

**DIFFICULTIES OF SECONDARY LEVEL STUDENTS IN LEARNING
GEOMETRY**

**A
THESIS
BY
BINA GHIMIRE**

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FOR THE DEGREE OF MASTER OF EDUCATION**

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This thesis entitled "**Difficulties of Secondary Level Students in Learning Geometry**" submitted by **Ms. Bina Ghimire** to partial fulfillment of the requirement for the degree of master of Education has been approved.

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Recommendation for Acceptance

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Declaration

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

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Dedication

I want to dedicate this thesis to my Father Nabaraj Ghimire and Mother Mrs. Sushila Ghimire. They have always been a source of inspiration in my life who have spent their whole life to transform me from nobody to somebody.

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The writing of this dissertation has been one of the most significant challenges I ever had to face. Without the support, patience and guidance of the following people, this study would not have been completed. It is to them that I owe my deepest gratitude.

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Bina Ghimire

Abstract

Geometry is a vibrant and exciting part of mathematics and a key to understanding our world through concrete experiences with geometric figures and relationship. Geometry is the study of size, shape and position of two-dimensional shapes and three-dimensional figures. Geometry is science of shape and extent. Geometry knowledge is very useful not only inside the school but also outside the school. Geometry develops the reasoning and logical thinking of the child. Geometry plays a vital role in everyday life. It is found everywhere in art, architecture, space, engineering, sports, machines etc. Many students perform poorly in geometry and find the subject very difficult and uninteresting. Student faces different types of problems in learning geometry. This research is cross-sectional and analytical and is completely based on primary data to examine the perception and difficulties faced by secondary level student. Data was entered in to Microsoft Excel and analyze by using Percentage Score. Data was summarized by using described using descriptive statistical tools. This research revealed that 45.6% students were from 15 years of age group. Majority of them were male by gender and Magar by ethnicity. Most of the students agree that the time spend by teacher to teach geometry is not enough. More than 60% students mention that geometric topics are too complex. Majority of the students feel difficult in out theorem, congruent triangles and introduction to geometry. Students from government schools had negative attitude towards learning geometry. Private student has higher positive attitude towards geometry as compare to government students. The schools and educational institutions should take measure to improve the attitude towards geometry

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List of Abbreviations

CDC	Curriculum Development Center
IT	Information Technology
IMSS	International Mathematics and Science Study
IX	Grade Nine
MOE	Ministry of Education
MS	Microsoft
SSS	Senior Secondary School
VDC	Village Development Committee
UNESCO	United Nations Educational, Scientific and Cultural Organization

Chapter I

INTRODUCTION

This chapter dealt with background to the study, statement of the problem, objectives of the study, research questions and hypotheses, limitations, definition of terms and the organization of the study.

Background of the Study

The word "Mathematics" comes from the Greek word mathematics, which means learning, study, science (Lemke,1998,). Mathematics is defined in a strict sense, is the abstract science which investigates deductively the conclusions, implicit in the elementary conception of the spatial and numerical relations". It has also been defined as the science of number and the science of calculation. On the other hand, in the east this subject was called "Rekhaganit". Mathematics has significantly positive impact on development of all human civilization. The development of mathematics was simultaneous with the development of society. Every people need mathematics to solve the problems in the daily activities (Puri, 2016). Ayinla in 2011 described mathematics as the subject, which is the stronghold of all knowledge depicting its relevance in all the other areas of life.

Geometry, the study of space and spatial relationships, is an important and essential branch of mathematics (Bora, 2018). In the study of geometry, students learn about geometric shapes and structures and understand how to analyze their characteristics and relationships. In Nepal, geometry is taught as a topic within mathematics in Secondary education. Geometry has taken place in curriculums since elementary education because of contributing development of students' critical thinking and problem-solving activities, being an important area of mathematics that is used in daily life, helping students to realize the world around them and appreciate

the worth of their world. Geometrical concepts are contributing to learning concepts in other areas of mathematics. But the results of studies carried out by different researchers at different parts of the world show that students encounter a lot of difficulties while learning geometry (Bora, 2018).

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 geometry teaching and for developing the positive attitude in the children towards geometry. There are supplementary factors to increase the efficiency of geometry teaching learning in the secondary schools.

Nepal adopted the Education for All 2000 and Dakar Framework of Action (2000) (UNESCO 2015). The Curriculum Development Center (CDC) of Nepal also prepared and implemented a National Curriculum Framework for School Education in Nepal 2007. This framework speaks of various provisions of school education focusing “globalization, modernization, decentralization, and localization of curriculum in the Nepalese context” (CDC 2007, p. 1). The framework was base on the following contemporary issues of school education in Nepal socio cultural, curricular, educational (norms, values, life skills, employment), technological, linguistic, instructional, assessment related, research-based, and quality and relevancy based. The basis of curriculum development has outlined many important points including integrated, child-centered, basic education in mother tongue, inclusive, local need-based, Sanskrit as a foundation for Eastern knowledge base, IT supported, and life skill oriented (CDC, 2007). Despite Nepal’s commitment to providing quality education in general and mathematics education by ensuring equity and access, there are so many issues of teaching and learning mathematics in Nepalese context. Some

of these issues are related to theories, and others are practical in nature. These issues are related to classroom management, ethnicity, lack of trained teachers, inequity, lack of teaching aids and materials, lack of textbooks, lack of time for students, lack of clear objectives, gender issues, and issues of mathematical contents and pedagogy. In our understanding, most of the public schools in Nepal do not have proper management of the classrooms. They have an inappropriate size of classes, not inclusive seating arrangement, and there is also the lack of technology for learning and teaching mathematics. There is a misuse of technological tools even if it is available. Classrooms in Nepal are multicultural and multilingual in general because students come to the school from different cultural and linguistic background. This context resonates with what Gates (2006) expressed, "in many parts of the world, mathematics teachers are facing the challenges of teaching in multi-ethnic and multi-lingual classrooms containing - immigrant, indigenous, migrant and refugee children, and if research is to be useful it has to address and help us understand such challenges" (p. 391). We agree with Gates' opinion that mathematics classroom situation in Nepal is the same as stated above because multi-lingual and different ethnic groups have their own problems in a classroom context. Also, we have the classroom issues related to internal refugees and migrants due to the ten-year conflict in the country and post-conflict political instability. These issues are creating challenges for us in teaching and learning mathematics.

The mathematics curricula designed by experts and implemented by the government to all grade levels do not fit our culture. We teach foreign mathematics. It has been imposed upon the teachers and students. We feel that it is western mathematics that we are teaching and learning without considering the needs of students, diversity and values of our society, and norms of the eastern culture.

There are so many issues related to social aspects are gender issues, language issues, social justice issues, and issues related to the achievement gap. The cultural issues are related to the diversity of language and ethnicity. The issues related to political aspects are equity and access, economic status, pedagogical choice, and professional organizations and unions. The issues related to technology include the technological skills, use of technology, and affordance.

The present position of the learning geometry can only be understood and mathematics can be properly taught and learned to explore problems and interpret their links in the teaching of given mathematical content and corresponding students learning. Many students find their studies in mathematics, especially in Geometry as difficult and unrewarding. There is a tendency for students to opt out of studying mathematics as soon as possible. However, geometry is very important and holds a central place in the curricula in most countries. Geometrical ideas find application in numerous areas of life and in many careers. The success of learning geometry is dependent on a number of factors such as school, classroom, student and teacher factors. In particular, the seriousness or otherwise attached to the teaching of Mathematics as well as geometry one way or the other affects students' performance in their final examinations. In the context of Nepal many students are failed in mathematics, its one problem is also negligence in geometrical part. So, this research is focused on the problem prospect of the secondary level students towards geometry.

Statement of the Problems

Effective and efficient teaching methods that could help improve student's performance in mathematics are most desired. Teaching is effective and efficient when students are taught the right content, having enough learning materials and high ratio of teachers' time on the teaching activity. This requires a teacher to have passion

in sharing knowledge with students while motivated with school management system. Mtitu (2014) also identified that, for effective and efficient teaching, learner centered methods that require teachers to actively involve students in the teaching and learning process must be applied. However enough effort was put to improve students' performance in mathematics through programmes for updating teaching syllabus with all the guides to teachers on the competence-based teaching practice. The number of mathematics teachers was increased compared to before and were provided with frequent seminars and workshops that emphasized on the application of competence-based teaching methods.

In the case of Nepal, I observe that most students dislike geometry, most of them don't understand the concepts and importance of geometry. So, this research focused to explore on the difficulties and perceptions of secondary level students towards learning geometry in this area. One of the reasons for this failure is that these issues are addressed superficially in the curriculum of training teachers of Geometry (Helena & Maria, 2015). Adegun and Adegun, (2013) stated that students in general find difficulties in solving geometry tasks and their performance is always poor in the senior high school mathematics exercises or tests.

Geometry is an integral component of mathematics containing verbal and abstract 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 is responsible behind failure and low performance of the students. Most of the student's thought geometry is the boring and difficult chapter of mathematics subject

Justification of the Study

This study was be baseline for those researchers who are planning to do research in this area. Also, it provides feedback for policy makers and curriculum planners to consider students perception in curriculum and text book and help mathematics educators, mathematicians and mathematics teacher and learner to improve the geometrical concepts of students.

Objectives of the Study

1. To explore the difficulties faced by secondary level students while learning geometry.
2. To analyze the perceptions of secondary level students towards geometry learning.

Research Questions

- i. What are the difficulties faced by secondary level students while learning geometry?
- ii. Why students perceive learning geometry at secondary level is difficult?

Delimitations of Study

The delimitations of this study were as follows:

1. This study was be delimited in the institutional and public schools of Myagde Gaupalika in Tanahun district.
2. The study was included only three hundred students of sample schools.
3. The study was including only the grade Nine (IX) students.
4. This study was only including the geometrical part of mathematics.

Definition of Terms

Geometrical concepts. In this study, geometrical concepts refer to the concept of Euclid geometry.

Problem. Learning difficulties faced by teachers and students while teaching and learning geometry.

School. The public place where student learns the various skills and the teacher teaches.

Secondary Level. The level containing grade nine & ten in Nepalese School system.

Students. In this study student means those who involve in learning secondary level School mathematics.

Teacher. In this study teacher means teacher who is teaching secondary level school Mathematics.

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

Chapter II

REVIEW OF THE LITERATURE

This chapter looks at previous literature to discover contributions that other researchers have made concerning secondary level students perceived difficult geometry concepts to study. These include the theoretical framework of the study, geometry topics students perceive to be difficult in core mathematics, factors responsible for students' difficulty in learning geometry and the performance of students in geometry.

Empirical Literatures

Students' perception of mathematics. Globally curriculum of mathematics is designed based upon the constructivist's principles with emphasis on opportunities for students to explore mathematical situations in the environment to enable them make their own discoveries (MOE, 2010), perceptions and beliefs about mathematics originate from past experiences; comprising both cognitive and affective dimensions (Aguilar, 2012). From a cognitive point of view, it relates to a person's knowledge, beliefs, and other cognitive representations while from an affective domain it refers to a person's attitudes, feelings and emotions about mathematics. The term is also understood broadly to include all visual, verbal representations, metaphorical images and associations, beliefs, attitudes and feelings related to mathematics and mathematics learning experiences.

The global claimed about the subject is that that, negative perceptions and myths of mathematics are widespread among the students, especially in the developed countries (Gadanidis, 2012). Many people hold the view that mathematics is only for the clever ones, or only for those who have 'inherited mathematical ability'. Another widely held belief is that mathematics is a male dominant subject. One other

stereotyped image is that boys are better in mathematics than girls (Ernest, 2001). Research carried out by Majhi (2012) in a community in Morang district, with the objectives to identify ethnographic mathematical concepts used to construct artifacts in Tharu community. He found through his study that their community children used different mathematical concepts in their daily works but they were ignorant of its use in pedagogy.

Bhatta (2014) has also conducted 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 manage diverse 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 questionnaires 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.

Students’ attitude towards geometry. The attitudes of students can be influenced by the attitudes of the teacher and his/her method of teaching. According to Batiks (2001), teachers’ content knowledge has a significant impact on students’ performance. In this study, the researcher was focus on secondary school students’ attitudes towards learning of geometry. Studies done by Rosaly (1993) had shown that the teachers’ method of geometry teaching and his/her personality greatly accounted for the students’ positive attitude towards geometry and that without interest and personal effort in learning geometry by the pupils, they can hardly perform well in the

topic. A study was done by Bora (2018), in title Secondary school students' attitude towards their learning geometry. Mogari (1999) examined four components of attitudes in the attempt to investigate more components of attitudes in Euclidean Geometry. These were enjoyment, motivation, perception of the importance of geometry and freedom from fear of geometry.

This study reveals that there exist significant differences in attitude towards learning geometry between male-female students, government-private school students. Research conducted by Brown et al., showed that students generally find mathematics a boring and difficult course and this finding is little contrasting to (Brown et al, 2008). Research conducted by Akhter, (2018) found that the students are enthusiastic in their learning in mathematics. They found mathematics interesting and valuable. Although very few found studying mathematics boring and tough.

Studies done by Thompson (1993) had shown that the teachers' method of geometry teaching and his/her personality greatly accounted for the students' positive attitude towards geometry and that without interest and personal effort in learning geometry by the pupils, they can hardly perform well in the topic. According to Betiku (2001), teachers' content knowledge has a significant impact on students' performance. Mayberry (1983) stated that geometry content knowledge among pre-service and in-service middle school teachers is not adequate. The quality of instruction is one of the greatest influences on the students' acquisition of geometry knowledge in Mathematics classes. Chappell (2003, 294) said, "Individuals without sufficient backgrounds in Mathematics or Mathematics pedagogy are being placed in middle school Mathematics classrooms to teach". Geddes and Fortunato (1993) documented that many students encounter difficulties and performed poorly in geometry. The usefulness of geometry in everyday life is obvious in areas like

measuring and estimating to both male and female students (Aiken, 1990). Geometry is one of the most important branches of Mathematics and it is concerned with the properties and relationships of lines, angles, curves and shapes, etc.

In relation to this work, related literature was reviewed to present the progress of research conducted in identifying geometry concepts perceived difficult to study by senior high school students.

Why students feel difficult. Geometry plays a significant role in primary and secondary schools mathematics curriculum in the context of Nepal and other countries. It provides a rich source of visualization for understanding arithmetical, algebraic, and statistical concepts (Battista, 1999). Also, Volderman (1998) expressed that geometry provides a complete appreciation of the world we live in. Geometry appears naturally in the structure of the solar system, a geological formation, rocks and crystals, plants and flowers, and even in animals. It is also a major part of the synthetic world such as art, architecture, cars, machines, and virtually everything humans create. In the same vein, studies revealed that geometry is applicable and relevant to employment in everyday life, other subjects in the curriculum such as science, arts, and technology. Also, geometry is used to develop students' spatial awareness, intuition, visualizations and to solve practical problems (Sunsuma, Masocha&Zezekwa, 2012). WAEC Chief Examiners' Report (2007, 2008, 2009, 2010 and 2011) confirmed that candidates had weaknesses in mensuration, construction, circle theorems and so on.

Factors responsible for students' difficulty in learning geometry. A number of factors have been put forward to explain why the learning of geometry is difficult. Some of these factors are language of geometry, visualization abilities, and ineffective instruction. Poor reasoning skills are also another area of concern among secondary

school students. Many students are unable to extract necessary information from given data and many more are unable to interpret answers and make conclusions. Traditional approaches in learning geometry emphasize more on how much the students can remember and less on how well the students can think and reason. Thus, learning becomes forced and seldom brings satisfaction to the students (Baffoe & Mereku, 2010).

Findings have shown that some factors are identified to make the learning of geometry concepts in mathematics difficult which include: teachers' methods of instruction, geometric language, visualizing abilities (Noraini, 2006 and Aysen, 2012). Other factors include: non-availability and obsolescence of instructional materials, gender differences, poor reasoning skill, inadequate time, inadequate school curriculum and lack of proof by students (Mason, 2002). All these are believed to have a negative effect on the learning of geometry. Fabiyi (2017) found out that the reasons given by students for perceiving a geometry concept difficult includes: Unavailability of instructional materials, and teachers' method of instruction.

Telima (2011) also conducted a study on Problems of Teaching and Learning of Geometry which aimed at identifying the problems and proffering solution to them. The study involved three hundred (300) students and thirty (30) teachers drawn from ten secondary schools in Rivers State. It was further revealed that, the foundation of most mathematics teachers in geometry is poor, the students have poor foundation in mathematics, attitude of students towards learning is very poor and the teaching and learning environment is not conducive. A cluster of variables has been implicated as responsible for the abysmal performance of students. These include, government related variables, curriculum related variables, examination body related, teacher, student, home and text-book related variables. Apart from these variables, Amazigbo

(2000) has identified poor primary school background in mathematics, lack of incentives for teachers, unqualified teachers in the system, lack of learner's interest, perception that mathematics is difficult, large classes and psychological fear of the subject as factors responsible for the dismal performance of students in the subject. For a topic like geometry which is the bedrock of engineering and technological development, the issue of adequate physical facilities cannot be over emphasized. The physical facilities such models were help grasp the idea of geometry which seems to be abstract. It is the facilities in terms of infrastructure, equipment and materials that afford the students the opportunity to acquire the necessary knowledge. As Betiku (2001) observed on a general note, that secondary schools lack facilities and equipment for teaching. According to him, such a situation where teachers are forced to discuss theoretically, practical aspects of the subject is not good enough.

Influence of gender on the study of geometry. Learning of mathematics particularly geometry is believed to be determined by gender differences. It has caused a lot of controversies in the sense that researchers such as Adebule (2004) opined that gender has no specific effect on the learning of mathematics while Udousoro (2011) was of the opinion that mathematics is male gender friendly. Abiam and Odok (2006) found no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. The researchers, however, found the existence of a weak significant relationship in geometry and trigonometry.

Several studies have been conducted to determine influence of gender on perceived difficult geometry concepts in mathematics. Baharvand (2001) and Uduosoro (2011) found that male students performed better than female students on difficult geometry concepts in mathematics. Etekudo (2002) and Ominrin (2009)

argued that female students performed better than male students at computation and spatial visualization. Olagunju (2001), Gbodi and Olaleye (2006) and Adegun and Adegun (2013) found that there is no disparity in the performance of male and female students in geometry.

In an attempt to investigate whether there is a significant difference in the number of geometry topics perceived difficult to study by senior high school students, Fabiyi (2017), conducted a study in Nigeria using five hundred students consisting of 228 males and 272 females from senior secondary school form two (SSS 2). The study revealed that students' gender had a great influence on the learning of concepts in geometry at 0.05 level of significant in favour of female students.

Performance of students in geometry. Mathematics educators have put up maximum efforts aimed at identifying the major problems associated with the teaching and learning of mathematics in the schools. Despite all these maximum efforts, the problem of poor performance in mathematics has continued to rear its head in the nation's public examinations (Adolphus, 2011). In 2003 and 2007, Ghana participated in Trends in International Mathematics and Science Study (TIMSS) in order to find out how the performance of her (JHS2) in science and mathematics compared with those of other countries. The analysis of the Ghanaian students' performance in mathematics indicated that, Algebra, Measurement and Geometry were the students weak content areas (Anamuah-Mensah, Mereku&Asabere-Ameyaw, 2004). According to TIMSS 2011 report, Ghanaian students' performance in mathematics also indicated that, algebra and geometry were the weak content areas (Mullis, Martin, Foy & Aron, 2011).

Studies have revealed that difficulty in teaching and learning of mathematics especially geometry has resulted in mass failure in examinations (NMC, 2009).

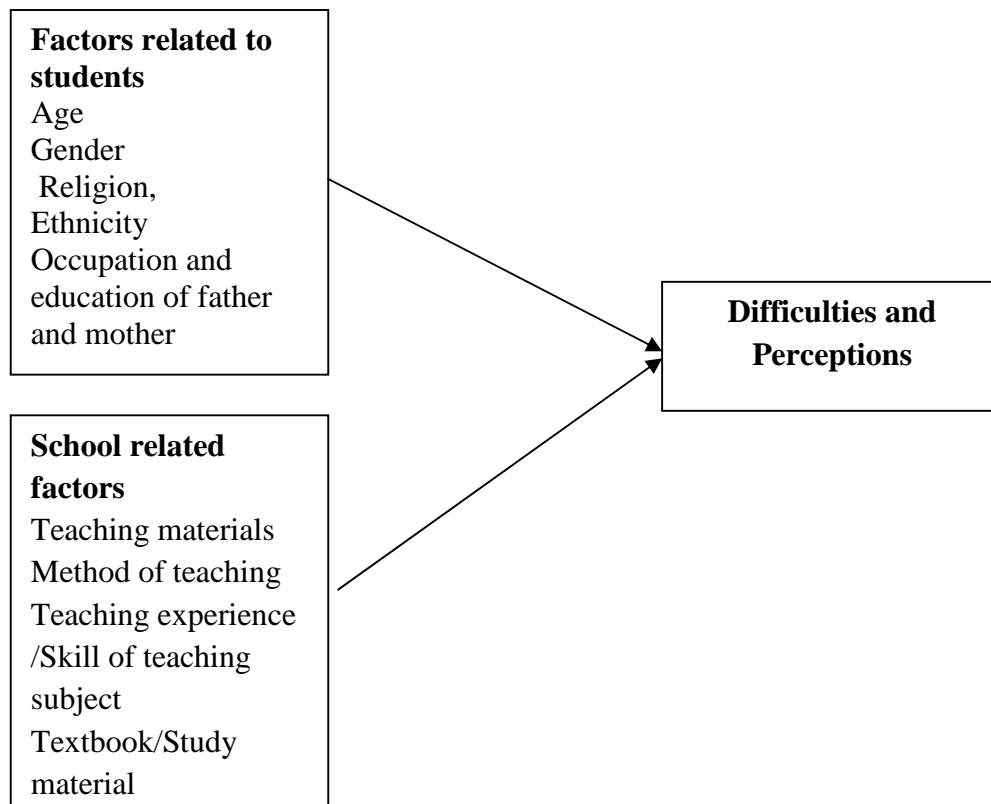
Adegun and Adegun, (2013) stated that students generally encountered difficulties in geometry and performed poorly in senior secondary school mathematics lesson. Also, Telima (2011) found out that many students fail to grasp key concepts in geometry and leave mathematics classes without learning the basic terminology. Consequently, research findings have confirmed that geometry is one of the topics among the abstract and complex aspects of mathematics that students find difficult to learn (Akinlade, 2004). Based on these findings, students have not been performing well in mathematics especially on geometry.

Implication of Review for the Study

There are various researches related to the problems faced by students in mathematics in other area but reviewed showed that very few research in our context. Review showed that problems related to difficulty in learning mathematics are: gender difference, economic status, urban and rural school, lack of materials, caste and culture. Carrying the same topic and following the same process of data collection and analysis no researches have been conducted in this area. This research was filling the gap between the theoretical perspective and practices. So, the researcher believes that the topic is suitable for the research related to contemporary issues.

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 portion. By the help of literature review, expert consultation and peer discussion it had been constructed by the researcher himself including school related and out of school contextual factors to make the study specific, systematic and easy.

Fig. : Conceptual Frameworks

From above point of views in related literature, difficulties and perceptions of teaching and learning mathematics in geometry may depend upon different variables. These variables affecting students learning process in geometry are Class, age, gender, religion of students, students' involvement, curriculum, textbook, teachers and students' behaviors homework, class work regularity, the major factor of teachers and students' activities, pre-knowledge, environmental variables. Teaching learning environment of the home and school pre-knowledge of the students' problems of teaching/learning in geometry. Teachers and student's activities in the classroom Teaching method materials and evaluation techniques Textbook.

Curriculum 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 was not known 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 help 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

Research Design

This research was focus on the summarization of difficulties and perceptions of Secondary level students towards learning Geometry in grade IX so I used descriptive cross-sectional study design in this research.

Study Site

Myagde VDC is located in Tanahun district of Gandaki province. The VDC consists of 14 schools (7 public secondary, 3 public primary, 3 private secondary and 1 private primary school). The study was be conducted in 7 public and 3 private secondary schools. I am from this area the major problem in the teaching learning activities in mathematics is Geometry. Most of the teachers are escaping these parts. So, many students seem so week in Geometry so I chose this area for my study.

Population of the Study

The population of this study consisted of all the secondary level students of class IX in Tanahun district of Gandaki province, who are currently involved in learning Geometry.

Sample of the Study

The participants of this study were be secondary level (Class nine) students of three private and seven public schools. Altogether 300 students were taken as participants (sample) from the population

Sampling Technique

Non probability purposive sampling technique was used this research to select the students form the selected areas. Because of the present situation it is difficult to collect the data from all areas.

Data Collection Tools

After choosing the title I had gone through review of literature. Consulting with research advisor and review of literature questionnaire was finalized. In this questionnaire mainly mathematics and geometry part are focus for research

And then ethical approval was taken from the respective schools and then from each student. To collect data from all the students' instruction was given for data fill up. Then data was collected by using self-designed questionnaire based on the observation of schools, discussion with principals. Questionnaire was included questions related to the problem and perception from four different aspects of geometry (Reasoning, Experimental Verification, Theorem Proving and Construction).

Reliability and Validity

The tools were modified and developed according to the suggestion and guidelines of the supervisor. The content validity of the tools was established by the expert judgment. Over all perception level of item is the index of difficulty which is the percentage of examinees that correctly answered the item so it takes the values from 0% to 100%.

Data Collection and Analysis Procedures

Self-designed questionnaire was used to collect the data from the students. Then the collected data was entered in the MS Excel. All the data was checked for completeness and accuracy.

Then data was coded by using serial number and was entered into Microsoft Excel. Then data was analyzed by using SPSS V 20. Data was analyzed by using descriptive statistics. In the descriptive statistics, continuous variable (age) was summarized by using mean and SD. For categorical variable various diagrams, frequency and percentage were used.

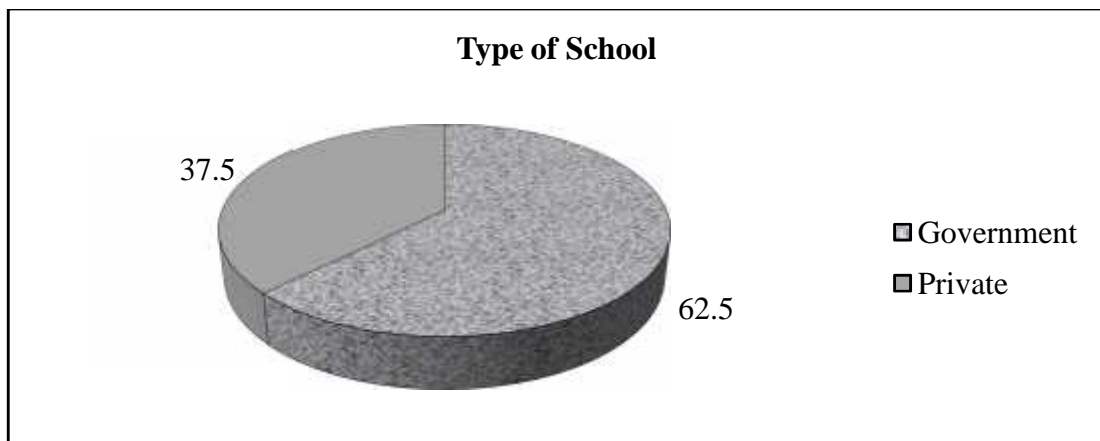
Chapter IV

DATA ANALYSIS AND INTERPRETATION OF DATA

The chapter deals with the analysis and interpretation of data regarding perceptions of secondary level students towards geometry. All the data obtained were analyzed and interpreted based on research objectives and are presented in different tables.

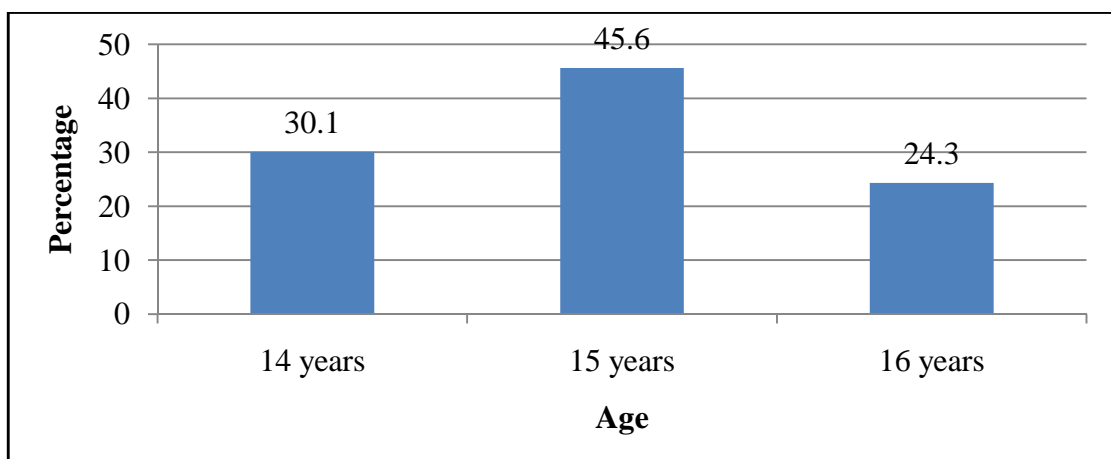
Socio-demographic Characteristics of the Students

Figure1: Type of School used in this Research



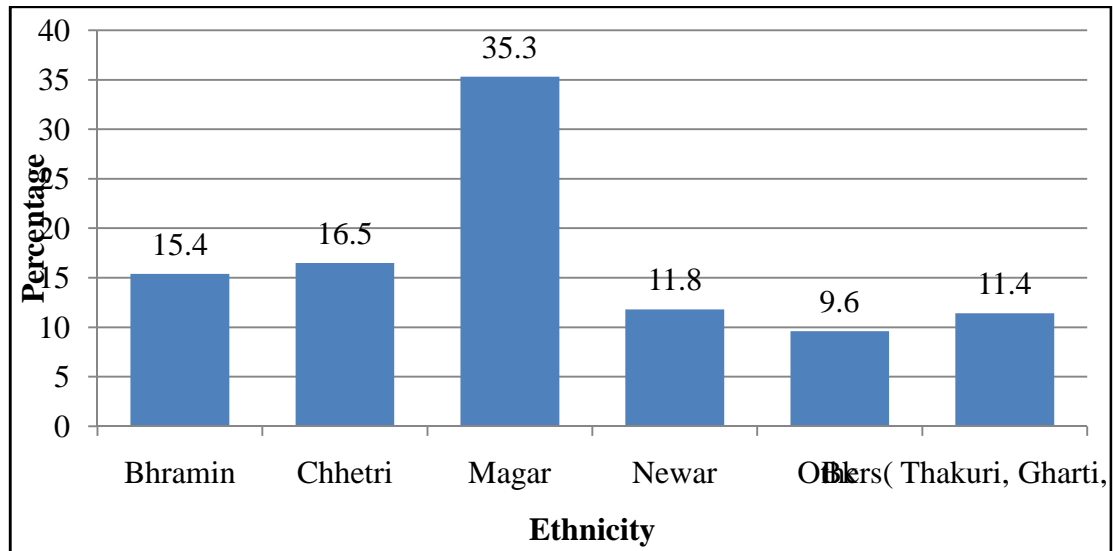
Above pie diagram showed the percentage of government and private school. Which showed that 37.5% were private while 62.5% government schools were included.

Figure 2: Age of the Students



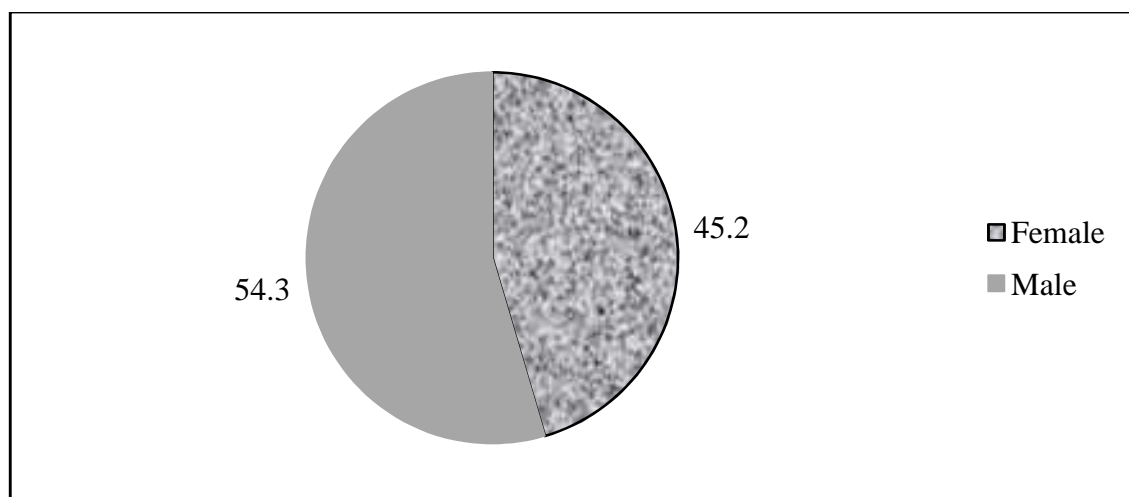
Above bar diagram showed the age of students. Which showed that majority of the students were in 15 years of age, 30.1% were 14 years of age while 24.3% were 16 years of age.

Figure 3: Ethnicity of Students

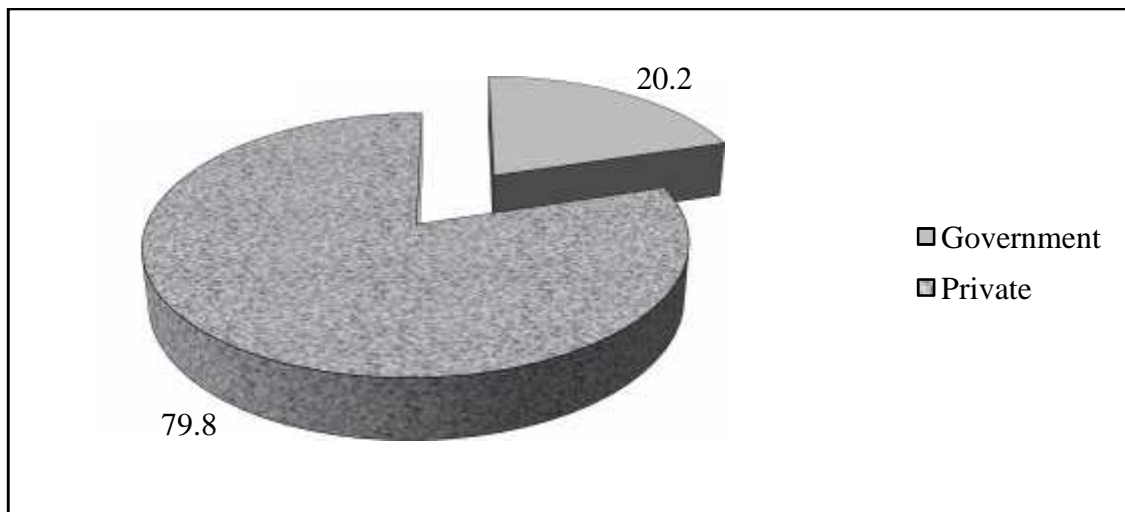


Above table showed the ethnicity of the respondents. Which showed that majority of the respondents were Magar (35.3%) followed by 16.5% Chhetri, 15.4% Brahmin and least were BK i.e 9.6%.

Figure 4: Gender of Students



Above pie chart showed the gender wise distribution of students. Which showed that majority of the students was male (54.3%) while 45.2% were female.

Figure 5: Number of Students from Government and Private School

Above table showed the number of students according to type schools. Which showed that majority of the students were form private school while 20.2% were from private school.

Table 1: Causes of Difficulty in Geometry Topics

Causes of Difficulty in Geometry Topics	SA	A	D	SD
There are not enough instructional materials to make the teaching real	8(2.9)	133(48.9)	118(43.4)	13(4.8)
Geometry in basic school was not taught to my understanding	29(10.7)	95(34.9)	111(40.8)	37(13.6)
I do not show interest in geometry topics	34(12.5)	52(19.1)	149(54.8)	37(13.6)
The time teacher spends on geometry topics is not enough	24(8.8)	95(34.9)	102(37.5)	51(18.8)
Geometry topics are difficult to understand	78(28.7)	126(46.3)	55(20.2)	13(4.8)
Textbooks do not explain the geometry topics to my understanding	40(14.7)	97(35.7)	111(40.8)	24(8.8)
Geometry topics consume a lot of time during tests and examinations	62(22.8)	139(51.1)	56(20.6)	15(5.5)
Geometry topics are complex	50(18.4)	176(64.7)	40(14.7)	6(2.2)
Teachers do not teach geometry concepts to my understanding	28(10.3)	89(32.7)	118(43.4)	37(13.6)
The topics are very complex	63(23.2)	152(55.9)	48(17.6)	9(3.3)

Regarding to not enough instructional materials to make the teaching real majority of the students was disagreed. While 40.8% students were disagreeing and only 10.7% were strongly agree in Geometry in basic school was not taught to my

understanding. More than half of the students said that they didn't show interest in reading geometry. While 34.9%-time teacher spends on geometry topics is not enough. Nearly half of the students were agreeing with the statement that they really feel difficult to understand the geometry. And 40.8% told that textbooks do not explain the geometry topics to my understanding. More than half of the students were agreed with Geometry topics consume a lot of time during tests and examinations. Majority of the students said that geometric topic is too complex. While 32.7% students were agreeing with the statement that teachers do not teach geometry concepts to my understanding. More than half of the students were told that all the topic of geometry are too complex to understood.

Table 2: Perceptions of Students in Learning Geometry

Statement	Agree	Neutral	Disagree
I entirely comprehend my lessons of geometry.	62(22.8)	151(55.5)	59(21.7)
I like teaching method of Geometry from my teachers	48(17.6)	171(62.9)	53(19.5)
I truly comprehend the procedures of construction of geometrical shape in class.	71(26.1)	162(59.6)	39(14.33)
I do not like doing too much extra problem in Geometry daily.	64(23.5)	132(48.5)	76(27.9)
I dislike home task because I can't do it independently.	106(39)	127(46.7)	39(14.3)
There is sufficient revision of Geometry at school to help me comprehend well.	93(34.2)	133(48.9)	46(17)
I think tuition is necessary to get good marks in mathematical geometry.	11(4)	61(22.4)	200(73.5)
I tend to panic near the exam.	93(34.2)	136(50)	43(15.8)
I find it problematic to revise the entire year syllabus in the annual examinations.	151(55.5)	113(41.5)	8(2.9)
I do not like short questions of geometry because I cannot express all that I know.	107(39.3)	127(46.7)	38(14)
I like multiple choice questions of geometry	73(26.8)	113(41.5)	86(31.6)
I realize that the allowable time for mathematics paper is insufficient.	76(27.9)	96(35.3)	100(36.8)
If I have problem in understanding something new, I seek help from my teacher.	175(64.3)	79(29)	18(6.6)
If I have problem in understanding something new, I seek help from my tutor.	172(63.2)	71(26.1)	29(10.7)
When the mathematics marks of student improve, it is due to his own hard work.	117(43)	114(41.9)	41(15.1)
I feel difficulty in learning a topic because I did not understand previous ideas.	89(32.7)	130(47.8)	53(19.5)
Teacher question in class helps my understanding.	97(35.7)	100(36.8)	75(27.6)
Only those units of textbook are taught that are important to pass the examination.	126(46.3)	102(37.5)	44(16.2)

Only 4% students think tuition is necessary to get good marks in mathematical geometry. Because of geometry 34.2% to panic near the exam. More than half of the students told that find it problematic to revise the entire year syllabus in the annual examinations. Nearly 39.3% do not like short questions of geometry because I cannot express all that I know. Only one third of students were like multiple choice questions of geometry. 27.9% students said that I realize that the allowable time for mathematics paper is insufficient. Nearly 65% students said that they have problem in understanding something new, I seek help from my teacher, 63.2% told that have problem in understanding something new, I seek help from my tutor. And 43% told that when the mathematics marks of student improve, it is due to his own hard work. Only one third students were feeling difficulty in learning a topic because I did not understand previous ideas, 35.7% students said that Teacher question in class helps my understanding and 46.3% told that only those units of textbook are taught that are important to pass the examination

Table 3: Attitude of students in mathematics

Statements	High	Medium	Low
I like Learning Geometry	152(55.9)	84(30.9)	36(13.2)
I find Geometry beneficial in my daily life	177(65.1)	78(28.7)	17(6.3)
I find Geometry an interesting subject	156(57.4)	96(35.3)	20(7.4)
I wish to study mathematics because I like it	122(44.9)	117(43)	33(12.1)
I feel mathematics is easy to understand	100(36.8)	109(40.1)	63(23.2)
Knowing mathematics was help me in my career	159(58.5)	84(30.9)	29(10.7)
Mathematics allows me to create ideas	105(38.6)	109(40.1)	58(21.3)
Understanding mathematics is important to me	49(18)	213(78.3)	10(3.7)
Mathematics rules can never be proved wrong	62(22.8)	183(67.3)	27(9.9)

Above table showed the attitude level of students. Which showed that majority of students have had high level of attitude towards like of learning geometry, geometry is beneficial in their daily life, they like geometry very interesting, where as they had medium level of attitude towards creating ideas, these rules can prove any things.

Table 4: Student's Difficulties in Learning in Mathematics

Statements	Easy	Moderate	Difficult
Introduction to geometry	70(25.7)	170(62.5)	32(11.8)
Congruent triangles	60(22.1)	162(59.6)	50(18.4)
Parallelograms and triangles	66(24.3)	167(61.4)	39(14.3)
Line bisectors and angle bisectors	112(41.2)	133(48.9)	27(9.9)
Sides and angles of a triangle	124(45.6)	119(43.8)	29(10.7)
Short problem of geometry	122(44.9)	132(48.5)	18(6.6)
Out theorem	20(7.4)	96(35.3)	156(57.4)

Above table showed the students difficulties in learning mathematics. Which showed that 11.8% students had difficult in the introduction of geometry, 18.4% had difficulties in concurrent triangles, 18.4% had difficulties on parallelograms and triangles, 9.9% had on bisectors and angle bisectors, 10.7% had on Sides and angles of a triangle. Only 6.6% had difficulties on short problem of geometry and most of the students had feel difficulties on out theorem.

Comparison of Difficulties among Private and Government School Children

Table 5: Comparison between Causes of Difficulty in Geometry Topics between Government and Private School

Causes of Difficulty in Geometry Topics	Government School				Private school			
	SA	A	D	SD	SA	A	D	SD
Not enough instructional materials to make the teaching real	5(2.3)	128(59)	71(32.7)	13(6)	3(5.5)	5(9.1)	47(85.5)	
Geometry in basic school was not taught to my understanding	29((13.4)	88(40.6)	74(34.1)	26(12)		7(12.7)	37(67.3)	11(26)
I do not show interest in geometry topics	32(14.7)	41(18.9)	111(51.2)	33(15.2)	2(3.6)	11(20)	38(69.1)	4(7.2)
The time teacher spends on geometry topics is not enough	24(11.1)	65(30)	91(41.9)	37(17.1)		30(54.5)	11(20)	14(25.5)
Geometry topics are difficult to understand	71(32.7)	86(39.6)	50(23)	10(4.6)	7(12.7)	40(72.7)	5(9.1)	3(5.5)
Textbooks do not explain the geometry topics to my understanding	37(17.1)	80(36.9)	78(35.5)	22(10.1)	3(5.5)	17(30.9)	33(60)	2(3.6)
Geometry topics consume a lot of time during tests and examinations	39(18)	107(49.3)	56(25.8)	15(6.9)	23(41.8)	32(58.2)		
Geometry topics are complex	49(22.6)	134(61.8)	31(14.3)	3(1.4)	1(1.8)	42(76.4)	9(16.4)	3(5.5)
Teachers do not teach geometry concepts to my understanding	28(12.9)	86(39.6)	73(33.6)	30(13.8)		3(5.5)	45(81.8)	7(12.7)
The topics are very complex	46(21.2)	119(54.8)	43(19.8)	9(4.1)	17(30.9)	33(60)	5(9.1)	

Regarding to not enough instructional materials to make the teaching real

majority of the students from government school had agree while majority of students

from private school were disagreeing. While 40.6% students were agreeing and only 12.7% were agree in Geometry in basic school was not taught to my understanding from government and private school respectively. More than half of the students said that they didn't show interest in reading geometry from both government and private school respect. While 30% students from Government and 65.5% told that time teacher spends on geometry topics is not enough. Nearly half of the students were agreeing with the statement that they really feel difficult to understand the geometry. And more than 30% students from both schools said that textbooks do not explain the geometry topics to my understanding. More than half of the students were agreed with Geometry topics consume a lot of time during tests and examinations. Majority of the students agree that geometric topic is too complex from government and private school respect. While 39.6% students were agreeing with the statement that teachers do not teach geometry concepts to my understanding from government school but only 5.5% students told from private school. More than half of the students from both government and private school respect told that all the topic of geometry are too complex to understand.

Table 6: Comparison of Perceptions of Students in Learning Geometry

Perceptions of students	Government School			Private school		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree
I entirely comprehend my lessons of geometry.	38(17.5)	122(56.2)	57(26.3)	24(43.6)	29(52.7)	2(3.6)
I like teaching method of Geometry from my teachers	39(18)	126(58.1)	52(24)	9(16.4)	45(81.8)	1(1.8)
I truly comprehend the procedures of construction of geometrical shape in class.	60(17.6)	122(56.2)	35(16.2)	11(20)	40(72.7)	4(7.3)
I do not like doing too much extra problem in Geometry daily.	45(20.7)	111(51.2)	61(28.1)	19(34.5)	21(38.2)	15(27.3)
I dislike home task because I can't do it independently.	71(32.7)	114(52.5)	32(14.7)	35(63.6)	13(23.6)	7(12.7)
There is sufficient revision of Geometry at school to help me comprehend well.	61(28.1)	119(54.8)	37(17.1)	32(58.2)	14(25.5)	9(16.1)
I think tuition is necessary to get good marks in mathematical geometry.	11(5.1)	78(35.94)	128(59)	24(43.6)	16(29.1)	15(27.3)
I tend to panic near the exam.	61(28.1)	117(53.9)	39(18)	32(58.2)	19(34.5)	4(7.3)
I find it problematic to revise the entire year syllabus in the annual examinations.	102(47)	107(49.3)	8(3.7)	49(89.1)	6(10.9)	
I do not like short questions of geometry because I cannot express all that I know.	77(35.5)	108(49.8)	32(14.7)	30(54.5)	19(34.5)	6(10.9)
I like multiple choice questions of geometry	57(26.3)	89(41)	71(32.7)	16(29.1)	24(43.6)	15(27.3)
I realize that the allowable time for mathematics paper is insufficient.	66(30.4)	90(41.5)	61(28.1)	10(18.2)	6(10.9)	39(70.9)
If I have problem in understanding something new, I seek help from my teacher.	126(58.1)	76(35)	15(6.9)	49(89.1)	3(5.5)	3(5.5)
If I have problem in understanding something new, I seek help from my tutor.	132(60.8)	58(26.7)	27(12.4)	40(72.7)	13(23.6)	2(3.6)
When the mathematics marks of student improve, it is due to his own hard work.	82(37.8)	103(47.5)	32(14.7)	35(63.6)	11(20)	9(16.4)
I feel difficulty in learning a topic because I did not understand previous ideas.	77(35.5)	92(42.4)	48(22.1)	12(21.8)	38(69.1)	5(9.1)
Teacher question in class helps my understanding.	83(38.2)	83(38.2)	51(23.5)	14(25.5)	17(30.9)	24(43.6)
Only those units of textbook are taught that are important to pass the examination.	101(46.5)	73(33.6)	43(19.8)	25(45.5)	29(52.7)	3(1.8)

Following table showed the comparison between perceptions of students

towards learning geometry. As compare to the governments school students private school students are more than double in entirely comprehend my lessons of geometry.

Government's schools' students are more like the teaching method of geometry. Regarding comprehend the procedures of construction of geometrical shape in class, more governments schools' students are disagreed. Students from private school do not like doing too much extra problem in Geometry daily as well as in dislike home task because I can't do it independently. More than half of the students are agreed with is sufficient revision of Geometry at school to help me comprehend well. Students from private schools feel tuition is necessary to get good marks in mathematical geometry. Students from private schools are more panic than government schools. Nearly ninety percent private school students are problematic to revise the entire year syllabus in the annual examinations. Students from private schools do not like short questions of geometry because I cannot express all that I know. Nearly one fourth students like multiple choice questions of geometry form both governments and private schools. Students from governments realize that the allowable time for mathematics paper is insufficient. Students from private schools feel problem in understanding something new, I seek help from my teacher. Most of the student from private schools feels that mathematics marks of student improve, it is due to his own hard work. Students form government's fells that Teacher question in class helps my understanding. In both schools nearly fifty percent student's feels that those units of textbook are taught that are important to pass the examination.

Table 7: Comparison between Level of Attitude of Students in Mathematics

Statements	Government School			Private school		
	High	Medium	Low	High	Medium	Low
I like Learning Geometry	111(51.2)	77(35.5)	29(13.4)	41(74.5)	7(12.7)	7(12.7)
I find Geometry beneficial in my daily life	133(61.3)	71(32.7)	13(6)	44(80)	5(9.1)	6(10.9)
I find Geometry an interesting subject	112(51.6)	91(41.6)	14(6.5)	44(80)	5(9.1)	6(106)
I wish to study mathematics because I like it	81(37.3)	110(50.7)	26(12)	41(74.5)	7(12.7)	7(12.7)
I feel mathematics is easy to understand	82(37.8)	79(36.4)	56(25.8)	18(32.7)	30(54.5)	7(12.7)
Knowing mathematics was help me in my career	124(57.1)	67(30.9)	26(12)	35(63.6)	17(30.9)	3(5.5)
Mathematics allows me to create ideas	86(39.6)	83(38.2)	48(22.1)	19(34.5)	26(47.3)	10(18.2)
Understanding mathematics is important to me	40(18.4)	172(79.3)	5(2.3)	9(16.4)	41(74.5)	5(9.1)
Mathematics rules can never be proved wrong	46(21.2)	153(70.5)	18(8.3)	16(29.1)	30(54.5)	9(16.4)

Above table showed the attitude level of students from both schools. Which showed that majority of students from both schools had have had high level of attitude towards like of learning geometry, geometry is beneficial in their daily life, they like geometry very interesting, where as they had medium level of attitude towards creating ideas, these rules can prove any things.

Table 8: Student's Difficulties in Learning in Mathematics

Statements	Government School			Private school		
	Easy	Moderate	Difficult	Easy	Moderate	Difficult
Introduction to geometry	55(25.3)	137(63.1)	25(11.5)	15(27.3)	33(60)	7(12.7)
Congruent triangles	52(24)	120(55.3)	45(20.7)	8(14.5)	42(76.4)	5(9.1)
Parallelograms and triangles	49(22.6)	132(60.8)	36(16.6)	17(30.9)	35(63.6)	3(5.5)
Line bisectors and angle bisectors	93(42.9)	104(47.9)	20(9.2)	19(34.5)	29(52.7)	7(12.7)
Sides and angles of a triangle	92(42.4)	100(46.1)	25(11.5)	32(58.2)	19(34.5)	4(7.3)
Short problem of geometry	89(41)	115(53)	13(6)	33(60)	17(30.9)	5(9.1)
Out theorem	54(24.9)	122(56.2)	41(18.9)	9(16.4)	34(61.8)	12(21.8)

Above table showed the students difficulties in learning mathematics in both schools. This showed that nearly ten percentage students feel difficult in introduction part, one fifth students from government's feels difficulties in concurrent triangle parts. Students from government's schools feel difficulties in Parallelograms and triangles. Few percentages of students from both types of schools feel difficulties in Line bisectors and angle bisectors. Nearly 20% students from both schools feel out theorem as difficulties.

Chapter V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

The design of the study was case study in nature. The main purpose of the study was to find out the difficulties and causes of difficulties in learning geometry by secondary level students. In order to achieve the objectives, I constructed questionnaire and observation form for interview guideline as tools. This tool contains multiple choice items of first four level because fifth level is hard for grade ten students. This study was conducted in government and private schools. Total 300 students were included in this research. There were six students selected from different gender with the help of VHGT. I interviewed with head teacher, mathematics teacher and six students. On the basis of the data obtained from the tools are analyzed and interpreted in chapter IV. On the basis of those analysis and interpretation the following findings and conclusion have been drawn.

On the basis of analysis and interpretation of the collected data, at the major findings of the study are presented according to the following difficulties while learning geometry.

-) This research was conducted among 37.5% private school children and 62.5% government school children.
-) Majority (45.6%) of the students were in 15 years of age, 30.1% were 14 years of age while 24.3% were 16 years of age.
-) Majority of the students were Magar (35.3%) followed by 16.5% Chhetri, 15.4% Brahmin and least were BK i.e 9.6%.

In this research 54.3% students were male while 45.2% were female.

-) In this research 79.8% students were from private school while 20.2% were from government school.
-) Majority (43.4%) students agree that we have enough reading materials to read in Geometry.
-) Most of the students agree that the time spend by teacher to teach geometry is not enough.
-) Majority of the study agree that text book does not explain geometric topic in understood level.
-) More than 60% students mention that geometric topics are too complex.
-) Only 17% students are satisfied teaching method of Geometry from my teachers.
-) Majority of the students are neutral towards do not like to do much more problems in geometry.
-) Most of the students do not like to do geometrical problem independently.
-) Most of the students don't think tuition is necessary to get good marks in geometry.
-) Most of the students are neutral with multiple choice questions in geometry.
-) Most of the students ask with teacher if any confusion related to geometry.
-) Most of the students agree that they are reading geometry to pass only in exam.
-) Most of the students have high attitude towards learning geometry and was be helpful in the future also an interesting subject.
-) Majority of the students feel difficult in out theorem, Congruent triangles and introduction to geometry.

-) Most of the students from government school as compare to private school agree that there are not enough instructional materials to make the teaching real.
-) As compare to private school government students reply that Geometry in basic school was not taught to their understanding levels.
-) Most of the students from government schools showing positive attitude towards learning geometry.
-) Most of the students from private schools agree that geometry topics are difficult to understand.
-) More than 60% students from both schools agree that geometry topic are complex and difficult to understood.
-) A compare to government school children private school children do not like do geometry anole
-) Students from private schools feel more panic than government school in geometry during exam.
-) Both schools' students agree that text geometry is tough base on exam orient not for knowledge.
-) As compare to government school private schools' children reply that geometry is used in daily life.
-) Students' difficulties in learning mathematics and geometry in both schools.

Conclusion

This research is accomplished on the students of secondary level to investigate the attitude towards learning geometry. Results of the present study demonstrate students from government schools had negative attitude towards learning geometry. Private student has higher positive attitude towards geometry as compare to

government students. The schools and educational institutions should take measure to improve the attitude towards geometry.

The concept of geometry is very important in mathematics. Most students haven't good knowledge about basic concept of geometry. Most of the students have lack of clear concept of geometric definitions, theorems, statements, postulates, axioms. So, teacher feels difficult to teach and students are unable to understand. It is concluded that students have learning difficulties in logical problems, proving geometrical theorems and understanding geometrical concept. The causes of becoming difficulties in learning geometry due to lack of time and interest, and students are poor, irregular. Teachers use traditional method and can't give sufficient time in classroom. There is good relationship between teachers, students and school family. Teachers are helpful, students can ask questions out of school time also. Teacher gives more suggestion in subject matter. But most of the students are from poor family background so that they were spend many times to earn money, absent in class, busy in house hold work, their surrounding environment not supportive for study so that students can't give sufficient time in study. In teaching geometry teacher applied generally traditional (teacher centered) methods like lecture. Teacher hasn't used student centered method. Teacher does not use any type of teaching materials because teacher hasn't taken any formal training about teaching methods and materials. Because of economic crisis of school to add materials for teaching mathematics and there is not available separate mathematics lab. So, learner less participation at geometry class and feel difficulties.

Recommendation

Most of the students felt that geometry is very complex to understood and learning is only exam oriented. Schools as well as Government of Nepal and local

government need to make new strategies and training relate to mathematic and Geometry for all the mathematics teachers. Students should be instructed to follow deeper learning strategies so as to improve understanding and memorization. Students should be given problems that promote metacognition instead of blind drill work Z Students' self-efficacy, expectancy beliefs regarding mathematics to be finely tuned to increase their effort. Provide clear the curricular goals to students and help them to set their own goals Z Make students confident that ability can be improved through effort and effort is important than ability

Based on the findings of this study, the following recommendations are made.

-) The local government should as a matter of urgency send mathematics teachers for training and seminars for effective teaching of mathematics and geometry in particular in our secondary schools.
-) The government should endeavor to provide the necessary infrastructures and facilities that will motivate teaching and learning of mathematics.
-) Teachers should try as much as possible to relate their lesson to real life situation in order to reduce abstract nature of the subject.
-) The government should come up with packages that will motivate mathematics teacher and reward hardworking teachers and students.
-) The appropriate bodies responsible for the monitoring of teachers and students should be made to leave up to expectations.

Suggestion for further study. This study recommends for further research as follows.

-) Similar study should be carried out with various schools of different parts of Nepal.
-) This kind of studies should also be conducted at all levels of schools and in other areas of mathematics.

-) The similar study should be done in another district of Nepal.

Implication

Observing the above findings and conclusions, the researcher has presented the following implication which will benefit to the concern authority to bring further improvement in the geometry teaching and learning.

-) The contents and methods of teaching should be influenced by some practical motives.
-) Use of paradoxes in teaching and learning of mathematics can generate curiosity, increase motivation and create effective instruction environment.
-) Teacher should be encouraged for making and using the teaching materials.
-) Evaluation system should be more precise and scientific.
-) The teacher should motivate the weak students and praise them to participate in teaching learning activities.
-) School should need to make mathematics laboratory.
-) Project work should be given to the students in different geometric topic.
Workshops on various portions of geometry should be conducted effectively.
-) Administer should be responsible and materials management and their effective uses.
-) The teacher shouldn't make students only busy copy the solved problems from the blackboard check them whether they are comprehending or not.
-) The classroom should be well arranged that the students can equality and easily participate in the classroom activities.
-) The school administration should interact to the students, teachers, guardians and other related persons to discuss the problems and come to the solution.
-) Innovative and refreshment training, orientation and supervision should be provided to the teacher's time to time.

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Appendix A
Questionnaire

1. Age:
2. Gender Male Female
3. Class:
4. School: private public Government
5. Religion:
6. Ethnicity

Causes of Difficulty of Geometry Concepts in Mathematics

Please tick [] in the appropriate box to rate the following causes of difficulty in geometry topics according to how each affects you.

Key: SA = Strongly Agree, A = Agree, D = Disagree and SD = Strongly Disagree

Causes of Difficulty in Geometry Topics	SA	A	D	SD
There are not enough instructional materials to make the teaching real				
Geometry in basic school was not taught to my understanding				
I do not show interest in geometry topics				
The time teacher spends on geometry topics is not enough				
Geometry topics are difficult to understand				
Textbooks do not explain the geometry topics to my understanding				

Geometry topics consume a lot of time during tests and examinations				
Geometry topics are complex				
Teachers do not teach geometry concepts to my understanding				
The topics are very complex				

Appendix B

Questionnaire

Perceptions of students in learning geometry

Statement	Agree	Neutral	Disagree
I entirely comprehend my lessons of geometry.			
I like teaching method of Geometry from my teachers			
I truly comprehend the procedures of construction of geometrical shape in class.			
I do not like doing too much extra problem in Geometry daily.			
I dislike home task because I can't do it independently.			
There is sufficient revision of Geometry at school to help me comprehend well.			
I think tuition is necessary to get good marks in mathematical geometry.			
I tend to panic near the exam.			
I find it problematic to revise the entire year syllabus in the annual examinations.			
I do not like short questions of geometry because I cannot express all that I know.			
I like multiple choice questions of geometry			
I realize that the allowable time for mathematics paper is insufficient.			
If I have problem in understanding something new, I			

seek help from my teacher.			
If I have problem in understanding something new, I seek help from my tutor.			
When the mathematics marks of student improve, it is due to his own hard work.			
I feel difficulty in learning a topic because I did not understand previous ideas.			
Teacher question in class helps my understanding.			
Only those units of textbook are taught that are important to pass the examination.			

Appendix C

Questionnaire

Attitude of students in mathematics

Statements	High	Medium	Low
I like Learning Geometry			
I find Geometry beneficial in my daily life			
I find Geometry an interesting subject			
I wish to study mathematics because I like it			
I feel mathematics is easy to understand			
Knowing mathematics was help me in my career			
Mathematics allows me to create ideas			
Understanding mathematics is important to me			
Mathematics rules can never be proved wrong			

Appendix D

Questionnaire

Student's difficulties in learning in mathematics

Statements	Easy	Moderate	Difficult	Not Taught
Introduction to geometry				
Congruent triangles				
Parallelograms and triangles				
Line bisectors and angle bisectors				
Sides and angles of a triangle				
Short problem of geometry				
Out theorem				