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PERCEPTION OF STUDENTS TOWARDS OPTIONAL MATHEMATICS

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PERCEPTION OF STUDENTS TOWARDS OPTIONAL MATHEMATICS

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MADHAV KUMAR BHUJEL**

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2020



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Letter of Certificate

This is to certify that **Mr. Madhav Kumar Bhujel**, a student of academic year 2072/073 with Exam Roll No 7228318, T.U. Regd. No. 9-2-243-76-2010 and Thesis No. 1476 has completed his thesis under supervision of **Mrs. Hom Kumari Adhikari** during the period prescribed by the rules regulation of Tribhuvan University, Nepal. The thesis entitled "**Perception of Students Towards Optional Mathematics**" embodied the result of his investigation conducting the period 2020 at the Department of Mathematics Education, Central Department of Education, University Campus, Kirtipur Kathmandu. I hereby, recommended and forward that his thesis be submitted for the evaluation as the partial requirement to as award the Degree of Masters of Education.

Date: December 13, 2020

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Prof. Dr. Bed Raj Acharya

Head of Department



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Letter of Approval

This thesis entitled "**Perception of Students Towards Optional Mathematics**" submitted by **Mr. Madhav Kumar Bhujel** in partial fulfillment of the requirements for the Master's Degree in Education has been approved.

Viva-Voce Committee

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Recommendation for Acceptance

This is to certify that **Mr. Madhav Kumar Bhujel** has completed his thesis
"Perception of Students Towards Optional Mathematics" under my supervision
during the period prescribed by the rules and regulation of Tribhuvan University,
Kirtipur, Kathmandu, Nepal. I Recommend and forward his thesis to the Department
of Mathematics Education to organize final viva- voice.

Date: December, 2020

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Mrs. Hom Kumari Adhikari

(Supervisor)

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Defense Date: 24th December, 2020

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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 other except due acknowledgement has been made.

Date: December, 2020

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Madhav Kumar Bhujel

Dedication

My respect parents **Mr. Damber Bahadur Bhujel** and **Laxmi Bhujel**, My Brother

Milan Bhujel, my wife Mahima Bhujel, my sister Saraswati Baral.

Whose inspiration, encouragement and

Support lead me where

I am today

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Thank you all the participants for your valuable opinion and your willingness has made my reach mean.

.....

Madhav Kumar Bhujel

Abstract

The study attempted to assess the perception of students towards optional mathematics as well as their perception with respect to gender and education institutes. This study is based on mixed method under concurrent design. The survey was conducted for quantitative data and interview for qualitative data. The purpose of this study was to find the perception of students towards optional mathematics and to find the factors influencing perception of secondary level students towards optional mathematics. Researcher selected 220 students from 8 government and 2 institutional school by simple random sampling method and among them 5 students selected for interview by purposive sampling method. The data were collected from questionnaire and open ended interview schedule. For quantitative data 34 statements of questionnaire were used in this study. Percentage, weighted mean and t-test were used to find out the perception of students towards optional mathematics at 0.05 level of significance. The responses from interview were recorded and transcribed under the headings and then were organized in themes and categories that emerged and analyzed by triangulation method. The result of this study showed that most of the students had positive perception toward optional mathematics. However there was significance differences between the perception of boys and girls, government and institutional school students towards optional mathematics. And the influencing factors of secondary level students towards optional mathematics were found to be teacher student's interaction, student's participation, application of optional mathematics, content knowledge and importance of optional mathematics.

Table of Contents

Letter of Certificate..... *i*

Letter of Approval..... *ii*

Recommendation for Acceptance..... *iii*

Copyright *iv*

Declaration *v*

Dedication..... *vi*

Acknowledgements..... *vii*

Abstract..... *viii*

Table of Contents *ix*

List of Tables..... *xi*

I INTRODUCTION.....1-8

 Background of the Study 1

 Statement of the Problem..... 4

 Objectives of the Study 5

 Statement of the Research Hypotheses 6

 Justification of the Study 6

 Delimitation of the Study..... 7

 Definition of Operation Terms..... 8

II REVIEW OF RELATED LITERATURE9-20

 Empirical Literature Review 9

 Theoretical Literature Review 16

 Conceptual Framework..... 18

III RESEARCH METHODOLOGY21-25

 Survey Design..... 21

Population of the Study.....	21
Sample of the Study	21
Data Collection Tools and Techniques	22
Reliability and Validity of Tools	23
Data Collection Procedure	24
Data Analysis and Interpretation Procedure	24
IV ANALYSIS AND INTERPRETATION OF DATA	26-44
Student’s Responses towards Usefulness of Optional Mathematics Course	27
Student Perception towards Enjoyment of Taking Optional Mathematics.....	30
Confident Scales of Students toward Optional Mathematics	34
Motivation of Students toward Optional Mathematics.....	37
Comparison of Boy's and Girl's perception towards Optional Mathematics	38
Comparison of Institutional and Government School Student's Perception towards Optional Mathematics	40
Factors Influencing Perception of Students towards Optional Mathematics.....	41
V CONCLUSIONS AND IMPLICATIONS	45-48
Summary and Finding of the Study	45
Conclusion of the Study.....	47
Recommendations for Further Study.....	48

REFERENCES

APPENDICES

List of Tables

	Page No.
Table 4.1: Weighted Mean and Percentage of Usefulness	28
Table 4.2: Weighted Mean and Percentage of Perception of Enjoyment	31
Table 4.3: Weighted Mean and Percentage of Confident Level	34
Table 4.4: Weighted Mean and Percentage of Perception of Motivation	37
Table 4.5: Comparison of Boys and Girls Perception towards Option Mathematics ..	39
Table 4.6: Comparison of Institutional and Government School Student Perception towards Optional Mathematics	40

Chapter I

INTRODUCTION

Background of the Study

Mathematics is an essential part of school curriculum so every student should study it and gain better achievement. For the improvement of student achievement in school mathematics education many researcher have been done to identify the variable that influence the achievement score of the students. It believes that student perception play the main role in achievement of mathematics. Perception towards optional mathematics is one's view opinion towards optional mathematics. According to Zan and Martino (2008), a perception is fundamental concern learning mathematics, a perception can be as positive and negative evaluation of people object event ideas it could be concrete abstract or just about anything in our environment. A positive perception towards optional mathematics is reflect a positive emotional disposition in relation to the subject and in similar way negative perception towards mathematics related to a negative emotional disposition.

Perception towards mathematics is defined as emotional disposition towards the school mathematics. Han (1961) argue that "the perception of students and teacher understanding of mathematics as the large number of teacher who desired or fear mathematics has become a factor in children attitude towards the subject".

Mathematics is taught as a compulsory subject at each level of school education system in Nepal. Whereas optional mathematics is taught as an additional subject for secondary level. In Nepalese context mathematics is considered as a complex subject and has become a cause of failure for the student in school education. In general studies as well as the researcher own empirical observation have created a

query that girls and poor family background children are affected by taking optional mathematics in secondary level. In addition to this many of the student are troubled by the level of understanding and achievement in their learning too.

Most of the students are terrible to take optional mathematics in elective subject , many students have miss concept they thinks clever and talent students only read mathematics and easily pass optional mathematics. Low capable students does not pass optional mathematics so some talent students take optional mathematics in elective subject in secondary level and girls participation is very low in mathematics.

Ray (2016), argue that the interest of the girls students teacher qualification student as well as parent expectation and their views and belief directly influenced on girls participation in optional mathematics. In this research girls students had very low participation in mathematics class. They were almost absent in class and had low interest in mathematics. More importantly rural girls' students were comparatively poor in learning mathematics. The boys and girls students has no vast difference between the attitude of mathematics and the influencing factors of secondary level students attitude towards optional mathematics were found to be personal factor, school environment, parent involvement, economic factor, tuition ,culture etc.

In Nepal, mathematics has been taught as one of the main subjects in secondary level education. Since beginning of modern school education mathematics has been given significant place in the Nepalese school curriculum, since implementation of Nepal Education system plan [NESP, 2028-2032].

Since 1993, the scope of the revised curriculum has been elaborated knowledge, skill, comprehension and application types of content are include there. There are 100 marks of compulsory mathematics and optional mathematics are

include in each class nine and ten and there are established class wise objective also. In this study the mathematics which is an optional subject of 100 full marks in secondary school level and which was incorporated from Shrawan 2056 in grade IX and from Shrawan 2057 in grade X and revised in 2063 B.S. of the school in Nepal. The curriculum has six (Nepali, English, Mathematics, Science, Social, EPH) compulsory subjects and two subjects chosen from OPT I (Language (23), Humanities and Sociology (7), Optional Mathematics) and OPT II (25) (structure of present curriculum design, 2071), these subjects are called optional subjects. Optional mathematics is also one of them optional subjects of OPT I group. The graded contents of optional mathematics are algebra (relation and function, limits, continuity, polynomials, sequence and series, quadratic equation and graph, linear programming), co-ordinate geometry (equation of circle, conic section), vector transformation (translation, rotation, reflection, enlargement, combination of transformation using matrix, inverse of circle), trigonometry, matrices, statistics (mean deviation, quartile deviation, standard deviation) are the content of optional mathematics at secondary level (Pant, 2014, p ,3) .

Curriculum were change subject expert to make vertical curriculum because introduce to the course of class 11 and 12 of mathematics. The curriculum of optional mathematics course was revised at academic year 2075 in class nine and academic year 2076 in class ten. In class nine had two unit is change limit is the new lesson of class nine course and class ten was changed lessons were continuity, co-ordinate geometry (conic section), transformation (inverse of circle) and matrix (Cramer rule).

In Nepalese context, no wide research about mathematical attitudes of students towards learning mathematics has been undertaken in the student's level. Some district level researcher and report show that many students are afraid of mathematics

and more girl's students have negative attitude of secondary more than boy's students towards this subjects, (Ray, 2016). It is already felt that a favorable attitude of secondary level students towards mathematics is necessary to course them to learn mathematics. So in this study the researcher try to find the mathematical attitude of secondary level students under different aspect, view about optional mathematics learning.

The perception of students towards optional mathematics effects the achievement of optional mathematics in early secondary level. Student are confuse to take optional mathematics in elective subject. Some students take optional mathematics and all most students take another elective subject.

Statement of the Problem

The problem of this study was mainly concerned with the perception of student towards optional mathematics. In secondary level students should be taken one elective subject. Students would be confuse to take or not to take optional mathematics in class nine. That's why low number of students take optional mathematics in elective subjects. Most of the students are fear to take optional mathematics in elective subject in class nine and some students do not fear to take optional mathematics. In my experience, I was worried to take optional mathematics when I was in class nine but I took it and passed easily thus perception is the main factor of this study. Low girl's participation were found in optional mathematics (Ray 2016). At secondary level there is positive attitude towards mathematics there is no different between boys and girls (Pant 2014). The secondary level students had positive attitude towards mathematics (Sharma, 2014). The different research had shown that secondary level students had positive attitudes towards mathematics and

optional mathematics. But still participation of girl's students are low in optional mathematics class. We saw that participation of optional mathematics students is low then other elective subject.

Most of the study were done about attitude of mathematics but such researches about perception of optional mathematics were not seen in particular area of dhading district so this topic was selected to research. The problem of this study was mainly concerned with the perception of student towards optional mathematics course at secondary level. So the study had elicit/explore answers along with the following research questions.

-) What is the perception of student's towards optional mathematics?
-) Do the difference between boys and girls perception toward optional mathematics?
-) Do the difference between institutional and government school students perception toward optional mathematics?
-) What are the influencing factor for perception toward optional mathematics?

Objectives of the Study

The main objectives of this study were as follow:

-) To analyze the students perception towards optional mathematics
-) To compare the perception of boy and girl students towards optional mathematics
-) To compare the perception of institutional and government school students towards optional mathematics
-) To explore the influencing factor for positive perception toward optional mathematics

Statement of the Research Hypotheses

The research hypotheses formulated for this study were as follows:

-) $H_0: \mu_1 = \mu_2$ (There is no significant difference between boys and girls perception towards optional mathematics)
 -) $H_1: \mu_1 \neq \mu_2$ (There is significant difference between boys and girls perception towards optional mathematics)
 -) $H_0: \mu_1 = \mu_2$ (There is no significant difference between institutional and government school students perception towards optional mathematics)
 -) $H_1: \mu_1 \neq \mu_2$ (There is significant difference between institutional and government school students perception towards optional mathematics)
- (Where μ_1 and μ_2 are parametric mean scores of the boys and girls, government and institutional schools students respectively.)

Justification of the Study

Today is the age of competition, especially in 21th century if we want to excel on any field. Every student choose one elective subject in class ix. Optional mathematics is also offered to willing and worthy students. Most of the educated parents in Nepal wish that their children should study optional mathematics. But many of them may have not known about various facts like attitude, aptitude and intelligence of their children. They are not enough capable to find out whether their child has got a favorable attitude for the study of particular subject or not. The result of which comes to us in mass failure, which causes to increase the number of students drop out from the class. However, mathematics has been given a significant place in school curriculum since the implementation of new education system plan. So it has become essential to investigate the perception of students before taking optional

mathematics. This might help to decrease the problem of the increasing number of failure students. Hence this study is important for students and parents who focus on studying optional mathematics.

In other hands, a curriculum designer and trainer are known about causes of low performance in optional mathematics. Curriculum designer focuses on revision on the content of optional mathematic course in context of Nepal and Trainer train new technique to teach optional mathematics course according to access the teaching material and researcher research about gap between secondary course and higher course,

The main significance of this study was as follows.

-) The result of this study is intended to determine the perception of secondary level students towards optional mathematics
-) It helps to parent who focus your children's study optional mathematics and students
-) The result of this study is to help the mathematics curriculum designer national policy makers, researchers, educational administrators. educationists and other concerned persons to consider about the further works related to it
-) It aims to help the councilor to provide the positive perception towards optional mathematics

Delimitation of the Study

The limitation of the study were as follows:

-) This study was limited on Rorang Gaupalika at Dhading district.
-) This study was limited on semi-structured questionnaire schedule form.

-) This study was included the students of grade ix and x who were taken mathematics as elective subject.
-) This study was limited on the content of optional mathematics curriculum prescribed by Nepal government for secondary level.
-) Simple random sampling tool was used to select secondary level students
-) This study was limited to the class room activity teaching approach of content of optional mathematics.

Definition of Operation Terms

Community school. In this study community school means those schools that have obtained approval or permission and receiving regular grant from government of Nepal.

Enjoyment. The process of taking pleasure, entertainment, benefit, use, ownership in learning optional mathematics course.

Motivation. A reason or reactions for acting or behaving in learning optional mathematics course.

Optional mathematics. In this study the mathematics which is a optional subject of 100 full marks in the secondary school level and which was incorporated from shrawan 2056 in grade ix and from shrawan 2057 in grade x and revised many time. .

Perception. The terms perception in this study is defined as understanding of the students towards optional mathematics before taking optional mathematics and after studying period.

Students. In this study students are those who study optional mathematics in class nine and ten.

Chapter II

REVIEW OF RELATED LITERATURE

Literature review is one of the essential task to conduct any research. According to Kothari (1995) “the literature review is an integral part of the entire research process and makes a valuable contribution to almost every operational step” (p.30). It widens the horizon of the knowledge of the researchers therefore I have made an effort to shed light on some theoretical aspect of the study.

Empirical Literature Review

This chapter present the review of books journal report of the previous researches and other published source. The major theses journal report reviewed are as follows:

Khasanah VN (2018) Conducted a study entitled “student thinking process in solving words problem in geometry” and the main objective of this study was to find out the thinking process of seventh grade of junior high school in solving word problem of geometry.

The method of this research was descriptive qualitative research and sample of the size of this research was 66 students , the finding of this research was there is no difference thinking process between male and female with high mathematical ability and there were difference of thinking process between male and female with moderate and low mathematical ability , Also it was found that male with moderate mathematical ability took a long time in the step making problem solving plane and female with moderate mathematical ability took long time in the step of understanding the problem.

Mustapa, Mahd Kanafiah and kamrul (2016), Conducted a study entitled " A study of students perception towards mathematics". The aim of this study was to examine the perception of MDAB students in mathematics in these aspect which is the student's attitude in mathematics. Student's perception on their mathematics lecture and influence of peer towards mathematics subject itself. The population of the study was 549 students taking intensive mathematics in semester 1 at UiTM Kelantan and sample of this study was 300 students.

The data collected was analyzed using mean and t-test by using a SPSS, 20 for windows.

The finding shows that lectures teaching is most important perception towards mathematics subject. From students attitude high ranking items is student perceived that mathematics is useful in their life. Meanwhile from lecture, teaching student believed that the mathematics lecture expert in their field.

Pants (2014), did research on the topic, "Attitudes of student towards optional mathematics." The main objectives of the study to identify factor of the secondary level students attitudes towards mathematics and to found attitude of secondary level students towards optional mathematics. The study was quantitative research method and research design was survey type. The researcher selected 240 students among them 140 were boys and 100 students were girls. The data were analyzed by using descriptive as well as inferential statistics. The Chi square-value and mean score of each statement were used to determine the secondary level student attitudes of boys and girls .The research find that there was a positive attitudes of secondary level students towards the optional mathematics, both boys and girls had positive attitudes towards the optional mathematics.

Kilman (2015), did his research on topic, "The relationship between students, applied mathematics skill and students attitudes towards mathematics." The main objective of this study was to explore the relationship between student's basic applied mathematics skill and student's attitudes towards mathematics. This research was quantitative conducted using survey method. That is do students, as they learn how to use mathematics in the real words, tends to develop a more favorable outlook towards mathematics? Or, on other hand, do the attitude towards mathematics of student's remains unaffected as their ability to use mathematics in the real world increase? The current research seek to clarify these proposition in an effort to improve instruction by providing educators with a better understanding of student's attitude towards mathematics. Participation in this study was open to any student currently enrolled at Mississippi College. Specifically, the researcher targeted for recruitment students who were enrolled at Mississippi College and were taking a mathematics course in the fall 2014 semester. The instrument consists of 40 statements five-point Likert-type items with responses ranging from Strongly Disagree (1) to Strongly Agree (5). The inventory consists of four sub-scales: self-confidence, value, motivation, and enjoyment. Some items gauge positive attitudes using statements such as "Mathematics does not scare me at all" whereas other items gauge negative attitudes using items like, "Mathematics is dull and boring." Eleven of the 40 items are worded in the 11 items negative and the remaining 29 items are formulated in a positive manner.

Multiple linear regression analysis found that attitude toward mathematics was indeed significantly related to students' basic applied mathematics skill. Attitude towards mathematics explain 29.7% of the variance observed in basic applied mathematics skill. Attitudinal subscales were also analyzed. Students self-confident

and motivation were both significant predictors and basic applied mathematics skill. In a separate analysis, attitude towards mathematics was not found to be significantly related to mathematical achievement in the collage classroom.

Ray (2016) The study entitled “Factor affecting low participation of girls in optional mathematics” aims at finding out the factor that affect the low participation of girls student in optional mathematics. Sample size of this research was one hundred twenty girl student and twenty math teacher from ten school five from urban and another from rural area. The research design of the study included survey design. The researcher used two tools to collect data. They were interview and questionnaire. After collecting the data, the researcher analyzed and interpreted the data in the percentage form and presented them in the tables. Triangulation was adopted to maintain the validity and reliability of the information.

The finding of the study show that interest of the girls students, teacher’s qualification, student as a well as parents’ expectation and their view and beliefs directly influenced on girls participation in optional mathematics. Similarly home environment such as gender bias at home, practice time given to solve problem study hour at home, teacher and peer’s behaviors towards girls had also direct influence on their participation in optional mathematics. Girls felt difficulty in reading comprehending the overall meaning of mathematics and make mistake in solving the mathematical problem were the factor affecting mathematics achievements of girls thus girls had very low participation in mathematics class. They were almost absent in class and had low interest in mathematics.

Birendra (2018) carried out the research entitled “Teacher perception and practices of active learning in mathematics classroom” the objective of this study are

to explore how often mathematics teacher practices active learning method in classroom and to find out the factor affecting the implementation of active learning in mathematics classroom.

The researcher use an explanatory sequential mixed research design the sample of this research was taken 102 mathematics teacher from private and institutes at Kathmandu district also the researcher selected 6 teacher from 102 teacher on the base of purposive sampling method. The finding of this study was mathematics teacher had perceived active learning positively in the mathematics classroom despite the positive perception, the implementation parts of active learning was poor it creates the boundless opportunity to share experience and encourage friendship among students, by encouraging active involvement in the learning rather than passive listening active learning encouraging independent learning and higher order thinking skill.

Sharma (2014) in his study on topic, "Attitudes of secondary level students towards mathematics." The main aim of study was to find out students attitude towards mathematics and to compare student attitudes toward mathematics by their socio economic status (SES) The researcher was selected 93 female and 107 males of Kaski district. The researcher found that the secondary level students had positive attitudes towards mathematics, the difference in the attitudes of the high and low SES was not, for the most part, statistically significance. The only significantly different attitudes was perception of student toward their mathematics teacher, for it, high SES had good perception toward their mathematics teacher then low SES student. Again the attitude at low SES lowered then those at high SES student negligibly. There was no relationship between SES and gender of student to determine attitude toward mathematics

The research done by Bhattarai (2016) related to “secondary level mathematics teacher perception towards mathematics”. The objective of this study are to find out the perception of secondary level mathematics teacher towards mathematics and to compare the perception of mathematics teacher gender wise and discipline wise, the method of this research was qualitative research design, for this purpose researcher selected 50 teacher from 30 school. The finding of this research were female mathematics teacher have consistent positive perception rather than male mathematics teacher and education faculty mathematics teacher has consistent positive perception than non- education mathematics teacher.

Schwanebeck (2008) examined the “A study of the summarization of word problem” and the main objective are to find success that would enhance their confident and ability to successfully the method of this research was qualitative research design and 93 student are selected from different sixth grade student. The analysis of information the student repeated practices using the word problem summarization worksheet improved student attitude towards solving words problem and also increased their ability to solve world problem successfully the researcher suggested that using the work sheet in the classroom is a way to help student find a more manageable way to organize steps in the problem solving process while improve their ability to successfully solve different type of word problem.

Maharjan (2016) Studied on “teacher perception and practices on culturally contextualized mathematics”. Explore perception of teacher and the classroom practices culturally in mathematics. Objective of this study were to find out the perception of teacher towards culturally contextualized and analyze the situation of class room practices in the context of culturally contextualized mathematics, researcher used descriptive survey method. The sample size of this research was 20

basic mathematics teacher selected by random sampling method. The researcher found that the teacher has positive view about making mathematics curriculum contextual, it makes mathematics as local subject matter but difficult to globalize at practices level. Teacher focus on rote learning process, Teacher have positive attitude towards reducing gap between math inside school and outside of school. Teacher mostly used deductive method. Teacher training are not sufficient on the culturally contextualize mathematics

Joshi (2016) conducted a study on “perception towards interactive approach of teaching and learning mathematics at secondary level: A case study in Kanchanpur district. The specific objective were to examine the level of interactivity in mathematics classroom, and to explore how interactivity teaching learning helps to improve mathematics teaching and learning, the sample of this study was taken two school and used descriptive case study design with semi structure interview and questionnaire. The major finding of the study was teacher perception towards interactive teaching is good even though they face a lot of difficulty due to school environment student participation and other factor student perception towards the interactive learning is not good due to the teaching method used by teacher lack of training about new concept relation modern technique and teaching method for interact teaching and learning. There is difficult to complete whole course in time because use of student center teaching method takes long time and difficult of teaching because different family background of student and classroom environment aren't conducive to student growth unavailability of curriculum.

Guragai (2015) conducted a study entitled “student perception on mathematics classroom environment and mathematics achievement”, the objective of this research were to find student perception toward mathematics classroom environment and to

explain how the perception on mathematics classroom environment differs based on gender. The method of this research was mixed research design method and total 445 students were selected sample size from Morang district. Analysis of the data show that the student had a moderate perception of their mathematics classroom environment mathematics achievement is low with girls achieving better than boys their mathematics assessment. There was no significant difference in perception of mathematics learning environment based on gender.

Many research showed that there is no different thinking process between male and female with high mathematical ability, there is positive attitude towards mathematics, Attitude toward mathematics was significantly related to applied mathematics, many different causes were showed that low participation of girls in optional mathematics class. From the above review I have found that most of the research studies focused towards perception on compulsory mathematics, trigonometry, and participation of girls in optional mathematics but very little research have been done towards student's perception on content of optional mathematics. Therefore I selected this topics for my research study.

Theoretical Literature Review

The theoretical discussion is needed for the interaction of the finding of the study. There are many theories about learning and development of children such as cognitive, behaviorist, humanist and social constructivist. Learning means the relatively permanent change in behavior which occurs as a reinforced practices, According to the behaviorist learning is the stimulus – response process they mention that learning is an interaction between human being and external environment.

In constructive learning theory, Vygotsky has developed “Socio-Cultural theory” and believed that children are active seekers of knowledge but he did not view them as solitary agents in this theory. Constructivism is basically based on observation and scientific study about how people learn. It says that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences when they encounter something new. We have to reconcile it without previous ideas and experiences which may be changing what we believe or may be discarding the new information as irrelevant in any sector. We are active creators of our own knowledge. To do this we must ask questions, explore and assess what we know. Constructivism stands on its three maxims that are: learner learns knowledge from their active participation, learner gains knowledge reflecting on their own action and learner gains knowledge when they try to convert their solution to others, this shows that the better learning results from the students' active participation and their own readiness for study.

Theoretically, to see the perception of students towards optional mathematics is relative or not to the constructivist's view. According to Vygotsky, Are students learning active participation in optional mathematics classroom? Are they make or find rules to solve optional mathematics problems? If teachers provide all material and leave students in class room then student can learn by active participation. To find the class room practices of optional mathematics goes according to constructivist view in our context of Nepal. Wrong concepts carry in our society poor student can't learn optional mathematics so some particular student take optional mathematics in elective subject. But constructivist view said that if we leave students in nature student can learn itself.

Generally the perception of the student towards optional mathematics course create confusion to choose to study. Mohd K& Jumadi A (2013) “the level of student

perception toward mathematic subject was high and negative linear and a moderate significant correlation between student perception and achievement of mathematics” According to Rao(2004) student who have positive attitude have achievement higher then student who have negative attitude towards mathematics similarity Gotome (2005) stresses that there is correlation between parent belief , student belief and achievement in mathematics .parents preserve gender bias in mathematics he also states that mathematical thinking and doing depends on the parental status and belief the upper casts student have higher achievement in mathematics due to their parents high expectation towards mathematics and school system. Parent’s belief is the main motivation factors in learning of mathematics. “Constructivism is a learning theory that proposes that students construct knowledge by connecting new knowledge to prior knowledge through new individual or social experience. A major tenet of constructivism is that students are curious and natural learners if placed in a conducive environment. Furthermore the learning process has been described as a highly social process.” (Vygotsky, 1978)

Mathematics is a subject with which many students struggle. It has been noted that students' attitudes towards mathematics can often affect their performance in related course. That is students as they learn how to use mathematic in the real word tend to develop more favorable outlook towards mathematics?

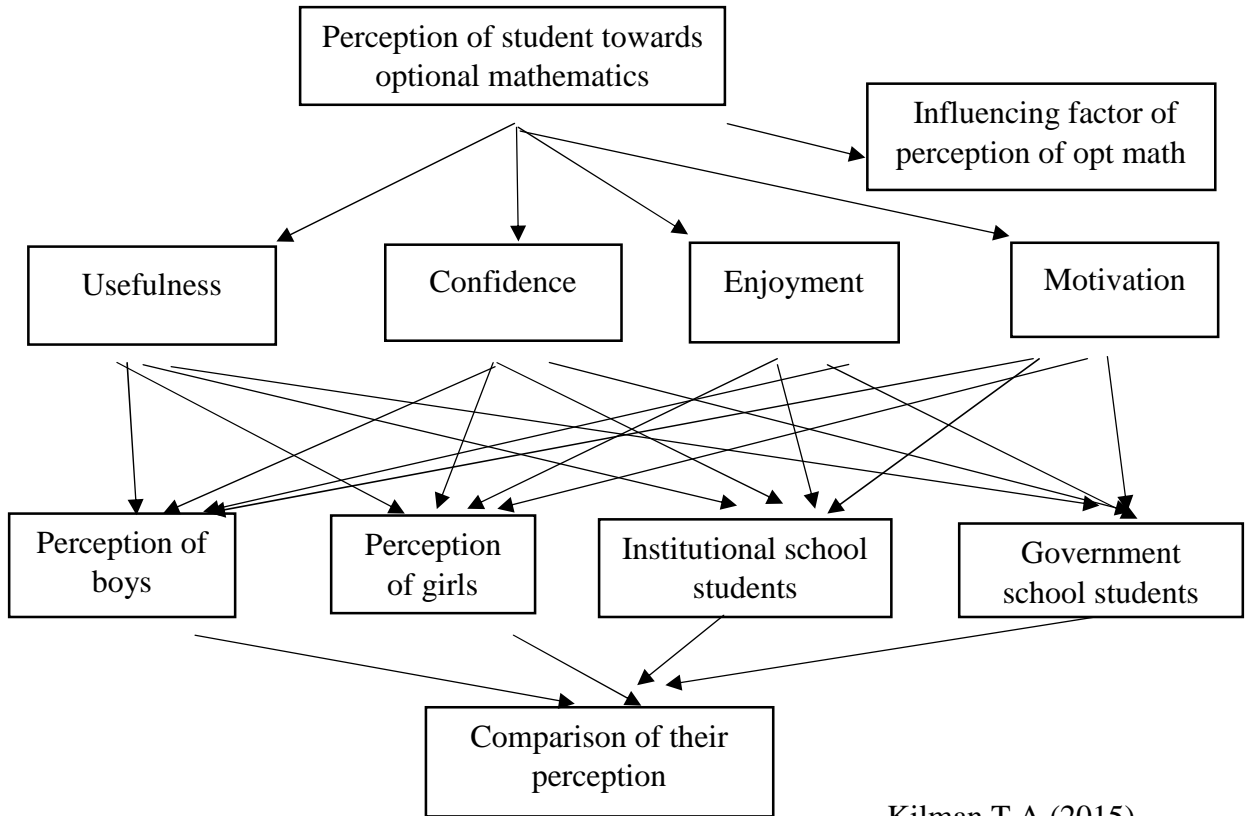
Conceptual Framework

Conceptual frame work is a road map that helps in making data collection tools. A conceptual framework refers to the connection of the research variables in the study as in compact form. The conceptual framework is developed on the basis of the researcher’s understanding about the research variable and research process using

some aspects of the theoretical framework. It maps out the actions required in the course of the study given his previous knowledge of other researcher's point of view and his observations on the subject of research (Regoniel, 2015). The conceptual framework "sets the stage" for the presentation of the particular research question that drives the investigation being reported based on the problem statement (McGaghie, Bordage & Shea, 2001). It is the narrow form of the theoretical framework by which study variables and circumstances of the study are presented in the diagrammatic form. I constructed the conceptual frame work on the basis of research topic " attitude of secondary level students towards optional mathematics" (Pant, 2014), "Factor affecting low participation of girls in optional mathematics" (Ray, 2016), "Attitude of secondary level students towards mathematics"(Sharma, 2014) and especially focus on the basis of research topic " The relationship between students applied mathematics skill and students attitudes towards mathematics"(Kilman 2015). In my research I study about perception of students. I categorized the student according to girls and boys, institutional and government school.

I used following conceptual framework for my study.

Fig 2.1 Perception of Students towards Optional Mathematics



Kilman T.A (2015)

This shows the conceptual framework of the student’s perception on Optional mathematics. There are four component and they are usefulness, confidence, enjoyment and motivation. It means student’s perception depend on usefulness, confidence, enjoyment and motivation of opt mathematics students. In my study perception depend on usefulness or importance of mathematics, confidence of students, motivation towards mathematics and enjoyment of students. The rate of student’s taking optional mathematics and achievement of students depend on perception. Thus Questionnaire were made on the basis of this conceptual frame work for data collection. For the questionnaire, 34 statements had prepared based on the above main theme of conceptual framework and the helps of experts.

Chapter III

RESEARCH METHODOLOGY

This chapter deals with the research design, population of the study, sample of the study, tool of data collection, reliability and validity of tool, data collection procedure and analysis of interpretation of data were presented in detail. So the research methodology is the important aspect of the study.

Survey Design

The research aims to find out the perception of student towards optional mathematics and to analyze the perception of boys and girls students towards optional mathematics and also institutional and government school students. For this study researcher used mixed method under the concurrent design, Kothari C.R (1985) “concurrent is use when quantitative and qualitative data collect at a time, in this method first often researcher should collect the quantitative and qualitative data one after another and finally draw a conclusion obtain from both data”. The quantitative method was used to find the students perception towards optional mathematics and qualitative method was used to find the factors influencing perception of secondary level students towards optional mathematics.

Population of the Study

The population of the study was taken from secondary level students at Rorang Gaupalika of Dhading district.

Sample of the Study

The population of the study were all the secondary students of grade IX and X from Rorang Gaupalika at Dhading District. The sample of the study was a group of

220 students from two institutional and eight government school consisting of both rural and urban school. 66 students were selected from institutional and 154 students were selected from government school by random sampling method. For this objectives 66 students were selected from institutional school and 154 students were selected from government school of Rorang Gaupalika of Dhading District. Also to fulfillment of this research objective five students were selected by purposive sampling method, three from community and two from institutional school and taken interview.

Data Collection Tools and Techniques

There were many tools for qualitative or descriptive research to get information from the informants. The researcher was adopted questionnaire, interview schedule as the tools of data collection.

Questionnaire. Questionnaire is an important tools using for data collection in the research. Closed-ended questionnaire were the research instrument to collect information. The questions were organized based on Likert five point scale. These questionnaires were contains statement which reflect the students perception about optional mathematics. The questionnaires were prepared on the basis of Conceptual Framework. The 34 questionnaire were made in the dimension of perception of optional mathematic. Nine were form usefulness, eleven were form enjoyment, ten were form confident and four were form motivation. The instrument consists of five-point Likert-type items with responses ranging from Strongly Disagree 1 to Strongly Agree 5 for positive statement and strongly disagree 5 to strongly agree 1 for negative statements. Some items gauge positive perception using statements such as “Optional mathematics help me to develop the mind and person think” whereas other items

gauge negative perception using items like “I don’t expect to use much math I get out of school”. In 34 items 12 items negative and the remaining 22 items were formulated in a positive manner. The questionnaire was conducted for 220 students and analyzed the perception of students towards optional mathematics. For the questionnaire, 34 statements had prepared based on the above main theme of conceptual framework and the helps of experts. The list of 34 statement (9 statement for usefulness, 11 statement for enjoyment, 10 statement for confident and 4 statement for motivation) were applied and instruments were collected as data, compared perception of boys students and girls students and institutional school and government school students. This statements were made in the form Likert five point scale i.e.; strongly agree, agree, neutral, disagree, and strongly disagree. Students tick any one of the corresponding Column of the statement. This conceptual frame work was also used in analysis of data.

Interview schedule. The researcher prepared semi-structured interview schedule to explore more about factors influencing perception of students towards optional mathematics. The semi structured interview was taken with five students who did not study optional mathematics.

Reliability and Validity of Tools

The researcher conducted a pilot study to a group of 20 students those represent the population but not included in the sample of the study. The researcher organized the data and performed SPSS21.0. Then the calculated Cronbach’s Alpha (reliability coefficient) was 0.8. This reliability coefficient was very good with reference to the interpretation criteria provided by George and Mallery (2003, p.

231). It means that there was greater internal consistency of the items in the scale. The validity of the data collection tools was ensured by expert judgment.

Data Collection Procedure

Data is the foundation of any research. Therefore, collection of reliable data is very essential part of all types of research. The researcher visited the sampled school with questionnaire and interview schedule to collect data and information. Researcher explained the purpose of the visit to the headmaster and had taken permission with head teacher and mathematics teacher before the distribution for students. During the distribution of the questionnaire to the students, the researcher provided general information about how to fill up the questionnaire. Moreover, the researcher helped the participant in language difficulty if they had in the questionnaire reading. By the used of questionnaire the researcher has taken the perception of all the students of grade IX and X in the present of their mathematics teachers. After getting response of all the students the questionnaires were collected. After collecting data, the researcher conducted a semi structured interview with five student who did not study optional mathematics.

Data Analysis and Interpretation Procedure

Simply, data interpretation is the systematic process of presenting the raw data and analyzing them to show their effects. The analysis of data is important things while we are preparing research report. In this report primary data collected from primary source through questionnaire and interview schedule. After quantifying the collection data, the researcher analysis obtain by using the statistical procedure. The collect data, weighted mean was used for each items to find the perception of students towards optional mathematics. By the help of weighted mean and percentage, the

researcher found out the positive perception of statement of usefulness, enjoyment, confident and motivation of optional mathematics. And mean score of each statement determine the secondary level student's perception towards optional mathematics. When mean was less than 3 the statement was negative and when mean was greater than three the statement was positive and mean was exactly 3 then statement was undecided. Then t-test was apply to compare the perception of boys and girls, institutional and government school students towards optional mathematics at 0.05 level significant.

For qualitative data, I took open ended interview with the 5 students who did not study optional mathematics for finding factor influencing perception of student towards optional mathematics. Out of them, I selected 3 students from government and 2 students from institutional school, and recorded the answers of each students respectively in my cell phone. Each student's views were analyzed with the help of thematic approach based on triangulation method. According to this approach the student's views were analyzed and coded and developed the themes.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter encompasses the analysis and interpretation of the data collected. The chapter is organized in terms of objectives and research questions stated in the chapter I. For the purpose of analyzing the data obtained from the questionnaire, SPSS21.0 statistical analysis software was used setting 0.05 level of significant. More importantly, the mean and standard deviation of each item was interpreted with reference to the interpretation criteria provided by Onwubuya E.A Nennam .M.G and Ugbaja M.O(2015)

This is a survey research related to find the perception of student towards optional mathematics. Quantitative method was used to measure the perception of students towards optional mathematics. This chapter present the result of statistical analysis of collective data, which were collected from the students of secondary level at Rorang gaupalika. From the list 10 secondary school were selected. A total 220 students of optional mathematics were the sample of this study. The questionnaire consist 34 statement which was develop and constituted under the guidance of supervisor. Questionnaire was the major tools for the collection of data in this research. Scale for scoring each items of the questionnaire used the Likert five point scale. The value of five point to strongly agree response, four point to agree, three point to neutral, two point to disagree, one point to strongly disagree for positive statement and one point to strongly agree, two point to agree, three point to neutral, four point to disagree, five point to strongly disagree for negative statement. This part deals with statistical analysis and interpretation of the data. For the analyzing the data,

mean, percentage, standard deviation and t-test were used. The collected data were analyzed and interpreted under the following heading

-) Student's responses towards usefulness of optional mathematics.
-) Student's response towards enjoyment of optional mathematics.
-) Student's response towards confident of optional mathematics.
-) Student's response towards motivation of optional mathematics.
-) Comparison of boys and girls perception towards optional mathematics.
-) Comparison of institutional and government school students perception toward optional mathematics

The first objective of the study was to find out the perception of secondary level students towards optional mathematics course in order to achieve this objective, the weighted mean and percentage calculated and analyzed. Which are tabulated in the following table.

Student's Responses towards Usefulness of Optional Mathematics Course

There were nine statement related to the usefulness of optional mathematics course. The following table consists the perception of students and its corresponding weighted mean of the questionnaire related to usefulness level of optional mathematics.

Table 4.1**Weighted Mean and Percentage of Usefulness**

Statement	SA %	A %	N %	DA %	SDA%	Mean
1. Optional mathematics helps me to develop the mind and person's think	47.27	45.45	5.45	1.8	0	4.38
2. I will need optional mathematics for my future works	39.09	19.09	16.36	18.18	7.27	3.64
3. I want after the studying new optional mathematics course to develop my mathematics skill	35.45	25.45	9.5	15.9	13.63	3.53
4. I think all content of optional mathematics are important for further study	32.72	28.63	14.54	15	9.09	3.6
5. Optional mathematics is useless subject in human life	15.45	21.81	9.09	40	13.63	2.14
6. I think trigonometry is useful in further study	20	23.63	20.9	26.36	9.09	3.19
7. I study optional mathematics because I know how useful it is	21.8	25.45	10.9	27.27	14.54	3.12
8. I believe studying optional mathematics because it helps me to problem solving in other area	19.09	35.4	8.18	18.18	13.63	3.12
9. I don't expect to use much math I get out of school	18.18	30.9	7.27	35.4	8.18	2.95

The table 4.1 shows that the positive statement “Optional mathematics helps me to develop the mind and person’s think” is significant and mean value is 4.38. A total of 47.27% students were strongly agreed, 45.45% students were agree and 5.45% students were neutral about the statement. This show that most of the students were positive about this statement.

The positive statement “I will need optional mathematics for my future works” is significance and mean value is 3.64. A total of 39.09 % students were strongly agree, 19.09% students were agree and 16.36% students were neutral about

the statement. This shows that maximum numbers of students were positive with the statements.

The positive statement "I want after the studying new optional mathematics course to develop my mathematical skill" is significant and mean 3.53. A total of 35.45% students were strongly agreed, 25.45% student were agree and 9.54% students were neutral. This shows that most of the students were positive with this statement.

The positive statements "I think all content of optional mathematics are important for further study" is significant and mean 3.60. A total of 32.72% students were strongly agreed, 28.63% student were agree and 14.54% students were neutral about this statement. This shows that most of the students were positive about this statement.

The negative statement "Optional mathematics is useless subject in human life" is significant and mean value 2.14. A total of 13.63% students were strongly disagreed, 40 % student were disagree and 9.09% students were neutral. This show that maximum number of students were negative about in this statement.

The positive statement "I think trigonometry is useful in further study" is significant and mean 3.19. A total of 20 % students were strongly agree and 23.63% student were agree and 20.9% student were neutral about this statement. This show that maximum number of student were positive about this statement.

The positive statement "I study optional mathematics because I know how useful it is" is significant and mean 3.12 , A total of 21.81% students were strongly agreed 25.45% student were agree and 10.9% students were neutral about this

statement. This show that maximum number of students were positive about this statements.

The positive statement " I believe studying optional mathematics because it helps me to problem solving in other area" is significant and mean 3.12, A total of 19.09% students were strongly agreed, 35.4% student were agree and 8.18% students were neutral about this statement. This show that maximum number of students were positive about this statements.

The negative statements "I don't expect to use much math I get out of school " is significant and mean 2.8, A total of 18.18% student were strongly agree, 30.9% student were agree and 7.27% student were neutral about this statement. This show that maximum number of student were negative about this statement.

Hence, from the analysis of data, it show that majority of student had positive perception towards the positive statement and negative perception towards negative statements under the usefulness scale which proves that majority of students are positive under the usefulness of learning optional mathematics.

Student Perception towards Enjoyment of Taking Optional Mathematics

There were 11 statements (10-20) related to enjoyment of student toward studying optional mathematics. The following table consists the enjoyment of student towards optional mathematics and its corresponding mean value of the questionnaire related to the enjoyment.

Table 4.2**Weighted Mean and Percentage of Perception of Enjoyment**

Statement	SA %	A %	N %	D %	SD %	Mean
10. I really like optional mathematics course	13.63	36.36	11.81	25.45	12.7	3.12
11. Optional mathematics course has very interesting subject matter	19.09	28.18	13.63	20	19.09	3.08
12. I usually enjoy in studying new optional mathematics course in school	17.27	41.8	6.8	25	9.09	3.33
13. Teacher use ICT to teach optional mathematics course	2.7	15	9.09	37.7	35.4	2.11
14. My teacher has encouraged me to study more math	39.09	25.45	7.27	15.45	12.72	3.62
15. I am comfortable to give the answer for questioning in optional mathematics class	16.42	20	20.12	23.21	19.64	3.12
16. I like to solve new problem in optional mathematics course	13.5	15	15.27	27.14	27.85	2.95
17. Taking optional mathematics is waste of time	10	16.36	10	26.36	37.27	2.94
18. I am happier in optional mathematics then in any other class	17.27	38.18	20.9	10	13.63	3.35
19. I can expressing my own ideas on how to take for solution to difficult problem in optional mathematics	21.8	28.18	18.18	14.09	17.72	3.22
20. All content are new so difficult to study	28.18	21.8	11.8	19.09	19.09	3.79

From table 4.2 shows that the positive statement “I really like optional mathematics course” is significant and mean 3.12. A total of 13.63% students were strongly agree, 36.36% student were agree and 11.81% students were neutral in the statement. This show that most of the students were positive in this statement.

The positive statement “optional mathematics course has very interesting subject matter” is significant and mean 3.08, A total of 19.09% students were strongly agree, 28.18% student were agree and 13.63% students were neutral about this statement. This show that maximum number of students were positive about this statement.

The positive statement “I usually enjoy in studying new optional mathematics course in school” is significant and mean 3.33. A total of 17.27% students were strongly agree, 41.81% student were agree and 6.8% student were neutral about this statement. This show that maximum number of students were positive about this statement.

The positive statement “teacher use ICT to teach optional mathematics course” is significant and mean 2.11. A total of 35.4% students were strongly disagree, 37.7% student were disagree and 9.09% students were neutral about this statement. This show that maximum number of students were negative about this statement.

On the positive statement “My teacher has encouraged me to study more math” is significant and mean 3.62. A total of 39.09% students were strongly agree, 25.45% student were agree and 7.27% students were neutral in the statement. This show that most of the students were positive about this statement.

On the positive statement “I am comfortable to give the answer for questioning in optional mathematics class” is significant and mean 3.12, A total of 16.42% students were strongly agree, 20% student were agree and 20.12% students were neutral in the statement. This show that most of the students were positive about this statement.

The positive statement “I like to solve new problem in optional mathematics course” is significant and mean 2.95. A total of 13.5% students were strongly agree, 15% student were agree and 15.27% students were neutral about this statement. This show that maximum number of students were negative about this statement. On the negative statement “taking optional mathematics is west of time” is significant and mean value is 2.94. A total of 37.27% student were strongly disagree, 26.36% student were disagree and 10% student were neutral about this statement. This show that most of the students were negative about this statement.

The positive statement “I am happier in optional mathematics then in any other class” is significant and mean value is 3.35. A total of 17.27% students were strongly agree, 38.18% student were agree and 20.9% students were neutral about this statement. This show that maximum number of students were positive about this statement. The positive statement “I can expressing my own ideas on how to take for solution to difficult problem in optional mathematics” is significant and mean 3.22. A total of 21.81% student were strongly agree, 28.18% student were agree and 18.18% student were neutral about this statement. This show that most of the students were positive about this statement.

The positive statement “All content are new so difficult to study” is significant and mean value is 3.79, A total of 28.18% student were strongly agree, 21.81% student were agree and 11.8% student were neutral about this statement. This show that most of the students were positive about this statement.

Hence from analysis and interpretation of the above data, it show that majority of student had positive perception towards the positive statement and negative

perception towards negative statement. Which proved that most of the students had taken enjoyment at studying optional mathematics.

Confident Scales of Students toward Optional Mathematics

There were 10 statement (21-30) related to confident. The following table consists the confident level of student toward optional mathematics and its corresponding weighted mean of the statements.

Table 4.3

Weighted Mean and Percentage of Confident Level

Statements	SA %	A %	N %	DA %	SDA %	Mean
21. I think I could do handle more difficult of optional mathematics	33.63	23.63	14.54	14.54	13.63	3.49
22. Optional mathematics is one of my most dreaded subject	17.27	20.9	6.81	30.9	17.27	3.1
23. I am always confused in my optional mathematics class	19.09	25.9	6.81	30.9	17.27	3.01
24. I am sure that I can solve all the problem of optional mathematics course	19.09	39.09	12.72	15.45	13.63	3.34
25. I am able to solve related continuity problem easily	24.54	28.18	13.63	18.18	15.45	3.28
26. My mind goes blank and I am unable to think clearly when working with optional mathematics	13.63	25.45	15.45	26.36	19.09	3.11
27. I am always under a terrible strain in optional mathematics class	9.54	17.27	15.9	30.90	17.27	3.35
28. When I hear the word optional mathematics I have a feeling of dislike	9.54	17.27	15.9	39.09	18.18	3.39
29. I am sure that I can solve all the problem of trigonometry	18.18	28.18	19.09	25.45	9.9	2.79
30. Optional mathematics is only for talent and rich student	10.9	23.63	17.27	29.09	19.09	3.21

The table 4.3 shows that the positive statement “I think I could do handle more difficult of optional mathematics” is significant and mean value is 3.49. A total of 33.63% students were strongly agreed, 23.63% student were agree and 14.54% students were neutral about this statement. This show that most of the students were positive about this statement.

The negative statement “optional mathematics is one of my most dreaded subject” is significant and mean value is 3.1, A total of 19.09% students were strongly disagreed, 28.18% student were disagree and 14.54% students were neutral in the statement. This show that most of the students were negative about this statement. On the negative statement “I am always confused in my optional mathematics class” is significant and mean value is 3.01, A total of 17.2% students were strongly disagreed, 30.9% student were disagree and 6.8% students were neutral in the statement . This show that most of the students were negative about this statement. On the positive statement “I am sure that I can solve all the problem of optional mathematics course” is significant and mean value is 3.34. A total of 19.09% students were strongly agreed, 39.09% student were agree and 12.72% students were neutral in the statement. This show that most of the students were positive about this statement. The positive statement “I am able to solve related problem continuity problem easily” is significant and mean value is 3.28, A total of 24.54% students were strongly agreed, 28.18% student were agree and 13.6% students were neutral in the statement. This show that most of the students were positive about this statement.

On the negative statement “my mind goes blank and I am unable to think clearly when working with optional mathematics” is significant and mean value is 3.11. A total of 19.09% students were strongly disagreed, 26.36% student were

disagree and 15.45% students were neutral in the statement. This show that most of the students were negative about this statement.

The negative statement “I am always under a terrible strain in optional mathematics class” is significant and mean value is 3.2. A total of 17.27% students were strongly disagreed, 30.9% student were disagree and 14.5% students were neutral in the statement. This show that most of the students were negative about this statement. The negative statement “when I hear the word optional mathematics I have a feeling of dislike” is significant and mean value is 3.39. A total of 18.18% students were strongly disagreed, 39.09% student were disagree and 15.9% students were neutral about this statement. This show that most of the students were positive about this statement.

The positive statement “I am sure that I can solve all the problem of trigonometry” is significant and mean value is 2.79. A total of 18.18% student were strongly agreed, 28.18% student were agree, and 19.09% student were neutral about this statement. This show that most of the students were negative about this statement.

The negative statement “Optional mathematics is only for talent and rich student” is significant and mean value is 3.21. A total of 19.09% student were strongly disagreed, 29.09% student were disagree, and 17.27% student were neutral about this statement. This show that most of the students were positive about this statement.

Hence, from the analysis and interpretation of each statement under the confidence scale, it was proved that majority of the students had highly confident towards studying optional mathematics. It was concluded that, secondary level student

of Rorang gaupalika at dhading district had positive perception towards optional mathematics.

Motivation of Students toward Optional Mathematics

There were 4 statement (31-34) related to motivation. The following table consists the motivation level of student toward optional mathematics and its corresponding weighted mean of the statements.

Table 4.4

Weighted Mean and Percentage of Perception of Motivation

Statement	SA %	A %	N %	DA %	SDA %	Mean
31. I am confidence that I could learn optional mathematics course for the further study	19.09	28.18	14.54	26.36	11.81	3.16
32. I can get good grade in optional mathematics	23.63	30.9	17.27	14.54	13.63	3.36
33. I do not know about optional mathematics but friend focus for me to take opt mathematics and then taken	19.09	28.18	18.18	20.9	13.63	3.8
34. Optional mathematics help me to study science and math in intermediate level	30.9	23.63	10.9	15.45	19.09	3.31

The table 4.4 shows that the positive statement “I am confidence that I could learn optional mathematics course for the further study” is significant and mean value is 3.16. A total of 19.09% students were strongly agreed, 28.18% student were agree and 14.5% students were neutral about this statement. This show that most of the students were positive about this statement.

The positive statement “I can get good grade in optional mathematics” is significant and mean value is 3.36, A total of 23.63% students were strongly agree, 30.9% student were agree and 17.27% students were neutral in the statement . This show that most of the students were positive about this statement.

The positive statement “ I do not know about optional mathematics but friend focus for me to take optional mathematics and then taken” is significant and mean value is 3.8, A total of 19.09% students were strongly agreed, 28.18% student were agree and 18.8% students were neutral about this statement. This show that most of the students were positive about this statement.

The positive statement “ optional mathematics help me to study science and math in intermediate level” is significant and mean value is 3.3, A total of 30.9% students were strongly agree, 23.6% student were agree and 10.9% students were neutral in the statement . This show that most of the students were positive about this statement.

Hence, from analysis of data, secondary level students were motivate about studying optional mathematics because it helps to study higher level course.

Comparison of Boy's and Girl's perception towards Optional Mathematics

The second objective of the study was to determine perception of secondary level students towards optional mathematics with gender. In order to achieve the objective the researcher analyzed the data of boys and girls perception distinctly which is presented below:

Table 4.5

Comparison of Boys and Girls Perception towards Option Mathematics

	N	Mean	S.D	d.f	t-value	Decision
Boys	130	3.26	0.4	118	3.54	
Girls	90	3.21	0.35			

Where

N = Sample size

Degree of freedom (d.f) = $N_1 + N_2 - 2 = 118$

Level of Significant () = 0.05

Therefore $t_{0.05, 118} = 1.96$

The null hypotheses is rejected if $-1.96 < t < 1.96$. Otherwise accepted

According to the above table, it shows that the mean perception score of boys and girls students were 3.26 and 3.21 respectively, the mean difference of two group is 0.05. It implies that the mean of boys' students is higher than girls' students. The stander deviation of boys and girls students were 0.4 and 0.35 respectively. The calculation t-value is 3.54, whereas the tabulated t-values is ± 1.96 at 0.05 level of significant which show that the calculation t-value is more than tabulated t-value.

Therefore the alternative hypotheses is accepted and null hypotheses is rejected. Thus it conclude that there is a significant different between boy's and girl's perception toward optional mathematics. According to theory gender does not effect in the studying but analysis of data, it showed that there has significance difference between gender wise perceptions towards optional mathematics

Comparison of Institutional and Government School Student's Perception towards Optional Mathematics

The third objective of the study was to determine perception of institutional and government school students towards optional mathematics. In order to achieve the objective, the researcher analyzed the data of institutional and community student's perception distinctly as presented below:

Table 4.6

Comparison of Institutional and Government School Student Perception towards Optional Mathematics

	N	Mean	S.D	d.f	t-value	Decision
Institutional	66	3.88	0.19	218	4.48	
Government	154	3.19	0.29			

Where

N = sample size

$$d.f. = N_1 + N_2 - 2 = 66 + 154 - 2 = 218$$

Level of significance () = 0.05

Therefore, $t_{0.05, 218} = 1.96$

The null hypotheses is rejected if $-1.96 < t < 1.96$. Otherwise accepted.

The analysis of the information mentioned in the above table represents there were 66 institutional school students and 154 government school students as sample. The grand mean response scores of institutional school students 3.88 and standard deviation 0.19. Similarity the grand mean response score of government school students 3.19 and standard deviation 0.29. The difference mean value score between these two groups is 0.69. The calculated t-value with respect to difference of mean

value score is 4.48 which is greater than tabulated t-value 1.96 at 0.05 level of significant. This show that the calculated t-value is more than tabulated t-value, therefore the alternative hypothesis is accepted and null hypothesis is rejected. Thus, I concluded that there is a significant different between perception of Institutional and Government school student's towards optional mathematics.

Factors Influencing Perception of Students towards Optional Mathematics

As per the objective, the interview schedule with open ended questions, were used as research tools I took open ended interview with the 5 students who did not study optional mathematics for finding factor influencing perception of student towards optional mathematics. Out of them, I selected 3 students from government and 2 students from institutional school, and recorded the answers of each students respectively in my cell phone. Each student's views were analyzed with the help of thematic approach based on triangulation method. According to this approach the student's views were analyzed and coded and following themes were developed.

-) Teacher-student interaction
-) Student's participation
-) Application of optional mathematics
-) Content knowledge
-) Important of optional mathematics

Teacher-student interaction. For learning, interaction between learner and the teacher is one of the most influencing factor. Without interaction teacher can't give proper knowledge and at the same time students can't get what actually they needs. Ironically, most of the optional mathematics teacher don't tend to interact with the students. Even if they ask question, they can't get the reasonable answers and punish

the students physically or verbally. To learn this, a question "*How does your optional math teacher punish you?*" Was asked to a student of government and institutional school respectively. Government school student said, "*Whenever we ask question teacher crosses the question that we do not know and punishes us so we do not interact and stay quite.*" In other half institutional student said "*teacher are boring and strict so we don't like to interact with them.*"

According to these statement and being a teacher myself I came in a conclusion of common answer, "*Teacher sometime punished us physically by caning or twisting the ears and less often verbally by abusing.*" Thus students can't hear the teachers. Though the teachers don't dominate the students' knowledge or willingly, most of the students don't prefer close relation with the teachers.

Student's participation. Student's participation is important factor that influences the perception of students towards optional mathematics. Whatever others do, far the lack of active participation of students, their learning activities can't be impressive as is expected. It applies everywhere and learning optional mathematics can't be an exception to it. I asked, "*Are you attending school regularly?*" to the government and institutional students respectively. Government students said that "*the distance between school and home is far and our family background is not good. I have to work in field along with my parents so I don't come regularly in school*". And institutional students said that "*yes, we attend class regularly except some program in home or when we are sick.*" from their views I concluded that regularity of institutional school students are slightly higher than government school students.

Application of optional mathematics. Mathematics is a practical subject which is very necessary in our daily lives. It can be used in buying and selling.

Calculating other things of day to day lives so in a quarry, "where do you use optional mathematics?" was enquired to students of institutional and government school respectively government students said. "*We don't have much information or knowledge about the use of this subject.*" Institutional students said. "*This subject might be useful in calculating and solving problem but we have not find it useful.*"

From these views we concluded *that* Most of them actually are unaware about the application of optional mathematics and found that they used it to solve their daily life problems but they do not know where they used. Students are learning about content of optional mathematics but they has not learn about its application in our daily life so that teacher also teach its application at teaching time.

Content knowledge. Most of the student were poor in mathematics.

Especially government school students are poor in content of optional mathematics. I asked a question that why they did not take optional mathematics in elective subject? Government school student said "*optional mathematics is very hard subject and only talent student can study however it's content is different and logical in comparison to compulsory mathematics* " Institutional school students said. "Optional mathematics is a hard subject and I get irritate whenever I see trigonometry and students who choose science in higher level only study this subject" It was found that answer of both institutional and government students were similar. Student said that, "*optional mathematic is a hard subject and I don't have more knowledge in mathematics and mostly I get irritate whenever I see trigonometry so I did not take it.*"

Important of optional mathematics. The importance is defined by the benefits or value of optional mathematics where we study it. I asked students of both institutional and government school. "What is the importance of optional

mathematics? "Government school students said *"if we study optional mathematics then we can learn mathematics in higher level. There is no necessity of optional mathematics if we take another subject Nepali, English etc."* And institutional school student said *"if we take optional mathematics then we can easily learn mathematics in higher level and can enter another field such as science and engineering."*

From responses of both government and institutional school student I concluded that *"If we study optional mathematics then we can easily learn mathematic in higher level and can study science, engineering, doctor etc. and we also can solve calculating problems easily in future."*

Chapter-V

CONCLUSIONS AND IMPLICATIONS

This chapter conveys the summary and finding of the study, conclusion and implication of the study based on the analysis and interpretation of data in previous chapter IV. Then finally the recommendation for future research areas are presented.

Summary and Finding of the Study

In the context of Nepal, more school's students are weak especially in optional mathematics. So many students fail in the SEE in this subject, It's due to lack of qualified teacher , lack of trained teacher , lack of teaching material due to backward society , due to lack of educated guardians all these factor becomes causes of low achievement in SEE examination. So that researcher had tried to study with purpose to determine. The factor that affect student's perception towards mathematics at Rorang Gaupalika in Dhading District. My research topic was "perception of student toward optional mathematics" and the main objective of this study were

-) To find the students perception towards optional mathematics
-) To find differentiate the perception of boys and girls students towards optional mathematics
-) To find differentiate the perception of institutional and government school students perception toward optional mathematics
-) To find factor influencing positive perception of student toward optional mathematics

For this study 220 students were taken from 8 community based school and 2 institutional school of Rorang Gaupalika at Dhading District were selected by the method of simple random sampling method. In the first phase researcher set the

closed ended 34 question for survey, to find the perception of students towards optional mathematics. For quantitative part researcher had used “Likert Attitudes Scale” for scoring the obtained data.

For survey researcher had prepared a questionnaire contains 34 items. The questionnaire is designed as five point Likert’s scale. In questionnaire 22 statements were positive and other 12 statements were negative. These statement were categorized in to four categories according to conceptual frame work. In each categories some question were included.

The t- test, weighted mean and percent of response for this statement was used to find the perception of students towards mathematics at grade IX and X.

Based on the analysis of data in chapter IV, the researcher found out the following findings

-) Weighed mean and percentage of response for the statement was used to find the perception of secondary level students towards optional mathematics, all statement are significant. Thus, the researcher found that the secondary level students had positive perception towards optional mathematics.
-) The weighted mean score of each statement related to usefulness. It also shows that most of students had positive perception towards optional mathematics course
-) The weighted mean score of each statement related to enjoyment. It also shows that most of students had positive perception towards optional mathematics course

-) The weighted mean score of each statement related to confident. From analysis of data, It also shows that most of students had positive perception towards optional mathematics course
-) The weighted mean score of each statement related to motivation. From analysis of data, It also shows that most of students had positive perception towards optional mathematics course
-) T-test was used to determine the significant different between mean perception score of boys and girls. It shows that they were significant different between boys and girls students perception towards optional mathematics course.
-) T-test was used to determine the significant different between mean perception score of institutional and government school students. It shows that they were significant different between institutional and government school students perception towards optional mathematics course.
-) The mean score of boy's student's perception towards optional mathematics was found higher than girls students
-) Factor influencing positive perception towards optional mathematics were teacher student interaction was not friendly, low student's participation, they feel content of optional mathematics were hard, unknown application of optional mathematics and it's important.

Conclusion of the Study

On the basis of finding, some very significant conclusion can be drawn about the perception of students towards optional mathematics. The secondary level students had positive perception towards optional mathematics as well as boys and girls have positive perception towards optional mathematics. The secondary level

boys and girls had similar perception towards optional mathematics. But mean perception score of boy's students is significantly different than that of girls. Perception of boy's students is better than the perception of girl's students towards optional mathematics in secondary level. Also perception of institutional school students is better than the government school students towards optional mathematics course in secondary level. They have to face so many problem due to which they couldn't get good grade in optional mathematics. Except some students, all remaining students had positive perception towards optional mathematics. It is also found that home environment, regularity, application of mathematics in daily life and teacher student's interaction were the main factor that affects student perception towards optional mathematics.

Thus, this research concluded that government should provide teaching material and teacher training. Parents should provide more time to practice at home. To create environment of regularity of student in school.

Recommendations for Further Study

The conclusions derived from the findings of this study leads to the following measures which would help to improve the teaching and learning situation in classroom and other areas of instruction towards optional mathematics.

-) The study is done only in Rorang Gaupalika at Dhading District. For generalization of case the study similar study should be done in a wider scope and large sample.
-) It is recommended to study the problem faced by the students in learning optional mathematics at secondary level.

-) School should provide free extra classes for those students who gets low marks.
-) Training are provided to all teachers and it should be made more practical.
-) Government should provide mathematical lab for every secondary level school.
-) Guardians should provide more time for practice to their children in home.
-) Government should provide optional mathematics book for all students in time.
-) Teacher should study the curriculum and follow the teacher's guideline during teaching.
-) Training are provided to all teachers and it should be made more effective.
-) Parent participation in school should be made more effective.
-) Curriculum should address the historical background of each unit.
-) To conduct special program encouraging students in optional mathematics.
-) This study would help to increase class participation of students in optional mathematics.

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APPENDIX- A

Survey Questionnaire

Dear students

I am from the central department of mathematics education, TU, Kirtipur to conduct a research on the “Perception of student towards optional mathematics”.

Which is for the partial fulfilment of the requirements for the degree of master of education. There are thirty two statements that you have to response. For each statement there are five choices. There are neither right nor wrong statement they only depend on your view. So please study the statement carefully and give your own opinion by putting Tick marks () on any one of the following,

Name:

class:

School:

Roll No:

S.N.	Statement	SA	A	N	DA	SDA
	Usefulness					
1	Optional mathematics help me to develop the mind and person think					
2	I will need optional mathematics for my future works					
3	I want after the studying new optional mathematics course to develop my mathematics skill					
4	I think all content of optional mathematics are important for further study					

5	Optional mathematics is useless subject in human life					
6	I think trigonometry is useful in further study					
7	I study optional mathematics because I know how useful it is.					
8	I believe studying optional mathematics because it helps me to problem solving in other area					
9	I don't expect to use much math I get out of school					
	Enjoyment					
10	I really like optional mathematics course					
11	Optional mathematics course has very interesting subject matter					
12	I have usually enjoy in studying new optional mathematics course in school					
13	Teacher use ICT to teach optional mathematics course					
14	My teacher have encouraged me to study more math					
15	I am comfortable answering questioning in optional mathematics class					
16	I like to solve new problem in optional					

	mathematics course					
17	Taking optional mathematics is waste of time					
18	I am happier in optional mathematics then in any other class					
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics					
20	All content are new so difficult to study					
	Confident					
21	I think I could do handle more difficult of optional mathematics					
22	Optional mathematics is one of my dreaded subject					
23	I am always confused in my optional mathematics class					
24	I am sure that I can solve all the problem of optional mathematics course					
25	I am able to solve related continuity problem easily					
26	My mind goes blank and I am unable to think clearly when working with optional mathematics					

27	I am always under a terrible strain in optional mathematics class					
28	When I hear the word optional mathematics I have a feeling of dislike					
29	I am sure that I can solve all the problem of trigonometry					
30	Optional mathematics is only for talent and rich student					
	Motivation					
31	I am confidence that I could learn optional mathematics course for the further study					
32	I can get good grade in optional mathematics					
33	I do not know about optional mathematics but friend friends focus for me to take opt mathematics and then taken					
34	Optional mathematics help me to study science and math in intermediate level					

SA= Strongly Agree A= Agree N= Neutral D=Disagree SD= Strongly Disagree

APPENDIX- B

Perception score of all students towards optional mathematics

S.N.	Statement	SA	A	N	DA	SDA	Total perception score	mean
	Usefulness							
1	Optional mathematics help me to develop the mind and person think	104	100	12	4	0	964	4.3
2	I will need optional mathematics for my future works	86	42	36	40	16	802	3.6
3	I want after the studying new optional mathematics course to develop my mathematics skill	78	56	21	35	30	777	5.9
4	I think all content of optional mathematics are important for further study	72	63	32	33	20	794	3.6
5	Optional mathematics is useless subject in human life	34	48	20	88	30	692	3.14

6	I think trigonometry is useful in further study	44	52	46	58	20	702	3.19
7	I study optional mathematics because I know how useful it is.	48	56	46	58	20	688	3.12
8	I believe studying optional mathematics because it helps me to problem solving in other area	42	78	18	40	30	686	3.12
9	I don't expect to use much math I get out of school	40	68	16	78	18	626	2.8
	Enjoyment							
10	I really like optional mathematics course	30	80	26	56	28	688	3.12
11	Optional mathematics course has very interesting subject matter	42	62	30	44	42	678	3.08
12	I have usually enjoy in studying new optional mathematics course in school	38	92	15	55	20	733	3.3

13	Teacher use ICT to teach optional mathematics course	6	33	20	83	78	466	2.1
14	My teacher have encouraged me to study more math	86	56	16	34	28	798	3.6
15	I am comfortable answering questioning in optional mathematics class	26	92	22	44	36	688	3.12
16	I like to solve new problem in optional mathematics course	32	62	32	51	43	649	2.9
17	Taking optional mathematics is waste of time	22	36	22	58	82	802	3.6
18	I am happier in optional mathematics then in any other class	38	84	46	22	30	738	3.3
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics	48	62	40	31	39	709	3.2

20	All content are new so difficult to study	62	48	26	42	42	614	2.79
	Confident							
21	I think I could do handle more difficult of optional mathematics	74	52	32	32	30	768	3.4
22	Optional mathematics is one of my dreaded subject	38	46	32	62	42	684	3.1
23	I am always confused in my optional mathematics class	42	57	15	68	38	663	3.01
24	I am sure that I can solve all the problem of optional mathematics course	42	86	28	34	30	736	3.3
25	I am able to solve related continuity problem easily	54	62	30	40	34	722	3.28
26	My mind goes blank and I am unable to think clearly when working with optional mathematics	30	56	34	58	42	686	3.1

27	I am always under a terrible strain in optional mathematics class	42	52	32	68	38	684	3.01
28	When I hear the word optional mathematics I have a feeling of dislike	21	38	35	86	40	746	3.3
29	I am sure that I can solve all the problem of trigonometry	40	62	42	56	20	614	2.7
30	Optional mathematics is only for talent and rich student	24	52	38	64	42	708	3.2
	Motivation							
31	I am confidence that I could learn optional mathematics course for the further study	42	62	32	58	26	696	3.16
32	I can get good grade in optional mathematics	42	68	38	46	30	740	3.3
33	I do not know about optional mathematics but friend friend focus for me to take opt mathematics and then taken	42	62	40	46	30	620	2.8

34	Optional mathematics help me to study science and math in intermediate level	68	52	24	34	42	730	3.3
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APPENDIX-C

Perception score of boy students towards optional mathematics

S.N.	Statement	SA	A	N	DA	SDA	Total perception score	mean
	Usefulness							
1	Optional mathematics help me to develop the mind and person think	60	60	8	2	0	568	4.36
2	I will need optional mathematics for my future works	39	36	20	25	10	459	3.5
3	I want after the studying new optional mathematics course to develop my mathematics skill	45	30	13	22	20	448	3.4
4	I think all content of optional mathematics are important for further study	42	35	21	20	12	465	3.5
5	Optional mathematics is useless subject in human life	18	30	10	52	20	416	3.2
6	I think trigonometry is useful in further study	22	32	30	34	12	408	3.1
7	I study optional	32	30	13	35	20	409	3.1

	mathematics because I know how useful it is.							
8	I believe studying optional mathematics because it helps me to problem solving in other area	24	44	10	24	18	392	3.01
9	I don't except to use much math I get out of school	28	42	8	42	10	354	2.7
	Enjoyment							
10	I really like optional mathematics course	21	48	15	30	16	418	3.2
11	Optional mathematics course has very interesting subject matter	24	38	17	26	25	400	3.07
12	I have usually enjoy in studying new optional mathematics course in school	22	58	8	30	12	438	3.3
13	Teacher use ICT to teach optional mathematics course	4	20	10	48	48	274	2.1
14	My teacher have encouraged me to study more math	57	28	9	20	16	480	3.6
15	I am comfortable answering	14	50	12	26	28	386	2.9

	questioning in optional mathematics class							
16	I like to solve new problem in optional mathematics course	18	36	18	28	30	374	2.8
17	Taking optional mathematics is waste of time	14	22	13	25	46	467	3.5
18	I am happier in optional mathematics then in any other class	20	50	28	13	19	429	3.3
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics	28	38	24	18	22	422	3.2
20	All content are new so difficult to study	36	30	17	24	23	358	2.7
	Confident							
21	I think I could do handle more difficult of optional mathematics	49	28	18	17	18	463	3.5
22	Optional mathematics is one of my dreaded subject	25	22	20	38	25	406	3.1

23	I am always confused in my optional mathematics class	25	35	8	40	22	389	3
24	I am sure that I can solve all the problem of optional mathematics course	28	48	16	20	18	438	3.3
25	I am able to solve related continuity problem easily	33	36	17	24	20	428	3.2
26	My mind goes blank and I am unable to think clearly when working with optional mathematics	17	32	19	32	30	416	3.2
27	I am always under a terrible strain in optional mathematics class	24	30	16	38	22	394	3
28	When I hear the word optional mathematics I have a feeling of dislike	13	21	20	54	22	441	3.3
29	I am sure that I can solve all the problem of trigonometry	24	38	25	34	9	424	3.2
30	Optional mathematics is only for talent and rich student	14	34	20	36	26	416	3.2
	Motivation							
31	I am confidence that I could learn optional mathematics	26	36	18	35	15	413	3.2

	course for the further study							
32	I can get good grade in optional mathematics	30	40	24	18	18	436	3.3
33	I do not know about optional mathematics but friend friend focus for me to take opt mathematics and then taken	28	30	24	30	18	370	2.8
34	Optional mathematics help me to study science and math in intermediate level	39	30	15	20	26	426	3.3

APPENDIX- D

Perception score of girl's students towards optional mathematics

S.N.	Statement	SA	A	N	DA	SDA	Total perception score	mean
	Usefulness							
1	Optional mathematics help me to develop the mind and person think	44	40	6	2	0	402	4.47
2	I will need optional mathematics for my future works	37	16	16	15	6	332	3.69
3	I want after the studying new optional mathematics course to develop my mathematics skill	33	26	8	13	10	329	3.67
4	I think all content of optional mathematics are important for further study	30	28	11	13	8	329	3.67
5	Optional mathematics is useless subject in human life	16	18	10	36	10	276	3.07
6	I think trigonometry is useful in further study	22	20	16	24	8	294	3.27
7	I study optional	16	26	11	25	12	279	3.07

	mathematics because I know how useful it is.							
8	I believe studying optional mathematics because it helps me to problem solving in other area	12	26	8	16	14	296	3.27
9	I don't except to use much math I get out of school	12	26	8	36	8	272	3.02
	Enjoyment							
10	I really like optional mathematics course	9	32	11	26	12	270	3.02
11	Optional mathematics course has very interesting subject matter	18	24	13	18	17	278	3.08
12	I have usually enjoy in studying new optional mathematics course in school	7	34	25	8	16	295	3.28
13	Teacher use ICT to teach optional mathematics course	2	13	10	25	30	165	1.87
14	My teacher have encouraged me to study more math	29	28	7	14	12	318	3.53
15	I am comfortable answering	12	42	10	18	8	302	3.36

	questioning in optional mathematics class							
16	I like to solve new problem in optional mathematics course	14	26	14	23	13	275	3.06
17	Taking optional mathematics is waste of time	8	14	9	23	36	335	3.7
18	I am happier in optional mathematics then in any other class	18	34	18	9	11	309	3.4
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics	20	24	16	13	17	287	3.19
20	All content are new so difficult to study	26	18	9	18	19	256	3.8
	Confident							
21	I think I could do handle more difficult of optional mathematics	25	24	14	15	12	305	3.3
22	Optional mathematics is one of my dreaded subject	13	24	12	24	17	278	3.07

23	I am always confused in my optional mathematics class	17	22	7	28	16	274	3.06
24	I am sure that I can solve all the problem of optional mathematics course	14	38	12	14	12	298	3.3
25	I am able to solve related continuity problem easily	21	26	13	16	14	294	3.27
26	My mind goes blank and I am unable to think clearly when working with optional mathematics	13	24	15	26	12	270	3
27	I am always under a terrible strain in optional mathematics class	18	12	16	30	16	290	3.2
28	When I hear the word optional mathematics I have a feeling of dislike	8	17	15	32	18	305	3.3
29	I am sure that I can solve all the problem of trigonometry	16	24	17	22	11	282	3.1
30	Optional mathematics is only for talent and rich student	10	18	18	28	16	292	3.2
	Motivation							
31	I am confidence that I could learn optional mathematics	16	26	14	23	11	283	3.14

	course for the further study							
32	I can get good grade in optional mathematics	22	28	14	14	12	304	3.37
33	I do not know about optional mathematics but friend friend focus for me to take opt mathematics and then taken	14	32	16	16	12	250	2.7
34	Optional mathematics help me to study science and math in intermediate level	29	22	9	14	16	304	3.3

APPENDIX- E

Perception score of government students towards optional mathematics

S.N.	Statement	SA	A	N	DA	SDA	Total perception score	mean
	Usefulness							
1	Optional mathematics help me to develop the mind and person think	32	48	20	30	24	496	3.2
2	I will need optional mathematics for my future works	44	30	26	24	30	496	3.2
3	I want after the studying new optional mathematics course to develop my mathematics skill	36	44	22	28	24	502	3.2
4	I think all content of optional mathematics are important for further study	36	42	24	24	28	496	3.2
5	Optional mathematics is useless subject in human life	22	32	24	42	36	506	3.2
6	I think trigonometry is useful in further study	54	30	18	30	24	528	3.4
7	I study optional	38	32	22	36	26	482	3.1

	mathematics because I know how useful it is.							
8	I believe studying optional mathematics because it helps me to problem solving in other area	36	38	25	30	25	492	3.1
9	I don't except to use much math I get out of school	20	32	24	36	42	510	3.3
	Enjoyment							
10	I really like optional mathematics course	44	38	26	30	16	526	3.4
11	Optional mathematics course has very interesting subject matter	36	38	28	25	27	493	3.2
12	I have usually enjoy in studying new optional mathematics course in school	46	36	20	28	24	514	3.3
13	Teacher use ICT to teach optional mathematics course	18	22	20	46	48	378	2.4
14	My teacher have encouraged me to study more math	32	30	46	24	22	488	3.1
15	I am comfortable answering	46	32	30	22	24	516	3.3

	questioning in optional mathematics class							
16	I like to solve new problem in optional mathematics course	38	36	25	35	20	499	3.2
17	Taking optional mathematics is waste of time	4	16	20	46	48	520	3.3
18	I am happier in optional mathematics then in any other class	42	46	18	20	4	492	3.1
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics	25	48	38	21	30	500	3.2
20	All content are new so difficult to study	38	40	21	25	30	431	2.7
	Confident							
21	I think I could do handle more difficult of optional mathematics	36	38	25	35	20	497	3.2
22	Optional mathematics is one of my dreaded subject	27	29	36	30	32	473	3

23	I am always confused in my optional mathematics class	32	16	20	40	46	514	3.3
24	I am sure that I can solve all the problem of optional mathematics course	28	35	20	36	35	447	2.9
25	I am able to solve related continuity problem easily	46	38	18	28	24	516	3.3
26	My mind goes blank and I am unable to think clearly when working with optional mathematics	18	38	16	40	42	512	3.3
27	I am always under a terrible strain in optional mathematics class	26	49	10	49	20	450	2.9
28	When I hear the word optional mathematics I have a feeling of dislike	32	25	20	47	30	480	3.1
29	I am sure that I can solve all the problem of trigonometry	32	25	20	47	30	412	2.6
30	Optional mathematics is only for talent and rich student	52	36	16	30	20	392	2.5
	Motivation							
31	I am confidence that I could learn optional mathematics	54	48	10	22	20	556	3.6

	course for the further study							
32	I can get good grade in optional mathematics	52	56	18	14	12	578	3.7
33	I do not know about optional mathematics but friend friend focus for me to take opt mathematics and then taken	36	46	20	30	22	418	2.7
34	Optional mathematics help me to study science and math in intermediate level	58	56	12	20	18	608	3.9

APPENDIX-F

Perception score of all institutional students towards optional mathematics

S.N.	Statement	SA	A	N	DA	SDA	Total perception score	Mean
	Usefulness							
1	Optional mathematics help me to develop the mind and person think	30	20	10	6	0	272	4.1
2	I will need optional mathematics for my future works	25	25	8	6	2	263	3.9
3	I want after the studying new optional mathematics course to develop my mathematics skill	20	26	6	10	4	266	4
4	I think all content of optional mathematics are important for further study	20	28	7	8	3	252	3.8
5	Optional mathematics is useless subject in human life	1	5	10	20	30	271	4.1
6	I think trigonometry is useful in further study	18	32	6	6	4	252	3.8
7	I study optional	16	28	12	7	3	245	3.7

	mathematics because I know how useful it is.							
8	I believe studying optional mathematics because it helps me to problem solving in other area	22	28	4	8	4	254	3.8
9	I don't except to use much math I get out of school	1	7	8	18	32	271	4.1
	Enjoyment							
10	I really like optional mathematics course	28	22	6	8	2	264	4
11	Optional mathematics course has very interesting subject matter	32	18	10	3	3	271	4.1
12	I have usually enjoy in studying new optional mathematics course in school	20	26	8	6	6	246	3.7
13	Teacher use ICT to teach optional mathematics course	16	28	12	4	6	242	3.6
14	My teacher have encouraged me to study more math	28	26	10	2	0	278	4.2
15	I am comfortable answering	22	24	12	6	2	256	3.8

	questioning in optional mathematics class							
16	I like to solve new problem in optional mathematics course	22	28	4	4	8	250	3.7
17	Taking optional mathematics is waste of time	2	2	8	22	32	278	4.2
18	I am happier in optional mathematics then in any other class	24	26	12	2	2	266	4.03
19	I am comfortable expressing my own ideas on how to take for solution to difficult problem in optional mathematics	22	24	8	8	4	250	3.7
20	All content are new so difficult to study	7	8	9	18	24	242	3.6
	Confident							
21	I think I could do handle more difficult of optional mathematics	16	18	20	8	4	232	3.5
22	Optional mathematics is one of my dreaded subject	4	4	8	26	24	248	3.9

23	I am always confused in my optional mathematics class	0	2	10	26	28	278	4.2
24	I am sure that I can solve all the problem of optional mathematics course	27	26	4	5	4	265	4
25	I am able to solve related continuity problem easily	25	20	8	7	6	249	3.7
26	My mind goes blank and I am unable to think clearly when working with optional mathematics	8	8	2	18	30	252	3.8
27	I am always under a terrible strain in optional mathematics class	3	3	12	22	26	263	3.9
28	When I hear the word optional mathematics I have a feeling of dislike	6	8	6	26	20	244	3.6
29	I am sure that I can solve all the problem of trigonometry	18	28	7	7	6	243	3.6
30	Optional mathematics is only for talent and rich student	3	16	5	20	22	240	3.6
	Motivation							
31	I am confidence that I could learn optional mathematics	24	32	2	3	5	265	4

	course for the further study							
32	I can get good grade in optional mathematics	20	18	12	10	6	234	3.5
33	I do not know about optional mathematics but friend friend focus for me to take opt mathematics and then taken	2	12	2	18	32	264	4
34	Optional mathematics help me to study science and math in intermediate level	32	16	10	2	6	264	4

Appendix -G

Statistical Formula Used for Data Analysis

1) For positive statement

Strongly agree	Agree	Neutral	Disagree	Strongly agree
5	4	3	2	1

Total score= No of strongly agree×5+No of agree×4+No of neutral×3+No of disagree×2+No of strongly disagree×1

For negative statement

Strongly agree	Agree	Neutral	Disagree	Strongly agree
1	2	3	4	5

Total score= No of strongly agree×1+No of agree×2+No of neutral×3+No of disagree×4+No of strongly disagree×5

Weighted mean= $\frac{\text{Total score}}{\text{Total student}}$

$$2) \quad t = \frac{\bar{X}_1 - \bar{X}_2}{Sp \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$\text{Where, } Sp = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$$

\bar{X}_1 = mean score of boys students

\bar{X}_2 = Mean score of girls students

n_1 = Number boys students

n_2 = Number of girls students

S_1^2 = Variance of boy's students

S_2^2 = variance of girls students