

PROBLEMS FACED BY TEACHERS AND STUDENTS IN TEACHING
LEARNING MATHEMATICS IN ENGLISH MEDIUM

A
THESIS

BY
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FOR THE PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE
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LETTER OF CERTIFICATE

This is to certify that Mr. Arjun pal, a student of academic year 2072/073 with Campus Roll No. 443, Exam Roll No.7228247, Thesis No. 1435 and T.U. Registration No. 9-2-306-94-2012 has completed this thesis under my supervision and guidance of prof. Dr. Binod Prasad Dhakal during the period prescribed by the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. The thesis entitled on "**Problems Faced by Teacher and Students in Teaching Learning Mathematics in English Medium**" embodies the results of his investigation conducted during the prescribed period under the Department of Mathematics Education, Cental Department of Education, Univercity Campus, Kirtipur, Kathmandu, Nepal. I recommend and forward this thesis for the evaluation as the partial requirements to award the degree of Master of Education.

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Prof. Dr. Bed Raj Acharya

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LETTER OF APPROVAL

This thesis entitled “**Problems Faced by Teachers and Students in Teaching Learning Mathematics in English Medium**” submitted by Mr. Arjun Pal 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. Arjun Pal has completed his thesis entitled
**"Problems Faced by Teachers and Students in Teaching Learning Mathematics
in English Medium"** under my supervision during the period prescribed the rules and
regulation of Tribhuvan University, Kirtipur, Kathmandu, Nepa. I recommended and
forward his thesis to the Department of Mathematics Education to evaluate in final
viva-voce.

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Date: 3 Feb. 2022

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DEDICATION

I want to dedicate this thesis to my grandfather Mr. Santaram Pal and grandmother Mrs. Sarswati Pal who devoted their entire life for my study and made me what I am today.

DECLARATION

I hereby declare that to the best of my knowledge this thesis is original and this thesis contains no material which has been accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

.....

Mr. Arjun Pal

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ABSTRACT

This is a qualitative study based on ethnography research design entitled "**Problems Faced by Teachers and Students in Teaching Learning Mathematics in English Medium**" conducted in Rupandehi district. The objective of this study were to analyze the perception of the teacher and students on the role of English language in teaching learning mathematics and to explore the kind of problem in teaching learning mathematics in English language. To achieve the accurate information 4 students and 2 teachers were selected purposively as research population. For collecting the data an interview schedule and observation tool were used. Interview and observation conducted on the basis of pre developed questionnaire and observation form respectively. The collected data translated in English, created theme, categorized on the basis of objectives and finally interpreted with related theory. Based on the interpretation and analysis of the data, it is found that both teacher and students agreed and realized that the English language hindered in teaching learning mathematics. Students having weak English competency struggled on conceptualizing, comprehending, memorizing, presentation and understanding the mathematical terms, definition and concepts meaningfully. There was lack of proper communication and interaction between teacher and students who came from Nepali background. Nepali's background students required more explanation and Nepali translation for lingual problem and mathematical terms and content. Finally it concluded that English medium of instruction is one of the major reason for less understanding, conceptualizing, memorizing and comprehending. And it is also the major cause for less achievement and promoting mathematical anxiety.

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ABBREVIATION

NTCM	:	National Council of Teacher of Mathematics
SMC	:	School Management Committee
CDC	:	Curriculum Development Center
NESB	:	Non-English Background Students
SPSS	:	Statistical Package for the Social Science
SEE	:	School Education Examination
SLC	:	School Leaving Certificate
B. Ed.	:	Bachelor of Education
M. Sc.	:	Masters of Science
T. U.	:	Tribhuvan University

Chapter-I

INTRODUCTION

Background of the Study

Mathematics is often called backbone of education and fundamental component of literacy. It is the study of quantity, structure, space and change. Mathematics is the gate way and critical filter to the study for further study and employment. Mathematics is the heart of many successful careers and successful lives (NTCM, 1998).

Language is formal system of sign governed by grammatical rules of the combination to communicate meaning (Khalid, 2007). This definition stress that human language can be described as closed structural system consisting of rules that relate particular sign to particular meaning. It plays the role in socialization process of any child. Every child has their own mother language which is learned socially and we can't ignore the role of language even in the classroom.

Language is a very important tool for communication. Hence teaching and learning can only take place when the right and appropriate language is selected and used as the medium of instruction in school. This means that the teaching and learning process should be conducted in appropriate, right, clear, and familiar environment to achieve desirable results. The overall process of teaching and learning had centered on the language. Various studies have indicated that the language problem is one of the major factors contributing towards poor performance, poor comprehension and poor participation of many students (Barton & Barton 2005).

The result all point to the fact that linguistic factor has significant effect on learning. Language makes it possible for the child to objectify and conceptualize his word and himself and to share the responsibility for his density. Hence language has

taken as a prime vehicle of expression and exchange the thought in the classroom. (Bokari & Yushau, 2005) state that student can't meet the desired objective of their study due to the lack of communication skill and also keep teachers in big dilemma on how to correctly access the source of students difficulties.

Nepal is home for a diversity of people, cultural, religious and language. Nepal is multicultural and multilingual country. So, the nature of Nepalese classroom is multicultural and multilingual at each level. Hence it is very difficult for policy maker, curriculum designer, book writer school management committee (SMC), teacher and other responsible person to select appropriate and familiar medium to each students. Medium of instruction in the context of study is primarily as means of delivering course content. The curriculum of grade 11 & 12 in Nepal has designed and implemented by curriculum development center (CDC). It designed mathematics curriculum of grade 11 & 12 in English language and also the text book and reference materials are developed in the same language. So the majority to the students are taught in English language during their higher level. Most of the school forced the teachers to do not use Nepali language in their classroom which really affect the student achievement. Especially those students who had passed their secondary level in Nepali medium. And also keep teacher in big dilemma on how to correctly access the source of student difficulty.

Based on this crucial educational matter the question may arise - how students with different and weak language background develop a mechanism to adjust in difficult lingual environment? This question inspired and motivated me to take this question and performed a deep study on this question. It is not single reason there are several other reasons that force me to select this topic. My own experience also helps to select this topic for in- depth study because I have been passed my secondary

school level from Nepali medium. So English may cause of hindrance in learning mathematic because my English is not so good. I had struggled with the language deficiency. So it is an interesting matter to study that as me other Nepali medium students struggle with the language deficiency or not in learning mathematics

Statement of the Problem

Teacher and students are facing varieties of problems during teaching learning process of different topic. Among the varieties of problems language problem is one of the major problems faced by higher level mathematics teacher and students especially those who had passed their secondary school level from Nepali medium. From a long period many researches are concerned with ethnic, culture, linguistic minorities and the achievement of these groups in learning mathematics. Only few studies have been done on the language problem in teaching learning mathematics at grade 11 & 12. But didn't present the language problem in teaching learning mathematics in English medium in recent period. So, this research is conduct to search for what kind of problem they face due to English as the language of instruction.

Objective of the Study

This research tries to explain or describe the effect of English language in teaching learning process in grade XI mathematics. The objective of the study is point out as follows:

- To analyze the perception of the teacher and students on the role of English language in teaching and learning mathematics,
- To explore the problems in teaching learning mathematics in English language.

Research Questions

The main aim of this study was to find out the problems faced by Nepali medium learners learning mathematics in English medium at higher level. The main research question of this study is “How can English language generate or create the problem in mathematics teaching learning for Nepali medium learners studying mathematics in grade 11 & 12. To get the precise answer, I had divided this question in to sub-questions. The sub questions are as follows:

- How do teacher perceive the role of English language in teaching mathematics?
- How do student perceive the role of English language in learning mathematics?
- What problems faced by Nepali medium learners in learning mathematics in English language?
- What problems faced by teachers in teaching mathematics in English language?

Justification of the Study

This study would inform about the perception of teacher and students on the role of English language on teaching and learning mathematics and explore the problem faced by Nepali medium learners studying mathematics in grade 11 & 12. This information should be helped to the related people to conduct the following activities:

- It would helpful for curriculum designer, policy maker and administrator educationist to select appropriates language,
- It would help to the teacher to apply appropriate strategies to teach mathematics that helps Nepali medium students to understand,

- It should be helped to decide difficulty level of the language to the book writer and reference material designer,
- It would be helped for carry out the related research to interested researcher.

Delimitations of the Study

Any study can't overcome all the fields so study has some limitation as follows:

- This study was limited in Rupandehi district,
- This study would only focus on English language's effects in mathematics teaching and learning,
- The study population would be drawn from two public school of Rupandehi district taking the population in to consideration with line with the stated objective,
- Four students and two teachers were included in this study,
- This study included only grade XI students who passed their secondary level from Nepali medium and teacher who taught at that grade,
- The result of this study could no more generalize because it took small sample with in short time period.

Operational Definition of Terminology

Problem. Problem are that things which is difficult to deal with or to understand the subject matter during learning mathematics. In this study problem refers to language difficulties of grade 11 & 12 in mathematics teaching and learning.

Medium. Medium is a language which is use for teaching or the language use to deliver the subject matter is called medium.

Teacher. The teacher is a person who teaches mathematics full time or part time in grade 11 & 12 after completing the master degree with training.

Learners. The learner is a person who learns mathematics in grade 11 & 12.

Curriculum. Curriculum refers to the set of the course designed for the students and teacher to achieve the fixed goal.

Teaching and Learning. Instruction between teachers and students acquiring new skill or concept.

Teaching Policy. Law guiding teaching and learning process in Nepal in grade 11 & 12 mathematics.

Proficiency. Advancement in Knowledge or skill.

Perception. The ability to see or become aware of something through the senses. In this study perception refers to the viewpoint of teacher and students on the effect of English language in teaching learning mathematics.

Chapter-II

REVIEW OF RELATED LITERATURE

Literature review is the study of researches done by other people closely related to the researcher topic of the study. The main purpose of review of related literature is to find out what works had been done so far in the area of the study being taken. It guides how to carry out the research from beginning to end. It helps to find related theory, frame the theoretical and conceptual framework, helps to select appropriate design, tools and techniques. Also provide idea for data collection and analysis. Within this assumption some works on relating topic are presented.

Empirical Review

Nancy (2009) in this research “Language difficulties in mathematics courses for students from non- English speaking backgrounds” investigated the role of language in mathematics and difficulties faced by second language learners in grappling with the specialized vocabulary and discourse feature of mathematics. To conduct the study a mixed method, interpretive case study methodology was used. The research was conducted in three parts that looked at reading and writing from different angle and enable the use of multiple methods for corroborating result by triangulation. This study has identified several language difficulties experienced by Non-English backgrounds (NESB) students of mathematics. Language background effect on the nature and level of difficulties experienced by students.

Nath (2009) in his research “Language issues in teaching & learning of mathematics” discussed about the important and role of language in mathematics teaching and learning. He concludes the result by reviewing the related literature and writes the conclusion of many researches. As a result he concluded that language

makes possible for the child to objectify and conceptualize his world and himself.

Language is a prime vehicle of expression and exchange of thought in the classroom.

Bajracharya (2011) conducted a study on "Relationship between student's mathematics achievement and medium of classroom instruction". The objective of the study was to find the relation between mathematics achievement and medium of instruction in the classroom teaching. This study based on class eight students of Kathmandu valley. The researcher has followed Ross's sampling guideline and selected 390 students from 26 schools as the sample of this study. To collect the data as tools he used achievement test and interview with teacher. The reliability of the achievement test was 0.87 and the validity of the achievement test was determined by the means of expert judgments. The obtained data was analyzed by SPSS program. As result he found English medium of instruction in the classroom teaching mathematics was better than the Nepali medium of instruction in classroom teaching mathematics

Rambely, Ahmed, Majid & Jaaman (2013) conducted a research "The relationship of English proficiency and mathematics achievement" this study aimed to investigate the relationship between English proficiency and mathematics achievement. The sample of the study is taken from a population of students from faculty of science and technology. Chi square analyses conducted to test the significance of the relationship between two variables. The result showed that good mastering of English is needed to understand mathematics subject and to achieve excellent result. Furthermore, low English proficiency resulted in students experiencing a shortage in mathematics learning and obtains a lower grade in mathematics course.

Rijal (2014) in his study tried to explore "Problems faced by higher secondary level mathematics teacher in curriculum implementation". The nature of

this study is quantitative and qualitative. To collect the data the researcher use the tools: questionnaire, interview guidelines. He took 42 mathematics teachers from all the higher secondary school in Salyan district who taught in grade eleven as a sample of the study. As a result the researcher found lack of training, class environment and unavailability of reference teaching materials and backgrounds of the students faced in implementation of curriculum in higher secondary level.

Chiluwal (2014) in his study “Language problems faced by students in Learning Mathematics at Higher Secondary Level” aimed to explore the understanding of mathematics and English language influences in teaching learning mathematics at higher secondary level. To achieve the purpose he had used ethnography method of inquiry in small sample size: three students and three teachers. As data collection tool he had used interview schedule and observation. And concluded that language problem is one of the major problem in teaching learning mathematics. English medium of instruction promotes the mathematics understanding, mathematical anxiety and classroom teaching and learning activities.

Paudel (2015) in her study “Problem faced by mathematics teachers at higher secondary” tried to find the cause of the problem which are faced by mathematics teacher at higher secondary level of Ramechhap district. The descriptive survey design was adopted to conduct the study for convenience. The nature of the study was quantitative design. To collect the data researcher use the tool: questionnaire, observation form and interview schedule. For her research she selected thirty higher secondary school level teachers. As a result she found : problem related to classroom management, problem related to mathematical instruction, methods and materials, problem related to medium of instruction, problem related to teacher proficiency and

professional development, problem related to teacher training and it's transfer in classroom teaching, problem related to Evaluation.

Sarabi and Gafoor (2017) conducted a research on “Linguistic challenges and it's influences on perceived difficulty in mathematics learning”. In his study the researcher selected two hundred students (90 boys and 110 girls) from 7th standards of Malappuram district of Kerala. The finding of this study: difficulty generated by the components of mathematical vocabulary, morphology and programmatic are contributing to perception of mathematics as a difficult subject. Most mathematics teachers look in required preparation for providing support that learners require to meaningfully learn mathematics.

Shaheen (2017) in his research “Effect of change in medium of instruction on academic achievement of students” investigated that either change in medium of instruction affect academic achievement of students. Survey method was used as the procedure for the data collection. A self-developed structured open ended questionnaire comprising was used in order to get response of the students regarding change in the medium of instruction. As a result he concluded that medium of instruction has an impact on students' academic achievement. The other factor which affect the student's academic achievement those are level of satisfaction, role of teacher and less proficiency in English.

All the reviewed literature indicates that language is the prime vehicle of instruction. Among the myriads of the problem during teaching learning mathematics language is the one of the significant problem. From the long period many researches were conducted in the field of language problem in teaching learning mathematics at different level and in different ethical groups. Also some comparative study had been done on the achievement of mathematics in different languages. To find out the result

most of the researcher used mixed method research design, some were used quantitative and some were qualitative. As research tool they used interview schedule, observation form, achievement test and present the result in table, pie chart, bar chart and descriptively also. That helps to the researcher to carry out the research from beginning to end. It guide to select the appropriate design, tools and techniques, sample of the study and also provide the idea for data collection and analysis.

In Nepal the higher level mathematics curriculum designed in English language and the medium of instruction is also English that might be cause of problem in teaching and learning mathematics. Many studies had been done on language difficulties in mathematical course from Non-English Background and Languages issues in Teaching and Learning of Mathematics in different level in different country. This study tried to explore the problems faced by students who learned mathematics in Nepali up to class ten and study mathematics in higher level. Also, the problem faced by the teacher who taught those students in grade XI. In the context of Nepal only few studies could be found on the language problems in teaching learning mathematics. I couldn't found any deep study had been done on the language problem in teaching learning mathematics in English medium in present time. So, this study was different to others on different topic like level, methodology, time, population of the study, method of analysis of the data e.t.c. Therefore the researcher decided to conduct a deep study on the topic language problem faced by Nepali medium learner learning mathematics.

Theoretical Review

This study was formed within constructivism theory. Constructivism is a cognitive learning theory with a distinct focus on the mental process that constructs reasoning which leads to the action they take (Acharya, 2015). So, in learning

mathematics a learner relates known patterns which lead to new ones. In constructivist philosophical approach, learning takes place through interaction and negotiation.

Language is the key mean of negotiation and interaction. The mutual capability in our use of the words and language is of course the result of social interaction. The student who are acquiring a language of interaction as well as learning mathematics in the new language, for them language is another sources of difficulties and confusion in learning mathematics.

The symbolic form of mathematics and language metaphor dazzle badly on the students understanding and compelled them toward rote learning without conceptual understanding. Some works on understanding of child has given a drastic way out in child psychological development. Piaget, Bruner, Vygotsky, Hart and Skemp are some key person looked at understanding through different perspective. In all these studies language is seen as a necessary condition for understanding and means of expressing our thought while the later would imply that language determines and is prerequisite for the thought.

Conceptual Framework

A conceptual framework is the representation of the understanding of the theories by the researchers and his/her own conceptualization of the relationship between variables. A conceptual framework is presented either graphical or narrative form which depicts the relation between the variables. This conceptual framework has been developed through brain storming with the help of some books and several literature related to this topic has reviewed. The researcher intended to learn how language facilitate in learning in this inter-personal and intra-personal characteristics and what perception made by theories. In this study the researcher search for how language proficiency enhance the learner ability toward mathematics will be observed

through the four skill of language i.e. listening, speaking, reading and writing. The individual language capability reflects his/her pace of learning mathematics in higher education. During this study I am keen interested how language is interlinked with mathematics learning. The diagrammatic representation of the conceptual framework is presented bellow;

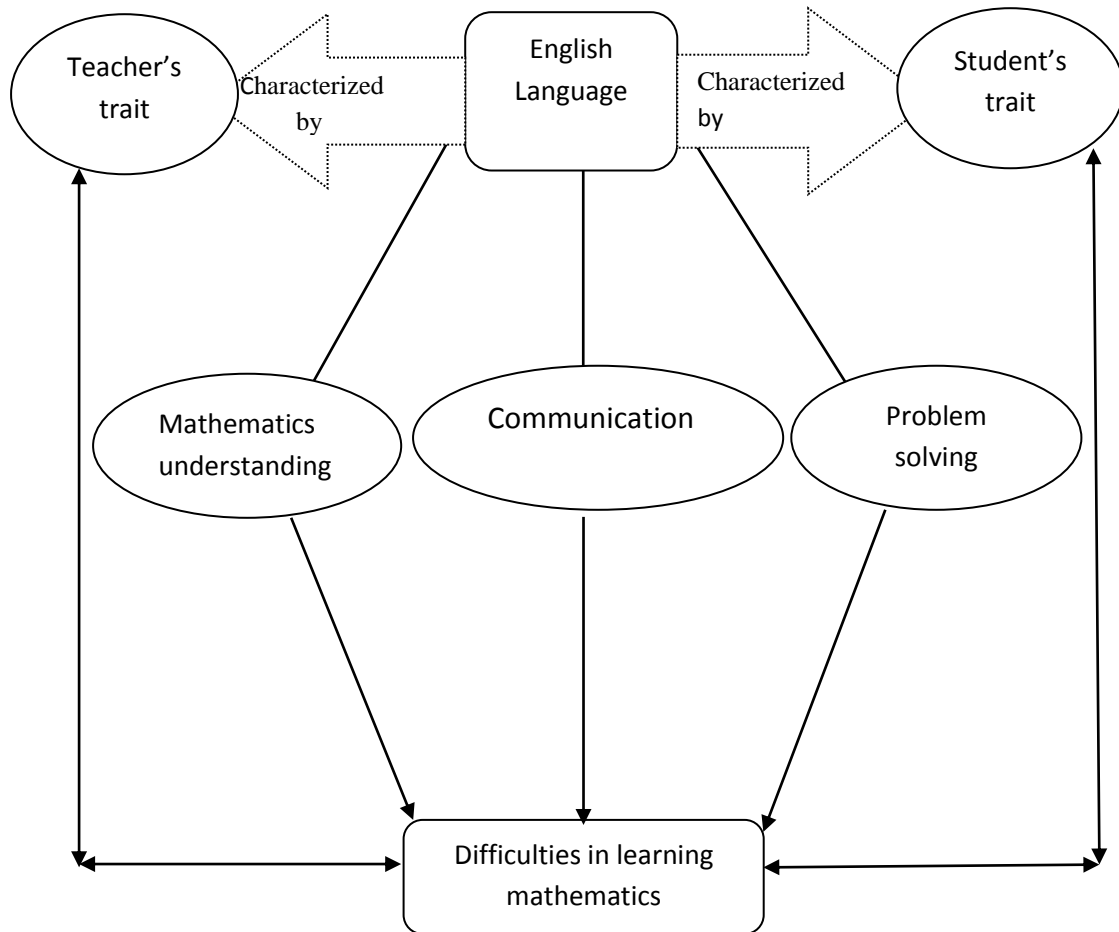


Figure: English language and difficulties in mathematics teaching learning.

The conceptual framework of this study gives the clear relationship between language and mathematics learning. Understanding mathematical concept is very crucial with weak language proficiency. It is very difficult to understand the definitions; examples infect the question also written in English for Nepali medium learners. Since language is prime vehicle of expression and exchange thought in the classroom. Because of weak proficiency in language students have less participation

in classroom interaction and mathematics is highly embedded in communication and interaction. Many students understand the definition, examples, question and also know the solution of the problem but with weak language proficiency they could not express their thought in written form. Therefore the difficulties in learning mathematics for Nepali medium learners is depend on understanding of mathematical terms, communication between teacher and students and problem solving procedure.

Chapter-III

METHODS AND PROCEDURES

Research methodology is a science which determines how the research becomes complete and systematic. This chapter contains the method and procedure to be done to achieve the objectives of the study and to get the answer of the statement of the problems. It describe that design of the study, population of the study, sample of the study, data collection tools, method of data collection, data analysis procedure.

Research Design

To achieve the purpose of the study the researcher used qualitative paradigm. Therefore, the researcher tries to understand and explain research topic “Problems Faced by Teacher and Students in Teaching Learning Mathematics in English Medium” qualitatively. This research is based on explorative method of research because it should be explain various issues of language faced by Nepali medium learners. Since ‘Ethnography’ is one of the specific research design of qualitative research so, I would have taken ethnography as my research design in this research.

Ethnography is best research approach for my research topic. There are four distinct reasons behind my claim. Through this study I am going to analyze and describe underlying language difficulties in grade XI mathematics education and classroom practice can be best represented by ethnography. Second social behavior cannot be reducing to predictable variables along the lines of the natural science. Third a central purpose behind ethnography is to get involved in the social world and to find out how its participant sees the world. Fourth, borrowing the term of qualitative research it provides a window to see the world. I want to use this window of ethnography and try to come up with a quality quilt.

Hammersely and Atkinson (2007) write that ‘ethnography’ has complex history and as a result it is difficult to define the term. They further write that over the course of time and each of the various ways in order to deal with the particular circumstances. Ethnography literally means writing about people in their own meaning. Ethnographers are interested in documenting things like shared attitudes, values, norms and practices, patterns of interaction, perspectives and languages of a group of people. The distinctive feature revolve around the notion of the people as meaning makers, around and emphasis on understanding how people interpret their words and the need to understand the particular cultural words in which people live and which they both construct and utilize. Ethnography comprises major significant feature of qualitative research. Hammersley and Atkinson (2007) have given the following five important features of ethnographic works:

- People action and account are studied in every context rather than under condition created by the researcher such as in experimental setup or in highly structured interview situation. In other words research takes place in the field.
- Data are gathered from range of source including documentary evidence of various kinds but participant observation and relatively informal conversations are usually the main ones,
- Data collection is for the most part relatively ‘unstructured’ in two senses. First it does not involve following through a fixed and detailed research design specified at the start. Second the categories are used for interpreting what people say into the data collection process through the use of observation schedule or questionnaires,

- The focus is usually on a few cases, generally fairly small-scale, perhaps a single setting or group of people. This is to facilitate in-depth study,
- The analysis of data involves interpretation of the meaning, functions and consequence of human action and institutional practice and how these are implicated in local and perhaps also wider context. What are the product for the most part, are the descriptions, explanation and theories.

Rationale of Selection of Study Area

The area of this study were those students who have completed their high school education from public school in Nepali medium and studying mathematics at higher level as their specialization subject. Also their mathematics teachers were other source of my study.

Selection of Case Respondents

Because of time and budget it is not possible to conduct the research in all the school of Nepal. So, to achieve the possible result the I had been used purposeful sampling method. The I had selected two school of Rupandehi districts purposively. And to achieve accurate information I had selected four students of grade XI and two teachers from these school.

Tools and Techniques of Data Collection

In the way of collecting the accurate data I used literature review for secondary data and for primary data I developed two types of tools: interview schedule and observation within the qualitative research paradigm. This is discussed below in details

Interview Schedule

Interview is a purposeful communication. The interview is a face to face interpersonal role situation in which one person interviewer, ask a person being

interviewed, the respondent, question designed to obtain answer pertinent to the research problem. In this research interview would be the main tool for data collection. Researcher developed the interview question related to language problem faced by teacher and students in teaching learning mathematics and their opinion. Also, their perception on relationship between language and teaching learning feasibility.

Observation

For the purpose of collecting qualitative data the observation is commonly used especially participant observation. It is the best approach to collect the required information when the researcher has to find fact knowledge. So, in this study I used it as the main tool of data collection. I observed the classroom activities, student's individual activities, social and classroom environment, interaction between teacher and students, student language proficiency, teaching learning process and writing skill of students.

Data Collection Procedure

In the beginning I visited the selected schools and consult about the purpose and the nature of his study with head teacher, math teacher and students. I had been chosen the sample students with the help of subject teacher. After that conducted the interview with both teacher and students by using the pre-developed questionnaire but the question asks to them in Nepali language. I note the key points and record the essential data also, I observed the classroom of the subject teacher and filed the observation form. Classroom observation had been done during teaching learning activities.

Ethical Consideration

Ethical consideration can be specified as one of the important part of the research. Research participants should not harm in any ways what over. To avoid all kind of difficulties and make the informants easy and open all kind of risks have been minimized. For the dignity of the research participants have been prioritized. Only with the full consent of the participant was the research halved. I had provided them the right to withdraw from the research. I avoided all kinds of prejudices and domination in accordance to the respondent's race, cast and economic status. I was very much conscious about the influence over the respondent and never involved to any activities that assume to exploit their life and life style.

Data Analysis Procedure

After collecting the data I was write the original data as per the information and change the data from Nepali to English. I would create the theme and code to make the data short and meaningful. After creating theme and coding I categorized and selecting the data on the base of how language is used in understanding mathematics, how language proficiency affect in mathematics learning, communication in the classroom and solving the mathematical problems. Finally the achieved data will interpret with the related theories.

The process of data analysis shown in the figure bellow.

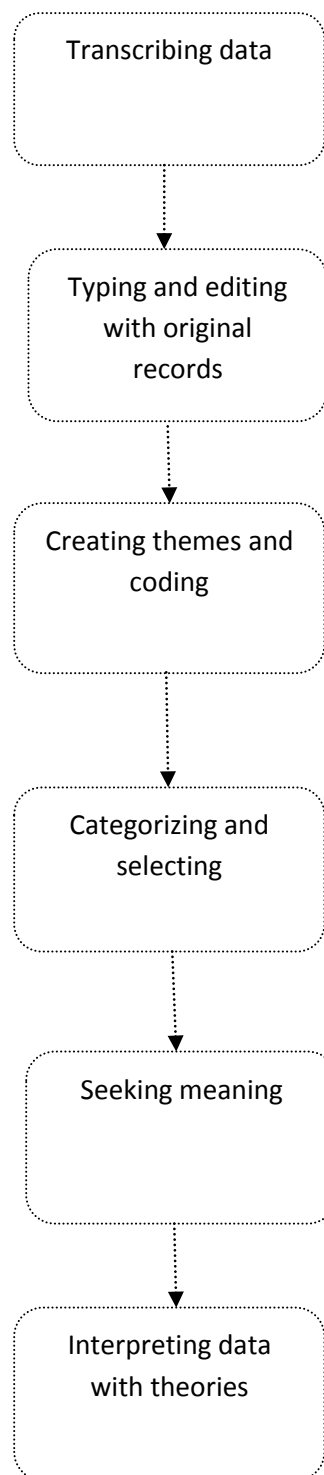


Figure: Data analysis process

Chapter-IV

DATA ANALYSIS AND INTERPRETATION

In this chapter, the collected data were analyzed. For the collection of the data interview schedule and class observation form were used by the researcher for the purpose of the study. Here the researcher was going to present the stories told by research participant, teacher and students. About their perception towards the role of English language in teaching and learning mathematics and language problem faced by teacher and students in teaching learning mathematics in English language at this level. This chapter is purely in narrative view told by informants in their own words. The researcher had interpreted their views in his own words with some theoretical support. He presents the pure description of the classroom observation from different perspective related with the purpose of the study.

Entering to the Field

To find the informants of my study, first I visited the colleges where the students were available in mathematics classroom by completing there SEE from public school in Nepali medium. I meet to the principal with letter and explained about my purpose for coming. I had conducted a meeting with principal and subject teacher for convincing them. On the basis of the meeting and under guidance of the mathematics teacher I had selected four students and two teachers for the interview. I also discussed about my purpose with the students and convince for interview. I requested to math teacher for the permission of class observation. After getting the permission a brief discussion had been done with the informants and class was observed.

Interview with teacher and students

For the purpose of the study I had selected four students who completed their SEE from public school in Nepali medium and two teachers teach at the same level from two school. I took interview on the basis of my pre-developed questionnaire. I had combined some question having common reaction and tried to present their reaction and perception in original form. I had presented their reaction and perception respondent wise and question wise and interpret in my own words. Firstly, I presented the reaction of one teacher and two students from one school. After that I presented the reaction of one teacher and two students from another school.

Respondent: A (Teacher)

My first respondent lives in Bhairahwa, Rupandehi. He had passed his SLC from a public school in Nepali medium. He completed his M.Sc from Tribhuvan University and one year B.Ed. he has four years' experience of teaching at this level.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

From the school side the medium of instruction is English but I use both English and Nepali. Yes, it is compatible for me but it creates little difficulties teaching in both languages. I need to know the Nepali meaning of each of the words which is a challengeable job.

English is an international language and we just followed the foreign footmark. Our curriculum, books and references materials are prepared in English so, English has been appointed as the medium of instruction at this level. But more than half of students came from Nepali background for their simplicity the teacher use Nepali also in classroom instruction. The teacher was compatible with it because the aim of the entire teacher is to provide the better knowledge to their students which are

not possible in absence of proper medium of instruction. Because of second and third language no one are perfect in English. There are some mathematical words which have no accurate translation in Nepali. That makes teacher to struggle with it.

Do you agree that language proficiency helps in mathematics learning?

Yes, I strongly agree with mathematics learning and language proficiency in higher level has symbiotic relationship. It decides the achievement of the students and effect the participant the response language proficiency also encourage to participant in classroom communication and interaction.

According to Shaheen (2017), medium of instruction has an impact on students' academic achievement and the above statement clearly verifies that English language proficiency really matter in mathematics learning. The result of both research showed that medium of instruction had vital role in mathematics achievement. The learning of any concept is completely depending on language proficiency. It is not effect only the achievement of students in examination rather it effect in the students participation and expression of the response. The students having good language competency having better understanding, achievement and participation in communication and interaction. But having weak language students get febrile hindrance from English language in this level.

What is the medium of instruction when you learned mathematics and what difficulties did you experienced in understanding mathematical concept at same level you are teaching now?

The medium of instruction is similar with today's medium of instruction. The teacher used both English and Nepali as medium of instruction. The main problem I faced was meaning problem. Because we learned the mathematical terms (Relation and function, linear programming, circle, statistics, trigonometry, probability, vector,

dot product, cross product etc.) in Nepali. So, I need translation and felt difficulties with expression of mathematical knowledge in English. I could not conceptualize, comprehend and understand meaningfully therefore constrain for rote learning.

This statement says that the medium of instruction when he learned at the same level was English but teacher use both English and Nepali to clarify the content and communication. He was also completed his school level from public school in Nepali medium so, definitely the English word hindered him to learn mathematics. He had been needed the translation of English words and felt problem to express the mathematical knowledge in English. Because of English medium he struggle in understanding, conceptualizing and comprehending the mathematical concept meaningfully. According to his view language proficiency develop the understanding level of students and low competency in language pushed students toward rote learning. They constrain for rote learning to get good marks in the examination.

What kind of difficulties do you face in teaching mathematics in English medium?

I don't have any difficulties in mathematics teaching in English to those students who are good in English but I face some problems to teach weak proficiency's students. I have repeated the same stories in Nepali for Nepali background students and they need more explanation of content which takes more time.

From the above experience of the teacher there is no more problems teaching mathematics in English medium to those students having good knowledge in English. But they face few problems to teach those students came from Nepali backgrounds and having weak English proficiency. They have to repeat the same dialogue in Nepali also. They have to translate the word meaning and also clarify the definition

and question more precisely in Nepali that is very difficult job for the teacher. And such type of activities of teacher takes more time that is another cause of problem teaching in English. The textbook and other reading materials are in English and students need Nepali conversation so mathematics teaching is time consuming task for teacher. Solutions are taken into English and explanation is done into Nepali.

Is there any different in mathematical achievement between public and private school's students?

Yes, in comparison of public school's students the mathematical achievement of private school's students is high. Private school's students always like to seat in front bench, look more confident and have more participation in classroom activities than public school's students.

Good mastering of English is needed to understand mathematics subject and to achieve excellent results (Rambely, Ahmed, Majid & Jaaman 2013). Here the above statement gave same result that the students from private school learned mathematics in English medium from their school days so they scored better in comparison to those students who have learned mathematics first time in English. Although public schools students have deeper understanding but such type of understanding remained always lower score than private school's students. Because of their good English proficiency they look more confident in math learning. They feel easy to communicate with teacher in any language so; they could get more affection from teacher also. But students from public schools hesitated to ask the teacher because they felt it was shameful to ask stupid question. They never like to seat in front bench and seated silently on the back benches. They never ask question and never discussed with teacher about the course content but they silently discussed with their friends.

Do you think that English language hinder mathematics learning? If yes how you cope these problems?

Yes, English language hinders mathematics learning. At this level language of teaching is also one cause of mathematics anxiety. Some students have changed their subject in middle year because of English language as medium of instruction. To decrease the problem I use the translation method and very simple English also. I suggest them to see the dictionary.

Due to the poor command in instructional medium all the feeling remains unexpressed and the interaction, communication and sharing was limited. This kind of activities promotes mathematical anxiety. After studying few days some students feel that they could not pass it because of this they have changed the subject. In my view language make students kept quite inside the classroom and promote the mute culture. No interaction between teacher and students was possible because of hesitation in new language they faced at this level. To subtract such language problems the teacher does not have conducted any extra classes because of their busyness but during class time by using Nepali in communication and explanation they help to the students in understanding. He encourages them for hard work and used to read mathematics dictionary to comprehend the word in better way.

In which language do you feel better while teaching mathematic?

I feel better in English because all the higher level mathematics were learned in English so; I have better understanding of mathematical content in English but for easiness of students I use both English and Nepali and I like it.

The teacher was not from education faculty. He completed his higher education from science faculty but during his school days he learned mathematics in Nepali medium. After completing the higher education in English his English became

some good and the understanding of the mathematical content are in English therefore he felt better to teach in English language. He had experienced of some difficulties because of English in learning at this level such that for the simplicity of the students he use both English and Nepali and he enjoyed it.

Respondent: B (Student)

My second respondent lives in Raypur, 3, Rupandehi. He had passed his SEE from a public school Sreemati Manaraji Devi Higher secondary School Shisoshemara-3, Marchawari in Nepali medium. His English was not satisfactory during his school days. In class nine and ten he studied optional mathematics. He was brilliant in mathematics and interested in learning mathematics from his school days so; he decided to study mathematics at higher level.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

Our curriculum prescribed in English as medium of instruction and all the mathematics books and reference materials are accessible in English only so, there is no alternative in medium. But our teacher use both English and Nepali. No, it is not completely compatible for me because some time the teacher speaks only English then I feel some difficulties in understanding mathematics.

This statement shows that the medium of instruction was not decided by college, school, teacher and students rather it is decided by curriculum development center, subject specialist, policy maker and other related person. Because the curriculum has been developed in English therefore there is no language in alternative of English as medium of instruction. But for simplicity of the students the teacher used Nepali and English both. But he use English more which is not compatible for the students. According to students sometimes he used only English that creates

confusion in understanding the mathematical content. That assure students were not completely satisfied with the medium of instruction.

Does English language proficiency helps in mathematics learning?

Yes, language competency plays vital role in mathematics learning because it helps in understanding the mathematical content deeply and sharing the information with teacher and friends.

The above statement verifies that language is the main tool of understanding the content and sharing the information. So, it has vital role in learning mathematics. The respondent completely accepted that language proficiency helps in mathematical concept deeply and clearly. Language helps to share the information and knowledge and also helps on receiving the information and knowledge. The respondent share his own experience towards mathematics learning in English language that some mathematical word are easier to understand in English more than in Nepali. Therefore good English makes good result in mathematics learning.

How was mathematics learning is different in Nepali and English language?

When I learned mathematics at school level in Nepali medium it is easy to write, understand and dealing the words problems. But when I learned mathematics in English I faced problem in writing, understanding and dealing with words problem of mathematics.

This statement presents the clear picture of difference in learning mathematics in Nepali and English medium. Learning mathematics is very easy in writing, reading, understanding and dealing with words problem because they have read mathematics in Nepali from ten years and they are perfect in Nepali language. They can understand the theme of Nepali terminology easily. But they have learned mathematics first time in English and their competency in English is not so good because of this they unable

to understand the mathematical matter as Nepali. They felt difficulties with words problem in comprehending and dealing with it.

What kind of difficulties do you face in learning mathematics in English language?

At this level I have to read and write in English. I feel difficult to understanding the word problems and writing the solution. I also face difficulties in conceptualization and memorization of mathematical concept in English.

Since all the reference materials and books are written in English so they have to read in English and it is not allowed to write in Nepali language in examination. Most of the students felt difficulties in understanding the word problems and in explanation their solution. They can't comprehend the words, question, definition and concept in their own words. Language makes possible for child to objectify and conceptualized his own words and himself (Nancy 2009). This study also concluded that the students fight to conceptualize mathematics. They also faced the problem on remembering the concept in English they forget suddenly. They need more time for learning few concept.

Which language do you use in classroom interaction with teacher and friends? Does your teacher discriminate between weak and good English proficiency's students?

I use Nepali language in classroom interaction. No, in my view he never discriminates between weak and good proficiency's students in the classroom. Rather he helps students who are weak in English and clarifying the concepts of mathematics in Nepali.

The teacher are expected always speak and emphasize the use of English in the classroom by college administrator. The teacher was very flexible from their side.

They are allowed to use Nepali in the classroom so most of the students use Nepali. Students in the classroom exposed them self in Nepali. Every communication and interaction with teacher and friends has been performed in Nepali however the teacher forcefully switch classroom in English. In his view the teacher never discriminate between weak and good English proficiency's students in the classroom. He uses same method and language to all. He behaves equally to all and helps especially those students who are weak in English. And clarify the concept of mathematics problems by speaking in Nepali.

How does your teacher manage when you feel difficult with English language during mathematics learning? In which language do you feel better while learning mathematics?

When I feel difficulties with the English language during mathematics learning the teacher helps me by saying Nepali meaning. I feel better while learning mathematics in Nepali.

The above statement indicates that the teacher was very careful about the language problems of the students. He translates the difficult words in Nepali. They always encouraged for questioning by the teacher especially those students who have very weak language proficiency in English. Because of good proficiency in Nepali he feels better to learn in Nepali than English.

Respondent: C (Student)

My third respondent lives in Semari, Rupandehil. He had passed his SEE from a public school Shree Semari secondary school in Nepali medium. His English is not good during his school days but he is brilliant in both optional and compulsory mathematics. He was interesting in learning mathematics from his school days. His

mathematics teacher advised him to study mathematics at higher level so he decided to study mathematics at this level.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

The teacher use both English and Nepali as medium of instruction but English use more. No it is not completely compatible for me because some words that he used makes me confused.

The above view indicates that the teacher use both English and Nepali language as medium of instruction but he uses English more than Nepali on describing the content and talking with students. Nepali only used by the teacher when students became confused with the English words. The students were not compatible completely because the teacher used some especial words of English that create confusion to them in understanding the mathematical concepts.

Does English language proficiency helps in mathematics learning?

Yes, language proficiency helps in learning mathematics. So to learn mathematics in better way the language competency must be good. It makes easier to understand mathematics.

Low English proficiency resulted in students experiencing a shortage in mathematics and obtains a lower grade in mathematics course (Rambley, Ahmed, Majid & Jaaman 2013). This study also justified this result because the above statement presents the clear picture that the role of language in learning mathematics is important. For the better learning better language competency has been needed. That means language makes easy to understand the content and express it fluently. So the student strongly agreed that language proficiency helps in mathematics learning in this level and it decide the achievement of the students.

How was mathematics learning is different in Nepali and English language?

I felt very difficult in learning mathematics in Nepali medium during my primary level education. But from long time I learn mathematics in Nepali so it is easy to understood the mathematical content deeply and could easily express it in written form and verbally also. During our school days there were less dependence on teacher but in English it is totally deferent. It is very difficult in understanding and expressing in English.

For most of the students Nepali is the second language so; in the beginning of their school days they faced difficulty with Nepali in learning. They had learned mathematics from long period in Nepali their efficiency in Nepali became better that helps them to understand and express mathematical knowledge and concept in written form and verbally also. They could understand the definition, question, examples and description by self-study. There was less dependency on teacher during their school days. But in English medium at this level it is totally different. They have faced myriads of problems in understanding the mathematical content and expressing it. They depend on the teacher and dictionary more to comprehend the word meanings.

What kind of difficulties do you face in learning mathematics in English language?

I feel very obstinate in memorization and imagination of the mathematical concept, content, definition, steps and solution in English. Mathematical words problem trouble me when I learn mathematics in English. I can solve the problem easily but before starting I need some explanation about the question in Nepali.

The above statement verified that English language hidens students to memorize the mathematical concept, definition, steps and solution. They can understand the concept, definition and theme with the help of Nepali but they could

not present the same thing in well managed order. Analytical power of the students has been paralyzed by language matter. Mathematics needs some imagination and creativity but they imagine the theme in Nepali and have to present in English at this moment they have to translate their feeling from Nepali to English which is really very difficult to them. This makes difficult for their study. They can't express the entire theme however they have identified clearly in their thought. Students know the solution of the problems but because of weak English efficiency they need the translation of the question before starting.

Which language do you use in classroom interaction with teacher and friends?
Does your teacher discriminate between weak and good proficiency's students?

Mostly, I use Nepali in classroom interaction and communication with teacher and friends but some time I use my mother tongue to communicate with friends. I think it is natural there are clear demarcation between good and weak students. The teacher shows more affection towards students with better performance and good English proficiency. The low achiever and weak English proficiency's students got fewer opportunities by teacher.

Most of the students present in the classroom belonged from Madhesi community. So, there mother tongue is different with Nepali. Generally the students used Nepali for interacting with teacher and friends but sometimes they use their mother tongue to interact and communicate with those friends having same mother tongue but they never use English while discussing in the classroom with teacher and friends. They agreed with the second statement and argued that it is the nature of all the teacher that they interested and focuses more on better performer and good English proficiency's students. The teacher paid more attention on each their activities and encouraged them for more learning. But the lower achiever and having weak

competency students got fewer opportunities by the teacher. The teacher always unconcerned to weak students

How does your teacher manage when you feel difficulties with English language during mathematics learning? In which language do you feel better while learning mathematics?

He does not provide us any extra opportunities but he helps by telling the Nepali meaning, defining the words and advising to see the dictionary. I feel better while learning mathematics in Nepali and I wish I have allowed to read and write in Nepali then it should be better.

This statement proves that the teacher did not provide any special opportunities for those students are weak in English proficiency while they felt difficulties with English language during mathematics learning. He never conducts any extra class for them. But he helped them by telling the Nepali meaning of the English words. The words having no accurate Nepali translation he used to define it in his own words and advices them to see the dictionary that helps to understand the meaning. The reaction of the students on the second statement showed that they felt better while learn mathematics in Nepali language. They thought that the books and references materials should be available in Nepali then it is good for everyone to understand, conceptualize and memorizing.

Respondent: D (Teacher)

My fourth respondent is lives in Bhairahwa, Rupandehi. He completed his secondary level education from a public school in Nepali medium and higher education from India in faculty of science. He had completed M.Sc. in mathematics and taught few days in India also. All together he has 25 years of teaching mathematics and about 16 years' experience of teaching at this level.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

In my classroom the medium of instruction is English. Yes, it is compatible for me but not for my students therefore I also speak Nepali for more clearance of content to students.

The curriculum of this levels has been designed in English language. On the basis of curriculum all the books and study materials are also developed in English so; the school use English as medium of teaching. English medium of instruction in teaching mathematics was better than the Nepali medium of instruction in teaching mathematics (Bajracharya 2011). The finding of this study also showed that English medium of instruction is not challengeable for teacher but it is challengeable for students especially for those students who completed their school education in Nepali. The teacher taught at this level most be used Nepali to clarify the course content therefore he used both English and Nepali for more clearance of content to students.

Do you agree that language proficiency helps in mathematics learning?

Mathematics does not need high level of competency in language. Only a little bit command could enough for it. But we can't neglect the role of language in math learning. It is important for understanding the teacher explanation and expression in our own way. Therefore I agreed that language proficiency helps in mathematics learning.

The above statement verifies that generally mathematics has been considered as universal subject and mathematics learning as independent of language background of learners. Basically mathematics does not need very good competency in English language like in other theoretical subject as economics, sociology, science and other subject because it has been used little bit command so it can be learned without good

English competency. But the learning process is highly embedded in communication and interaction. So, mathematics teaching and learning could not separate with language. Learning realizes proper communication between teacher and students without language it is not possible. That proves the role of language competency for understanding teacher's explanation and expression.

What is the medium of instruction when you learned mathematic and what difficulties did you experienced in understanding the mathematical concept at same level you are teaching now?

When me at this level the medium of instruction was English and Hindi because I completed my I. Sc. from India. I had faced a lots of difficulties occurred in understanding the meaning of symbols ω , ψ , θ , β , δ , χ etc. and words which are came in definition of content.

The respondent completed his higher level education from India so, the medium of instruction was English and Hindi because of this he faced a lot of problems in understanding mathematical concepts. He struggled with English as well as Hindi because Hindi was also new for him. Both mediums hindered him to learn mathematics and he struggled in understanding, conceptualizing, and comprehending the mathematical ideas. In the beginning he had to translate all the English and Hindi in his own words to understand. But after spending some time with these languages he could able to understand Hindi as well as English. The symbols used in mathematics are also became the cause of problems he could not understand the meaning of the symbols. That forces students for rote learning.

What kind of difficulties do you faced in teaching mathematics in English language?

When I teach mathematics in English language most of the students could not understand meaningfully. Even they asked what the Nepali meaning is to most of the words is like; limit derivative, anti- derivative, function, tangent etc. Also students do not clear about the mathematical concept, writing skill problems occurred in students in words problems. There is lack of interaction and participation when teaching in English.

This presents that it is not so easy for anyone to teach in English at this level especially to those students came from Nepali backgrounds. Language background effect on the nature and level of difficulties experienced by students (Nancy 2009). This study also proved that students fight for understanding with limited English competency that creates problems for teacher. They asked Nepali meaning of most of the mathematical words. This is not easy job for the teacher. Because some mathematical words like; limit, derivative, anti- derivative, arc, sector, tangent, diameter, radius, bisector, homogeneous etc. are very difficult to translate in Nepali with mathematical perspective. During solving the words problem student can't comprehend it meaningfully. They depend on the teacher for the comprehension that increases the duty of the teacher. While using English in the classroom interaction and communication the participation and of students in class activities going to be decreasing that create one way instruction which is not effective according to constructivism.

Is there any deferent in the mathematical achievement of student came from public and private school?

Yes, because in public school the curriculum has been designed in Nepali up to grade ten and in private it is in English. So, private school's students have more practice in English than public school therefore they faced less difficulty in

understanding the word problems. They could answer in examination in better way and get better marks than public school.

Respondent argued that there are few differences in mathematical achievement can be seen because of their language backgrounds. The curriculum, books and other study materials in government schools have been designed in Nepali and question also asked in Nepali but it is in English in private schools. They have more practice in English than public school and practice makes them perfect. At this level private students scored better in comparison to public school's students. The main reason behind this contrary is language skill. The question in exam comes in English they need to have answered in English because of this reason private school's students benefited in the examination and could answer in better way. Because of well practice in English they got better marks. Those students who belonged from public schools faced first time English in exam so, their performance could not be better in examination.

Do you think that English language hinders mathematics learning? If yes, how you copes these problems?

I think it is not more but some, since our curriculum is in English and the students who learned mathematics in Nepali medium at school they faced some problems in language in language understanding, definition conceptualizing etc. in learning mathematics. So, those students hindered from English language in learning mathematics. To copes these problems I motivated more to study math dictionary and also give the clear concept in Nepali language.

Difficulties encountered in language might have serious cause in learning mathematics. Language problem is one of the major problem in teaching learning mathematics. English medium of instruction promotes the mathematical anxiety

(Chiluwal 2014). Here according to the respondent English language hindered only those students having weak competency in English. Because they felt difficult in understanding mathematics and conceptualize the mathematical definitions. That creates a kind of anxiety in their mind which makes the participants to silent sitter and non-responsive students. They may have felt that they speak in wrong way so that they have been insulted by their friends and teacher. To manage such type of problems teacher must be careful about these problems. The teacher has to provide more time inside and outside of the classroom and motivates them for learning in English and always be ready to use Nepali language to clarify the mathematical content clearly.

In which language do you feel better while teaching mathematics?

In English language I feel better while teaching mathematics but I use Nepali according to the level of students.

The teacher had completed his higher education in English medium. So, he has better knowledge in English about the mathematical content that makes easy to read, comprehend and write. He thought English could be written faster than Nepali. But he paid more attention to the level of the students. And the level of the English is not so good of those students from Nepali medium. Therefore the teacher used Nepali language also. That makes simple for students to conceptualize, comprehend and interact.

Respondent: E (Students)

My fifth respondent lives in Sukrauli,3, Mayadevi. He had passed his SEE from a public school Shree piparahawa ma. vi. in Nepali medium. He had good English proficiency during his school days and also good in mathematics. He is very

interested in learning mathematics therefore he decided to study mathematics at this level.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

The teacher use both English and Nepali as the medium of instruction but he use English more. Yes, it is compatible for me because there are limited English structure we have to care about otherwise mathematics can be learned without good English. But it creates some difficulties.

The above statement inform that the teacher used both English and Nepali language as the medium of instruction. But English used more that does not affect in mathematics learning more because mathematics has limited English structure. So it does not require good English competency itself. It can be learned without good English. But we can't bypass the problems created by English. He appreciated that English language makes difficult for those students came from Nepali backgrounds.

Does language proficiency helps in mathematics learning?

Yes, language proficiency helps in mathematics learning. It determines the student achievement, understanding level and expressing capacity. So, English language proficiency have vital role in learning mathematics at this level.

According to the above statement language proficiency helps in learning mathematics. The achievement of mathematics is depending on language because mathematics is not only the subject of manipulation, problem solving and memorization rather it is a matter of content and language. It helps for understanding the mathematical concept more precisely. So, having good proficiency's in English perform better than weak proficiency's students. Language proficiency have

remarkable role in mathematics learning. Students also suggested that the language should be similar in all the level of learning.

How mathematics learning does different in Nepali and English?

There is a big difference in learning mathematics in English and Nepali. I could understand the mathematical content and definition meaningfully in Nepali. I can express my thought in written form. But in English medium I struggle to understand the mathematical content and definition meaningfully. And struggle to express my thought verbally and in written form.

The respondent found the difference in learning mathematics in English and Nepali on myriads of aspects. It is different in understanding and expressing of the mathematical knowledge. The students can appreciate the definition and mathematical content meaningfully in Nepali. It is easy to express the thought in written form and verbally in Nepali language. But because of English they struggle in learning mathematics. They tussle and fight with English to appreciate and comprehend the matter.

What kind of difficulties do you face in learning mathematics in English language?

There are no difficulties in solving the numerical problems and trigonometric problems but in comprehending the word problems I feel very difficult because of English. I know the solution in my own language but I can't present it in systematic order in English. It is very difficult to memorize and recall the theoretical solution.

There are limited English structures used in numerical and trigonometric problems so, it does not require good English proficiency. It can be learned without good English. Therefore the respondent does not have trouble in solving numerical and trigonometric problems. But it does not mean they have no problem in

mathematics understanding. They felt difficult to comprehend the word problem of mathematics written in English. The presentation of the solution in systematic order with good English is very crucial job for the students. English also makes to memorize and recall the theoretical problems. It took more time to understand and memorize.

Which language do you use in classroom interacting with the teacher and friends? Does your teacher discriminate between weak and good proficiency's students?

I use Nepali more in classroom interaction with teacher and students.

Sometime I tried to interact with the teacher in English. Not more but few biasness can be seen by the teacher between good and weak language proficiency's students.

The above statement clarified that student use Nepali more for interaction with friend and teacher. Some of them also tried to use English to communicate with teacher. They faced problem of biasness because of English. Teacher believes that good English proficiency's students have better understanding and good achievement in the examination. So, the teachers show more affection towards them inside and outside of the classroom. He provides fewer opportunities for the weak proficiency's students.

How does your teacher manage when you feel difficulties with English language during mathematics learning? In which language do you feel better while learning mathematics?

The teacher helps us by describing the question in simple English and Nepal.

He suggests for reading mathematics dictionary and encouraging trying comprehending in English. I feel better learning mathematics in English but because of word problems I need Nepali also.

The teacher was helpful from student side and careful about the problems faced by English language especially by those students having weak English proficiency. The teacher used to describe the word problems in simple English and also in Nepali. The translation of vary words is difficult for the teacher also so, he suggested to the students to see mathematical dictionary. And some of the mathematical words do not have fix Nepali translation for this he suggest them to try to understand it in English and do not try every word translate. Finally the respondent feels better during learning mathematics in English language. But because of words problem they also need Nepali. That shows that they have interested in learning mathematics in both language English and Nepali used together.

Respondent: F (Student)

The sixth respondent lives in Chhapiya. He had passed his SEE from a public school Birendra ma. vi. Durgapur,5, Chhapiya in Nepali medium he had dream to study science but because of low economic condition he decided to study mathematics from education faculty. He was very interesting in science and mathematics during his school days.

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

The medium of instruction from school side is English. Our curriculum also prescribed in English as medium of instruction and all the mathematics books and reference materials are accessible in English only so, there is no alternative in medium. But our teacher use both English and Nepali. He used 70% English and 30% Nepali. Yes, it is compatible for me partially because mathematics is not fully lingual subject.

The above statement shows that the medium of instruction was not decided by college, school, teacher and students rather it is decided by curriculum development centre, subject specialist, policy maker and other related person. Because the curriculum has been developed in English therefore there is no language in alternative of English as medium of instruction. But because of the students weak English proficiency it is allowed to use both English and Nepali in classroom instruction as medium. But the teacher use English more which is not completely compatible for the students. They do not face more problems during solving numerical problem but in solving verbal problems they felt difficult.

Does language proficiency helps in mathematics learning?

Yes, language proficiency helps in mathematics learning. Good language efficiency makes easier to comprehend the word problem, definition and theme. But some of the mathematical content does not need good language efficiency.

Language proficiency helps in learning, communicating, expressing and sharing the mathematical ideas. Having good language competency's students comprehends the word problem meaningfully and independently. They does not need of translation in to the Nepali. They can understand the definition and able to share in correct order. At this level student attend their final examination in English medium so; it determines the achievement of mathematics. We can't bypass the role of English language in learning mathematics but some of the mathematical content has very limited English structure which can be learned without good English.

How was mathematics learning is different in Nepali and English language?

Learning mathematics in Nepali is very comfortable and easy for me. I had good marks in my SEE examination but because of English it is very difficult to pass the examination.

The above statement shows that English language also affects the mathematical achievement of the students. Throughout their school level education in Nepali they had better achievement in mathematics. They had got high marks in the examination but at now days their mathematical achievement become low. They could not get marks in comparison to their school days. Because they have necessary to attend their examination in English. They left many steps while solving the problem. They forgot to write the formal thinks in the examination that also might the cause of low marks in the examination. It all because of English language.

What kind of difficulties do you face in learning mathematics in English language?

I know the words but I don't know the meaning. I understand it only when teacher translate it in Nepali. It is very difficult to recall and write the definition and theoretical content.

The above information clarify that most of the student have same difficulties with English words. They can read the words written in books and in other references materials but they could not understand its meaning. They were able to comprehend the words only after translation of in Nepali. That clarifies that the understanding, comprehending and conceptualizing depend on the teacher. They also felt difficulty with reminding and writing the definition in theoretical form.

Which language do you use in classroom interaction with teacher and friends?
Does your discriminate between weak and good proficiency's students?

My English is weak so I use Nepali more but with the teacher I try to communicate in English. My teacher does not discriminate between weak and good proficiency's students directly but indirectly he does. He provides a lot of chance of

learning to them and likes to discuss with them inside and outside of the classroom more than us.

All teachers are forced to use English for interacting with teacher and friends from school sides. So, sometime teacher encourage using English for communication and interaction but because of weak competency they could not use English. Therefore they used Nepali more to communicate with teacher and friends. But they tries to use English in the classroom discussion. The mathematics teacher does not dominate weak language competency's students directly but indirectly it can be seen. He is more collaborative with better performer and good proficiency's students. The teacher provides more chance to them for asking questions and likes to discuss outside of the classroom.

How does your teacher manage when you feel difficulty with English during mathematics learning? In which language do you feel better while learning mathematics?

Some time he neglects the language problem faced by us. But sometime he uses the materials and pictures to clarify the meaning. He also used to define some difficult words. I feel easy to learn in Nepali about 70% and 30% in English.

Teachers in this level are very much professional and they don't have enough time to look after their students. Because of lack of time they neglect the language problems faced by the students. But some time the teacher uses some materials and picture to clarify the meaning. He defined the word in very simple language also told it in Nepali that helps students to understand mathematics. The students belonged from Nepali background like to study in Nepali more and they felt better learning in Nepali.

Class Observation

For the second purpose of the research to explore the problems in teaching learning mathematics in English language researcher observed the mathematics classroom of Grade XI with the permission of principal and mathematics teacher of Bhairahwa model secondary school. I observed the mathematics classroom regularly for six days with my pre developed observation form. I observed the mathematics classroom from different perspective and approaches such as classroom management and environment, use of teaching methods, medium of instruction, language used for communication, discussion and interaction, student's activities and participation, student's difficulties during learning, mathematics vocabulary and responsiveness of the teacher towards students feedback. The finding of my each class observation related to the above approaches is discussed below one by one.

Observation: I

In my first observation, I found that teacher as well as students feels uncomfortable due to my presence in classroom. I entered in the classroom and quietly sit in one corner of the class behind the students. All together there were fifty students in the classroom in which 42 students from science faculty and 8 students from education faculty. About ninety percent students attend in the classroom. Desks and benches were arranged in five rows and three columns traditionally but managed well. Doors and windows were also appropriate for the room. The classroom was the example of mixed culture. Different students from different community had gathered together.

The teacher was started the topic pair of straight lines where he taught bisector of the angle between the pair of lines represented by homogeneous equation

$ax^2 + 2hxy + by^2 = 0$ Which is very important for the examination. He started the classroom by using lecture methods to discuss about the topic and recall the previous knowledge. He use English more as the medium of instruction but for the description of the content he used few Nepali words also. For communication and interaction the teacher used very simple English and Nepali also but he used English more than Nepali. In case of students having better performance in the classroom and good proficiency in English tried to use English to interact with teacher but with the friends they used Nepali. The students from Nepali backgrounds always used Nepali to interact and communicate with teacher and friends.

During the lesson I did not see active participation from all students. Only front benchers asked and discussed with the teacher and the students from back benches were listening to the teacher carefully and copying all the things honestly written on the board. In my observation I noted that the teacher forcefully conducted the class in English language and students did not meet the level of teacher. Most of the students need translation of English words and who were weak in English needed detailed description in Nepali of some words like bisector, pair of line, straight line, homogeneous equation because they had studied the word bisector as ardhak, pair of line as joda rekha, straight line as siddha rekha, homogeneous equation as samghatiya samikaran. Until the teacher did not transcribe they could not understand the topic deeply and clearly. To make easy for understanding he had presented the words bisector in the figure and defines properly. He presents the different examples of bisector between pair of lines. That showed that the teacher is very careful about the language problem faced by the students and try his best to solve it. Teacher encouraged those students sit silently by asking question and checking their copy.

Observation: II

In my second observation I entered in the classroom with education faculty students and sit together with them on the back bench. The management of the classroom was well and setting was traditional in rows and columns. The presentation of the students was above 95%. The teacher continue the topic Pair of Straight Lines where he taught about a problem given as ; if the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of lines then $ax^2 + 2hxy + by^2 = 0$ represents a pair of line through the origin parallel to the above pairs and one important examples was solved by the teacher. His medium of instruction was English but used Nepali also frequently. He started the topic through description of the statement traditionally by lecture method. He discussed about the process on the right side of the board. He described all the terminologies origin, center, line through the origin, parallel line because they had studied the terms origin as kendra bindu, parallel line as samanantar rekha. He also asked some questions to backbenchers many times but students ignored are question or keep standing without answering. Some students participate very interestingly and actively. They every time ready to answer is question and all most all question asked to other has been answered by them. During my observation I found he used mostly the problem solving approach and almost his teaching was dominated by lecture method. For lecture he used English proficiently but from student side Nepali used proficiently. Few students having very weak English did not take participation in to the classroom activities and communication they kept silent and sit quietly. All students felt very hard to comprehend the statement on the board. So, they need detail description from the teacher. He was very smart and careful about the student's problems so, he described it in simple English meaningfully and translates it in to Nepali. As he able but he did not use any kind of figure and

definition of the terms. He encourages students to try to understand the words in English.

Observation: III

I entered in the classroom with the education faculty's students and sit together with them. The setting of the classroom was traditional and managed well. Among all the students 20% were girls and they seated middle columns but all girls from science faculty. The teacher continued the same topic pair of straight lines where he taught the exercise given in book and asked more time in the final examination. He wrote three questions those are

- If the pair of lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ be such that each pair bisect the angle between the order pair. Prove that $pq = -1$.
- If the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of parallel line :prove that

$$\text{➤ } \frac{a}{h} = \frac{h}{b} = \frac{g}{f} \text{ and}$$

$$\text{➤ } \text{The distance between them is } 2\sqrt{\frac{2^2-ac}{a^2+ab}}$$

- Prove that the straight lines joining the origin to the of intersection of the line $\frac{x}{a} + \frac{y}{b} = 1$ and the curve $x^2 + y^2 = c^2$ are at right angle if

$$\frac{1}{a^2} + \frac{1}{b^2} = \frac{2}{c^2}$$

He asked them to read first question and conceptualize it. All they read but they could not comprehend it. They could not understand the terms order pair, intersection of the line, curve, right angle because they had studied the term order pair as kram joda, curve as bakra rekha, right angle as samkone, intersecting line as pratichhedid rekha etc. He used to describe the question through lecture method in English first and he repeats it in Nepali. They want everything from their teacher.

Most of the time has been spend in solving the problem. Continuously, he asked question to involve all of them in learning actively but only few students replied the answer and participate actively. The students from education faculty looked passive more than science faculty because they thought they were weaker than them. The teacher spends more time in example first so he gave the third question as class work but he provides some hints. The students from front bench solve it about in ten minutes. But student who had weak proficiency in English could not solve. Some were solve but they did not show the teacher because they were not confident that is true or false.

During my observation I realized that weak proficient students need the Nepali description of the problems and the solution step by step. They knew the numerical part of the solution but could not write the language used in solution. They felt hard in memorizing those parts. So for the simplicity teacher used translation method while solving the problem. He encouraged them to discuss about the solution to their friends that provides better knowledge.

Observation: IV

In my fourth observation, I entered in the class together with teacher and sit with the students friendly. The management of the classroom was same. I saw the classroom was clean all students were well dressed but the presentation of the students were low because of rain. The teacher continued the same topic and same exercise given in the book and important for the examination. He wrote three different questions on the board which is in simple to complex order. Those are:

- Prove that the following equation represents pair of lines

$$2x^2 + 7xy + 3y^2 - 7y + 2 = 0,$$

- Find the equation of the two lines represented by

$x^2 + 6xy + 9y^2 + 4x + 12y - 5 = 0$, prove that two lines are parallel.

Also find the distance between them,

- Find the equation of the straight lines through the origin and at right angles to the lines $x^2 - 5xy + 4y^2 = 0$.

He did not solve the question first just provides hint verbally and went for question second and third. He asked to read the question carefully and try to understand it. All the students read and teacher asked them do you understand the question. Many student told yes sir but some told no sir because the terms pair of line, straight line, represented by, parallel line etc. were new for them. The students who understood the question partially tried to solve but they couldn't start it. The teacher read the question and clarifies to all in Nepali.

During my class observation I realized that today the teacher use Nepali more than English for teaching and interacting with students. I think because of Nepali all students looking exited they listen carefully to the teacher and involved in the discussion with teacher and friends. The students felt better learning in Nepali. Some students felt difficult in understanding the theme of the question. They copied very carefully to the teacher. For the easiness of the students the teacher presents graphically some terminologies and he behaved very friendly with students. He always encouraged students to ask the question.

Observation: V

In my fifth observation I saw the setting of the classroom is traditional in row and columns but managed well all the students seated friendly and silently. The topic was about The Circle. He started the class by lecture method and discussed what students know about the topic and tried to link the idea they had learned in the previous grade. He taught the equation of circle in different perspective and different

form and also for some particular cases. His instructional medium was English but also used Nepali. He used English more so; many students looked confused on understanding the simple concept. They are unknown with the terms circle, center, perimeter, diameter, radius because they had studied circle as britt, perimeter as parimiti, diameter as byas, radius as ardhabyas etc. but they are familiar with the Nepali meaning of these words.

There was less interaction between teacher and students because English used more. Only some student tried to talk with the teacher in English. Students who were very weak in English or from Nepali medium background had less participation in classroom activities and interaction. The main difficulties seen in the classroom was understood the meaning. Students knew the words but they didn't know the meaning so, for they need Nepali translation. Many students knew what is circle and they could explain it on their own words but they were unable to define it in systematic order in English language. For better understanding the teacher used to present the circle with center, diameter and radius in different form with different center. He was careful about the language problems of the students but because of course weightage he neglects their problems and didn't provide any extra opportunities to them.

Observation: VI

In my sixth observation, I had entered in to the classroom with education faculty students and seated with them on their bench. The setting of the classroom was same as previous days and managed well. Above 90% students were present in the classroom. The teacher had continued the same topic The Circle where he taught the question related to equation of circle. He used same style, he wrote the problem on the right side of the board those are

- Find the center and the radius of the circle $x^2 + y^2 - 12x - 4y = 9$.

- Find the equation of the circle passing through the points (1,2), (3,1) and (-3,1).
- If $y - x = 2$ is the equation of the chord of the circle $x^2 + y^2 + 2x = 0$. find the equation of the circle of this chord is a diameter.

The medium of instruction was English. He used to write everything in English but for communication he used Nepali also. In students side they use Nepali more some brilliant students tried to communicate and ask the question in English with teacher. There were also some students available who never spoke a word during the class. They felt difficult to understand the third problem because the terms chord, arc, sector etc. are new for them. They had studied the word chord as jiwa, arc as chap, sector as chhetrak, segment of circle as brittakhanda. They copied the solution very honestly and carefully done by the teacher. The students having weak understanding used to discussed with their friends in low volume but they didn't ask the same thing with teacher.

During my class observation I realized that English language effect in the participation of the students, understanding of the students, conceptualizing, comprehending, imagination and memorization. The teacher had been spending more time on solving the bookish problem by using problem solving method traditional lecture method and discussion method. I felt that English language hindered in learning mathematics for those students having weak English. Because I found only few students participate very interestingly and actively. They were ready every time for question and all most all question asked to other has been answered by them. The low achievers always need translation of the question and description in Nepali.

After translation they had comprehend but the same thing couldn't express in English in systematic order. I also saw that they felt difficulties related to generalization of formulas and rules. The teacher had done hard work to teach mathematical content especially to those students having very weak English competency.

CHAPTER-V

Summary, Finding, Conclusion AND Recommendation

This chapter discussed about the summary, major finding and conclusion of the study. Also discuss about recommendation for further study.

Summary

The purpose of the study is to identify and analyze the language problems faced by teacher and students in teaching learning mathematics in English medium. For the purpose of the study the researcher was established two objectives. The first objective of the study was to analyze the perception of the teacher and students on the role of English language in teaching and learning mathematics and second was to explore the problems in teaching learning mathematics in English language.

To achieve the purpose of the study the researcher used ethnography research design. The responses had collected by class observation and interview with both teachers and students. Two mathematics teacher and four students of class eleven were taken purposively as population of the study.

The researcher had developed the questionnaire and classroom observation guideline under the guidance of supervisor. All the question were related to the perception of teacher and students on the role of English language in teaching learning mathematics and language problem faced by teacher and students in teaching learning mathematics in English language at +2 level. The collected data was changed in to Nepali from English. The researcher create theme meaningfully and finally the achieved data will interpret with related theories.

Finding of the Study

The major findings of this study are based on responses of four mathematics students and two teachers who taught mathematics in grade 11 &12 and class

observation. It is found that the teacher and students have faced great language problems in teaching learning mathematics in English medium. On the basis of interpretation of the data the major finding of the study are presented below:

- All they strongly agreed that the English language hindered in teaching learning mathematics in grade 11 &12,
- They realized that language proficiency helps in mathematics learning in this level and decide the achievement of students,
- The teacher need to know the Nepali meaning of each word because Nepali's background students need more explanation and Nepali translation of lingual problems and mathematical terms and content that creates difficulties for the teacher and takes more time,
- Because of the weak language proficiency they couldn't conceptualize, comprehend, memorize and understand the mathematical terms, definition and concepts meaningfully that push them to rote learning,
- The students having good language competency having better participation in communication and interaction with teacher and friends. Also having better understanding and achievement,
- Mathematics need some imagination and creativity but they imagine the theme in Nepali and have to present it in English at this moment they have to translate their feeling from Nepali to English which is really very difficult for them,
- English language, the medium of instruction makes mathematics very confusing and the notions are also confusing too. Because they have learned mathematics in English first time,

- Medium of instruction is the major reason promoting math anxiety in student's participation in teaching and learning activities most of the students remain quiet and just copying the solution done by teacher on the board,
- Few students changed their subject in middle year and few leave the school because of English language as the medium of instruction,
- Some of the students know the definition and proof on their own words and Nepali but they couldn't present it in systematic order in English. It is very difficult to recall and write the definition and theoretical content,
- Most of the students felt difficulties related to generalization of formulae and rules,
- I found that there is no proper communication between teacher and students in mathematics classroom. Every activity is teacher centered and delivered like one way teaching. The understanding, comprehending and conceptualizing of mathematical content depend on teacher,
- Some students felt that the teacher shows more affection towards with the better performance and good English proficiency.

Conclusion

From the above finding of the study it was concluded that all the teacher and student of strongly agreed and realized that the English language hindered in teaching learning mathematics. Students having weak English competency struggled on conceptualizing, comprehending, memorizing and understanding the mathematical terms, definition and concepts meaningfully that effect directly on student achievement. As we know that mathematics need some imagination and creativity but because of English language students could not present the same thing which they have imagine. It was also concluded that Nepali's background students requires more

explanation and Nepali translation of lingual problems and mathematical terms and content that creates difficulties for the teacher and takes more time.

In constructivist philosophical approach language is the key mean of negotiation and interaction and learning takes place through interaction and negotiation. There was lack of proper communication and interaction between teacher and students who came from Nepali background. Student having weak language proficiency have not better participation in communication and interaction. Finally it was concluded that English medium of instruction is one of the major reason of less achievement and promoting mathematics anxiety.

Recommendations

The conclusion of the study can't be generalized to all areas due to the limitation contained in the study. Thus after analyzing the conclusion and implication of the study the researcher has made the following recommendations or suggestion for further studies.

- This study was limited in Rupandehi district. For generalization of the study similar study should be done in wider scope and large sample,
- Curriculum designer, Policy maker and administrator should select appropriate language for teaching learning mathematics,
- Book writer and reference material designer should decide difficulty level of language,
- Teacher should use different strategies to teach Nepali's background students,
- Teacher should suggest to use mathematics dictionary to all mathematics,
- Institution and Teacher Should Provide guidance to students to improve the language competency,

- school should provide extra classes for those students came from Nepali background.

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Guiding interview question

I am Arjun Pal, student of Tribhuvan University Department of mathematics education, now I am carrying out research on “*Problems Faced by Teachers and Students in Teaching Learning Mathematics in English Medium.*” This questionnaire consist 10 questions for teachers and 10 questions for students also. I requested you to co-operate by giving your response to the question below. I promise that I will maintain confidently and will use the information for research purpose only. Your cooperation in this regard will be individual for me to complete the research.

Students

1. एउटा गणित सिकारुको हैसियतले आफ्नो परिचय दिनुहोस् ?

Could you introduce yourself with the experience as mathematics learners?

2. स्कुलको समयमा तपाईंको गणितीय सक्षमता कस्तो थियो ? के भाषिक सक्षमताले गणित सिकारुमा सहयोग गर्दछ ?

What short of image did you posses regarding mathematics during your school days ? Did language proficiency helps in mathematics learning?

3. तपाईंको कक्षाकोठामा गणित कुन भाषामा शिक्षण गरिन्छ ? के तपाईं त्यसबाट सन्तुष्ट हुनुहुन्छ?

What is the medium of instruction in your mathematics classroom? Is it compatible for you?

4. अंग्रेजी भाषामा गणित सिक्दा तपाईंले के कस्ता समस्याको सामना गर्नुपर्दछ ?

What kind of difficulties do you faced in learning mathematics in English language?

5. नेपाली र अंग्रेजी भाषामा गणित सिक्दा तपाईंले के कस्ता भिन्नताहरु पाउनु भयो?

How was mathematics learning is different in Nepali and English language?

6. कक्षा कोठामा शिक्षक र साथीहरूसंग छलफल गर्दा कुन भाषाको बढी प्रयोग गर्नु हुन्छ?

Which language do you use in classroom interacting with teacher and friends?

7. के तपाइको गणित शिक्षकले अंग्रेजी कमजोर र राम्रो भएका विद्यार्थीहरूमा विभेद गर्नुहुन्छ?

Does your teacher discriminate between weak and good English proficiency students?

8. गणित सिकाई गर्दा भाषगत समस्या परेको बखत तपाइको शिक्षकले कसरी सहयोग गर्नु हुन्छ?

What is the role of your teacher when you feel difficulty with English language during mathematics learning?

9. अंग्रेजी कमजोर भएका सिकारुका लागि तपाइको शिक्षकले के कस्ता सिकाईका अवसरहरू सिर्जना गर्दछन्?

How does your teacher create learning opportunities for those students who have weak language proficiency?

10. तपाईंलाई कुन भाषामा गणित अध्ययन गर्दा रमाईलो लाग्दछ?

In which language do you feel better while learning mathematics.

Teachers

1. Could you introduce yourself with the experiences as mathematics learner and teacher?
2. What is the medium of instruction when you learned mathematics at same level you are teaching now? What different you feel between mathematics learner and teacher?
3. What difficulties did you experience in understanding mathematical concepts in your school days? Do you agree that language proficiency helps in mathematics learning?
4. What is the medium of instruction in your mathematics classroom? Is it compatible for you?
5. What kind of difficulties do you face in teaching mathematics in English language?
6. Which language do you use in classroom interacting with your students?
7. Do you think teaching mathematics at school and college are different? Is there any different in the mathematical achievement of students from public and private school?
8. Do you think that English language hinder mathematics learning? If yes, then how you cope this problem?
9. How did you create opportunities for those students who have weak English proficiency?
10. In which language do you feel better while teaching mathematics?

Tribhuvan University, Kirtipur, Kathmandu

Classroom Observation Guidelines

Name of Teacher:..... Date of Observation:.....

Level of Observed Class..... Name of School:.....

Items	Qualitative information
Classroom Management	
Well managed	
Traditional class setting	
Teaching Methods	
Lecture method	
Discussion method	
Project method	
Other method	
Medium of Instruction	
Nepali	
English	
Others	
Use of Language in Interaction	
English use most	
Nepali use most	
Degree of use of Language	
Proficient user	
Novice user	
No user	
Students Engagement	
Discussion	
Direct by teacher	
Interest/excitement	
Others	
Student talk	
Student initiated	

Teacher-student talk	
Student-student talk	
Learning Difficulties	
Student need translation	
Know but can't explain	
Does not understand the mathematical concept	
Others	
Mathematics Vocabulary	
Meaning translation method	
Define properly	
Graphical representation	
Give some example	
Responsiveness to Students Feedback	
The teacher is paying attention to the cause of problem and confusion	
The teacher encourage students questions	
The teacher provides students opportunities to mention problems	