry and students indicated that the mathematics teacher in the classroom did not try to extra mathematics activities such as did not give many examples and did not try to manage extra mathematical activities.

Analysis and Interpretation of Responses about Classroom Management

Educations have been aware that the quality of classroom management is an important factor for students achievement and teaching success. We have written about management rather than control in classrom 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 capability to provide remarkable learning activities so that students can develop their conceptual thinking. The overall situation concerned with classroom management is given in Table No. 4.

Table 4: *Students' Responses about Classroom Management*

Item No.	Statements	SA	A	U	DA	SDA	Mean weightage	Remarks
15	We feel difficulties while participating in the congested classroom	54	85	15	32	84	3.35	Favorable
16	Problems of the text books are not related to the daily life of students	35	69	21	52	63	2.84	Less Favorable
17	We have no problems of blackboard and other furniture in our classroom	90	73	12	31	34	3.64	Favorable
18	We solve our	53	67	22	41	57	3.08	Favorable

	mathematical problems in group							
19	Anything written in blackboard is visible.	123	94	4	9	10	4.3	Favorable
	Total						3.44	

However, during the research period it had been found that students were disagreed about the classroom management in teaching geometry mean weightage of item 16 has 2.84 which follows that students agreed only about the blackboard and furniture of the classroom but which are not sufficient for learning geometry item number 15, 17, 18, 19 have mean weightage 3.35, 3.64, 3.08 and 4.3 respectively which follows that students are in favor of the problems with congested classroom, group work activities and visibility of blackboard. The total mean of the statement is 3.44 which show that most of schools have problems in classroom management because of the overload of students in government schools.

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

Table 5: *Classroom Observation Records Related to Classroom Management*

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

Table No. 5 shows that there were too crowded. Similarly, classrooms were not properly arrangement. The classroom decoration was not properly managed and there was the problem of blackboard, drinking water, playground and furniture. The maps posters and other charts were not properly hanged. However, the classroom was well ventilated and lighted.

Analysis and Interpretation of Responses of Evaluation Techniques

The primary responsibility of a teacher is to using about the maximum degree of students achievement in learning. Evaluation device such as examination of various types, oral quizes and different class activities are essential evaluation process of evaluation techniques. The main purpose of the evaluation program may be help more intelligent guidance in learning. Table No. 6 presents the situations related with the problems in evaluation techniques.

Table 6: *Students' Responses on Evaluation Techniques*

Item No.	Statements	SA	A	U	DA	SDA	Mean weightage	Remarks
20	The teacher checks our homework daily	77	144	6	8	5	4.16	Favorable
21	The teacher does not take the test at the end of each unit.	24	49	5	38	124	3.94	Favorable
22	Our teacher takes different types of test except terminal exam.	25	64	16	22	113	2.53	Less Favorable
23	Teaching is only exam oriented.	38	112	8	52	30	3.32	Favorable
24	The teachers do not focus on our creativity and curiosity	45	77	16	38	64	3.00	Favorable
25	Contents in the given textbook are related to lower classes	91	126	11	8	4	4.37	Favorable
26	Teachers give the feedback	70	91	4	31	54	3.08	Favorable
27	All geometrical problems aren't	112	93	10	21	4	2.57	Less Favorable

	included in exam							
28	The first priority is not given to teach geometry	88	94	7	44	7	2.07	Less Favorable
	Total						3.03	

The total mean weightage 3.03 indicates the most. Students are in favor of the problems of evaluation techniques. During research and analysis of Table No. 9. It had been found that most of students especially in items 20, 21, 23, 24, 25 and 25 with mean weight age 4.16, 3.94, 3.32, 3.00, 4.37 and 3.08 respectively are in favor of the problems. The items 22, 27, 28 with mean weightage 2.53, 2.57 and 2.07 respectively are not favor of the problems of evaluation techniques. Students agreed about the unit tests, terminal tests. Problems included in exam of geometry and given priority in teaching geometry.

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

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

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

Analysis of Data Obtained from Interview

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

Do You Feel Geometry as Hard Subject ? And Why ?

"Yes, I am feeling mathematics is hard subject but in lower level my favourite subject was math. Now a day, I don't get sufficient time to practice mathematics so I feel it is hard." (Nitu Chaudhary)

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

"Geometry becomes hard subject to me because I use the evening time by playing football, volleyball, carromboard and listening folk song is mobiles as well as watching TV everyday as like". (Ritu Agrahari)

"Yes, I am also feeling that geometry is the hardest subject because of my pre-knowledge and teacher does not care us he used to forward lesson according to talent students only".

"I also feel geometry as an interesting and easy subject. But sometime if teacher does not give clear concept in proving and verifying the geometry theorems then I used to feel lazy."

Study other problems related to evaluation techniques are as follows:

- Yearly and half-yearly tests are not reliable due to cheating problems.
- Record keeping evaluation system is tire. Some job.
- Poor students copy the homework of talents.
- Weak students also pass the class and place new comers in class due to the defective promoted policy.
- No use of any other evaluation tools except paper pencil test exam.
- The evaluation of classroom activities is not included into terminal examination.

In conclusion, various problems have appeared in evaluation system of mathematics learning. Lack of involvement in curriculum planning, lack of efficiency to conduct with their teachers such as shy, hesitation produces, lack of books and journals and teaching facilities, lack of opportunities given to upgrade their knowledge. Poor family environment in terms of financial and social prestige in society. Involvement in their household work as child labour and various capacities.

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

What Kinds of Problems do you Face in Your Professional Life ?

"I know it is my duty to diagnose each child's exact deficiencies and treat them according to their needs to improve mathematical achievement. Also I know that local teaching materials are more useful to teach geometry to the students. But it is impossible to me because of the over crowded classroom. Over load of periods upon me, short time of per periods and no any evaluation for extra labour." (Teacher)

Chapter V

FINDINGS, CONCLUSION AND IMPLICATION

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

Summary

The main purpose of the study was to identify the problems faced the mathematics students in geometry at secondary level of Kapilvastu district.

The specific objectives of the study were:

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

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

This study was entirely survey type. The population of this study consisted of entire mathematics students, teachers of government school situated in Kapivlvastu district. The collected data were quantified based on. Likert five points scales, questionnaire, observation, form and interview schedule were included in each category of problems and descriptive analysis of collected r4esponses were carried out-statistical indicators such as mean weightage, t-test and percentage were used for analysis of problems.

Findings

From the field survey and statistical analysis of the collected data. It was found that students have been facing numerous problems of geometry teaching in the classroom at secondary level. Different types of internal and external factors are affecting to arise these problems.

Problems related teaching learning activities are as follows:

- The problems in learning geometry at secondary level founded that lack of instructional materials congested classroom and lack of appropriate feedback.
- The cause of problems in learning geometry founded from interview are spending more time on household work, playing, distance between home and school, negligence by teacher to poor students, teaching without providing clear concepts.
- The problems faced by institutional and community students in learning geometry at secondary level are not significantly different.
- Problems on teacher guidance for solving problems.
- Due to the lack of sufficient time, there were difficulties in checking homework.

Problems related to instructional materials are as follows:

- School had a few quantity teaching materials but there was no facility to store and place rightly.
- Time factor finder use of instructional materials due to short time period of mathematics class.
- Teaching materials have not been used because of the large number of class size.

- Problems on construction and using locally available and low cost materials in teaching geometry.
- There was economic crisis in schools therefore; school could not manage the proper environment of teaching learning.

Problems related to proving and verifying theorems and construction are as follows:

- Problems on using geometrical instruments in teaching construction.
- There was the problem that related to the theoretical and practical concept of proving theorem.
- Most of the teachers were not able to teach their students in the basis of Van Hieles five levels of thought of geometry.
- Problems on using materials in teaching theorems and exercises.
- Teacher was unknown about the current teaching methods and implication of it.

Problems related to classroom management are as follows: -

- It was problem of managing the weak students in the classroom teaching learning.
- It was difficult to demonstrate and use the teaching materials because of the lack of space in classroom.
- There was problem related to decoration of classroom and proper arrangement of furniture.
- The teacher was not able to manage the students due to the small size of classroom.

Problems related to Evaluation Techniques are as follows:

- There was problem related to evaluation of classroom activities.

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

Conclusion

Form the above stated findings of this study, it can be concluded that:-

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

Implication

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

- The contents and methods of teaching should be influenced by some practical motives.
- Using of lesson plans should be encouraged.
- Government of Nepal should supply the essential teaching materials and should encourage the school administrations to purchase such teaching materials.

- Teacher should be encouraged for making and using the teaching materials.
- The teacher should motivate the weak students and praise them to participate in teaching learning activities.
- The demonstration materials should be fit the classroom size and situation.
- School need to make mathematics laboratory.
- The classroom should be well arranged that the students can equality and easily participate in the classroom activities.
- Innovative and refreshment training, orientation and supervision should be provided to the teacher time to time.

Implication for Further Study

This present study may not be completed for all situation further researchers can apply the different tools and methods related to the some problems. For this, the researcher has presented the following recommendations for further studies.

- Similar study should be carried out with a large sample and various schools of different parts of Nepal.
- This kind of studies should also be conducted at all levels of schools and in other subjects as well.
- The similar study should be done in other districts of Nepal as well.
- The District Education Office should manage the inter resource center visiting and observing the mathematical classes and also should play vital role of organizing the inter district level mathematical conferences.
- The teacher shouldn't make students only busy copy the solved problems from the blackboard check them whether they are comprehending or not.
- The school administration should interact to the students, teachers, guardians and other related persons to discuss the problems and come to the solution.

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Appendices

Appendix-A

Response Score of Students in Questionnaire

S.N.	Statements	SA	A	U	DA	SDA	Total
1	Class starts from in interesting way	50	140	26	24	-	240
2	Teacher gives extra parallel problems related with exercises given in the textbook	90	100	6	4	11	211
3	Problems of the textbook are not related to the daily life of students	8	44	10	52	76	190
4	The contents given in the textbook are related to lower classes	80	120	12	5	2	219
5	Examples and exercise of theorems are highly correlated	90	120	5	3	-	218
6	Geometric theorems of secondary level related with life.	80	126	4	10		220
7	We do not feel difficulties while proving theorems	15	65	15	30	-	125
8	Teachers give the feedback	120	80	9	8	2	219
9	The teacher does not focus on our creativity and curiosity	10	70	15	45	80	220
10	The teacher also participate with you in classroom activities	120	80	10	16	6	232
11	We feel difficulty while participating in the congested classroom	70	105	3	7	15	200

12	We have no any problems of whiteboard and other furniture in our classroom	30	45	3	3	5	86
13	We solve our mathematical problems in group	80	60	15	20	15	190
14	Anything written in white board is visible	150	70	3	5	2	220
15	Textbook and practice books are available in time	60	150	2	12	3	227
16	Teaching materials are used in teaching theorems and exercise	80	65	5	6	25	181
17	Our teacher uses instructional materials while teaching geometry	40	60	15	15	30	160
18	Our teacher uses locally available and low east materials in teaching geometry	70	90	5	2	20	187
19	Manipulative geometric materials are not available in our school	15	35	6	9	160	225
20	Teacher does not take the test at the end of each unit	40	60	5	13	29	147
21	The teacher checks our home work daily	100	105	3	5	2	215
22	Our teacher takes different types of the text except terminal exam	50	80	16	5	30	171
23	Our teachers uses geometrical instruments while teaching construction	15	30	6	3	50	104
24	Less use of teaching material	130	80	5	10	8	230
25	The first priority is not given to teach geometry	20	60	6	40	10	136

26	Teaching is only exam oriented	60	105	5	20	10	200
27	All geometrical problems aren't included in exam	22	55	3	25	20	125
28	Teachers provide opportunity for weak students	90	100	3	2	15	210

Appendix-B

Number of Respondents in the Questionnaire of School Students

S.N.	Statements	SA	A	U	DA	SDA	Total
1	Class starts from in interesting way	20	69	13	18	-	120
2	Teacher gives extra parallel problems related with exercises given in the textbook	37	50	6	4	23	120
3	Problems of the textbook are not related to the daily life of students	13	44	7	26	30	120
4	The contents given in the textbook are related to lower classes	40	66	7	5	2	120
5	Examples and exercise of theorems are highly correlated	38	76	3	3	-	120
6	Geometric theorems of secondary level related with life.	36	71	3	10	-	120
7	We do not feel difficulties while proving theorems	27	69	9	15	-	120
8	Teachers give the feedback	54	44	6	13	3	120
9	The teacher does not focus on our creativity and curiosity	13	45	8	16	38	120
10	The teacher also participate with you in classroom activities	46	39	7	17	11	120
11	We feel difficulty while participating in the congested classroom	27	53	2	9	29	120
12	We have no any problems of whiteboard and other furniture in our classroom	57	44	2	3	14	120

13	We solve our mathematical problems in group	32	36	10	18	34	120
14	Anything written in white board is visible	68	40	2	5	5	120
15	Textbook and practice books are available in time	24	76	1	14	5	120
16	Teaching materials are used in teaching theorems and exercise	32	32	3	6	47	120
17	Our teacher uses instructional materials while teaching geometry	16	31	8	14	51	120
18	Our teacher uses locally available and low east materials in teaching geometry	27	5	3	2	43	120
19	Manipulative geometric materials are not available in our school	15	31	3	13	58	120
20	Teacher does not take the test at the end of each unit	40	71	2	4	3	120
21	The teacher checks our home work daily	40	71	2	4	3	120
22	Our teacher takes different types of the text except terminal exam	19	39	10	6	46	120
23	Our teachers uses geometrical instruments while teaching construction	6	15	4	3	92	120
24	Less use of teaching material	53	40	3	8	16	120
25	The first priority is not given to teach geometry	22	55	3	22	18	120
26	Teaching is only exam oriented	38	54	4	20	4	120
27	All geometrical problems aren't included in	44	55	2	12	7	120

	exam						
28	Teachers provide opportunity for weak students	34	50	2	2	32	120

Appendix-C

Total Number of Respondents in the Questionnaire

S.N.	Statements	SA	A	U	DA	SDA	Total
1	Class starts from in interesting way	70	90	26	44	10	240
2	Teacher gives extra parallel problems related with exercises given in the textbook	68	108	20	6	38	
3	Problems of the textbook are not related to the daily life of students	25	78	18	51	68	
4	The contents given in the textbook are related to lower classes	90	122	12	10	6	
5	Examples and exercise of theorems are highly correlated	65	137	10	28	-	240
6	Geometric theorems of secondary level related with life.	70	140	8	22	-	240
7	We do not feel difficulties while proving theorems	50	130	22	38	-	240
8	Teachers give the feedback	112	94	10	20	4	240
9	The teacher does not focus on our creativity and curiosity	46	78	16	39	61	240
10	The teacher also participate with you in classroom activities	84	95	9	31	21	240
11	We feel difficulty while participating in the congested classroom	54	100	8	17	61	240
12	We have no any problems of whiteboard	112	84	3	16	25	240

	and other furniture in our classroom						
13	We solve our mathematical problems in group	52	80	17	33	58	240
14	Anything written in white board is visible	126	95	3	8	8	240
15	Textbook and practice books are available in time	45	132	11	45	7	240
16	Teaching materials are used in teaching theorems and exercise	55	93	16	20	56	240
17	Our teacher uses instructional materials while teaching geometry	18	93	16	23	90	240
18	Our teacher uses locally available and low east materials in teaching geometry	45	103	15	6	71	240
19	Manipulative geometric materials are not available in our school	50	55	6	6	123	240
20	Teacher does not take the test at the end of each unit	25	50	5	37	123	240
21	The teacher checks our home work daily	78	144	6	8	4	240
22	Our teacher takes different types of the text except terminal exam	31	64	16	23	106	240
23	Our teachers uses geometrical instruments while teaching construction	10	24	8	8	190	240
24	Less use of teaching material	104	83	11	15	27	240
25	The first priority is not given to teach geometry	88	95	6	46	5	240
26	Teaching is only exam oriented	39	112	8	50	28	240

27	All geometrical problems aren't included in exam	70	90	3	15	62	240
28	Teachers provide opportunity for weak students	56	80	10	25	69	240

Appendix-D

Number of Respondents of Teacher in the Questionnaire Related to Geometry

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

Appendix-E

Sample Schools

S.N.	Name of schools	Location
1	Shree Tauleshwarnath Sanskrit Secondary School, Taulihawa	Kapilvastu Taulihawa
2	Shree Janki Secondary School	Kapilvastu Maharajgunj

Appendix-F

Sample Teachers Profile

S.N.	Name of teachers	Age	Experience	Trained/Untrained
1	Pujari Kurmi	52 years	18 years	Trained
2	Pradeep Ojha	44 years	14 years	Untrained
3	Krishna Prasad Chaudhary	57 years	29 years	Trained
4	Rajesh Pandey	34 years	5 years	Untrained

Appendix-G

Guidelines for Interview with Compulsory Mathematics Students

Name..... Age..... Sex.....

Father's Name..... Qualification..... Occupation....

Mother's Name..... Qualification..... Occupation....

Scholl's Name.....

Location Urban Nature Government

Time to reach school

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

- Home environment of the students: Task, help, facility, parents, family.
- Opportunity to learn to home
- Teaching learning activities:

  Starting situation, methods, response, management, question/evaluation system, summarize
- School environment of classroom managements
- Instructional materials
- Nature of materials, effectiveness etc.
- Relation between teacher and students
- Class behaviour towards students
- Opportunity provided by school group work given in classroom