EXPLORING LEARNING DIFFICULTIES IN SCHOOL LEVEL GEOMETRY

Surendra Singh Thagunna

A Dissertation

Submitted to

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in partial fulfillment of the requirements for the degree of

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DECLARATION

I hereby declare that this thesis has not been submitted for candidature for any other degree.

_____ July 05, 2015

Surendra Singh Thagunna

Degree Candidate

DEDICATION

This work is profoundly dedicated

To my Father Mr. Man Singh Thagunna and Mother Ms. Pasupati Devi Thagunna whose guidelines, vision, wishes, and blessings have given me the strength to live my life uniquely.

AN ABSTRACT OF THE DISSERTATION OF

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This dissertation portrays my lived experience in educational journey and makes an exploration into my pedagogical practices as a student, teacher, teacher trainer and novice researcher. Mainly, I focused on the how difficulties impact in learning achievement of geometry and how learning difficulties creates. In this study, I used interpretive and critical, research paradigms to shape my dissertation where autoethnography helped me to observe critically and it produce the research text of my cultural and professional contexts of learning and teaching mathematics in Geometry. For this, I have used postmodern approach thereby multiple genres of writing such as stories, diary, poems, and narratives as a major source of data generation.

Articulating myself within the multi-paradigmatic space and as an autoethnographic researcher, I have used the term 'autoethnography' as a synthesis research methodology by uncovering my 'Personal via. Professional' experiences to layer out the transformative source of data cohort. So, auto-ethnography helped me to place myself within my culture thereby enabling me to explore 'multilayered pictures' (i.e. journey toward different metamorphosis and pedagogical empowerment) of my educative practice through the reconstructing of self and others. Autoethnographic

inquiry also helped me to examine the pedagogical culture and context from different perspectives as students, teachers, and researcher thereby offering space for interpretation, transformation and envisioning. During the process of this self-investigation, this inquiry has changed my understanding about the reality, my views towards how to know the reality and accordingly what ways to espouse to understand the reality. My reflection and the review of literature have formed the ground for the same. In the process I have represented my stories and poem which has shown in the form of transformation based on my research project. After my investigation of traditional teachers - centered teaching learning strategy and root memorization method, I didn't find these dualities so helpful

and meaningful to understand geometry. I have experienced many situations which I encountered in classroom as both a teacher and a student.

Nonetheless, the focal aim of my research work was to find out learning difficulties in geometry, how difficulties are created in geometry and what is the remedy of teaching learning geometry in secondary level classroom. In regard to theoretical referents and making my research more trustworthiness, I have considered realistic mathematics theory (RME), Burner's theory of discovery and Van Hiele theory moreover different learning theories as my guide. Based on those research contexts, I hope my inquiry will make little bit of contribution for further improvement in the field of secondary level geometry in school.

Thus, in this dissertation I have touched mainly three geometry-learning difficulty contexts that are often complicated for learners. Firstly, it focuses in how difficulties are created in school level geometry. I show different scenario of my experience as teacher and student. Secondly, I identify main problem of learning difficulties in geometry based fallacy. In our learning system we are following traditional

method of teaching learning i.e. speech, discourse, lecture etc. Thirdly, it focuses on how those misconceptions are reduced and what are the remedies for it. For this session, I also figure out the needs of geometry.

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Surendra Singh Thagunna July 05, 2015

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I understand that my dissertation will become part of the permanent collection of the library of Kathmandu University. My signature below authorizes release of my dissertation to any reader upon request.

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ACRONYMS

APA `	American Psychological Association
ASA	Angle Side Angle
B. Ed.	Bachelor of Education
CAMT	Computer Application in Mathematics Teaching
CDC	Curriculum Development Centre
EFA	Education For All
HOD	Head of Department
HPE	Health Population and Environment
ICT	Information Communication Technology
KU	Kathmandu University
LHS	Left Hand Side
MBA	Master in Business Administration
M.ED	Master Of Education
MOE	Ministry OF Education
PHD	Doctor Of Philosophy
RHS	Right angle Hypotenuse, Side
RHS	Right Hand Side
RME	Realistic Mathematics Education
SAS	Side, Angle, Side
SLC	School Leaving Certificate
SSS	Side, Side, Side
UNESCO	United Nation Education Scientific and Cultural Origination

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION-RE/CONSTRUCTING RESEARCH AGENDA

Chapter Overview

To some, teaching is a passion or a vocation as though teaching is life; but for others it is a profession and the school is just a machine that produces products with big heads ready for cognitive enterprises. (Milton, 2012)

This chapter portrays my experience of teaching learning mathematics and the difficulties on learning geometry as a student and a teacher. In this chapter I have include purpose of my study, problem statement, research question, limitation of the study and structural design of my inquiry. It also embrace the background of the study - its derivative, the inquiry agendas, why is it worth-doing? How does it contribute to the field of mathematical knowledge? And also, begins to tell little bit about my journey started to serve the discrete nature of this study. Overall, this chapter tells you of my life's journey in the globe of research, ranging from many research agenda to one, from pain to pleasure. But those downfall moments of my life serve as nutrients that nourish the plant to make it grow stronger and fruitful.

My Journey Starts T/[1]here

It is wise to say; 'Interest and dedication makes everything possible'. Of course human nature is very optimistic, therefore, before hardworking we all calculate and search the benefits of our hardworking. Sometime we forget the strong interest and continuous dedication make it possible and more realistic. When I started with research units with my supervisor and other colleagues, first thing that came to my

[1] I have used the symbolism of slash (/) to represent the dialectical relationship between sometime opposing attributes. Thus, this notion slash (/) represents my dialectical thinking and expression.

mind is ‘I will select a suitable research agenda that will enable me to finish within two months so that I would not need to stay in here, Kathmandu University.

Annoyingly, it did not happen. Remembering the very beginning days of my research journey, I chose another topic but it did not give me any satisfaction. At this moment, I hang myself many hours a day on flashing my life’s work experiences which may give me more pleasure and satisfaction. Then, I start to consult with my different colleagues who also suggest many attractive topics but again it does not touch my heart. Time and again I get disappointed. They say ‘every new day gives you one more chance to make your life more beautiful’. The same thing happened with me. One day when I was entering my classroom my supervisor and other colleagues were busy discussing about geometrical problem and its common fallacy about students. After long and very insightful discussion there, un/knowingly I request my supervisor; “sir! Can I conduct my research on this topic?” He smiled quite amusingly and replied; “fabulous Surendra ji but I suggest you to be sure why you are interested in this topic? However, if you have proper data and experiences about it then you can conduct research.” Again, my couple of days has been passed without any progress.

A few weeks later on March 2012, The first day of our research class Ass. Prof Luitel entered the class with other two co-instructor carrying big pockets of reading materials where I and my other colleagues were ready to welcome him. Mr. Luitel had started his conversation about the comprehensive descriptions about research and various possibilities to the selection of research topic. At that moment, I didn’t understand anything but his one sentence made me clear that "what kinds of problem you are facing your professional life and your own teaching-learning problem that may be your best research topic’.

"After that sentence I didn't listen him anymore because it made me clear that a problem of my professional and student life may be my future research agenda. Immediately, I remembered my last class discussion about the Learning difficulties in Geometry. Then, I was convinced myself to conduct research on the topic; 'Learning difficulties in Geometry'.

This is the shortest experience of my research journey. However, I intend to include this story because I want to illustrate how it feels to be a researcher when he/she is presenting his/her works in dilemmatic period. Clearly, it also shows that how one researcher put himself as a researcher by researching his/her experiences. Although, I was good student in mathematics but in geometry I always got trouble and used to think that geometry is not a part of mathematics. As a mathematics student in my school days, I never felt that the problem of geometry is the basically other's problem. My assumptions about geometry is as an '*abstract subject'* (although I never got chance to change the geometrical problem into the linguistic form) which always pushed me to try rote-memorization strategies of learning. Most of the time I thought rote-memorization was the best way of learning and at times I thought abstract knowing was the best way of learning. I rarely found that geometry is presented as a social subject. When I followed conceptual and contextualised knowing by relating geometrical ideas with my cultural and physical world, I never got a chance to visualize it.

Some Scenarios And Anxiety of Mathematics

Earnest (1991), identified the aim of mathematics education into five different groups namely painted on; industrial trainer aims, technological pragmatist aims, old humanist aims, progressive educator aims public educator aims. As my experience I

used to think that the aim of mathematics education is to learn mathematics problems which help us to excel in business.

I always used to think that mathematics and business is same and they should learn mathematics who wants to involve in business in future. So, I was weak in mathematics in my school level. Mathematics had never been a favorite subject of mine in school level and I have never been the insightful mathematician; I struggled a lot with challenging and abstract math problems because of that I think now I have good relationship and attachment with mathematics.

> *Sir! My son is very weak in mathematics, what to do? Sir, look this report card my son has passed all subjects but he failed in both mathematics (Optional Mathematics and compulsory Mathematics)? Sir My daughter want to join extra tuition class of mathematics, when are you going to start extra tuition class? These are questions which I face usually first hour of my school. One educated parent said me "Sir I don't mind my children become weak in other subjects but they should be good in Mathematics and Science."*

With my experience of teaching learning in different private and government schools, I found that parents, family, community, even teachers also think that mathematics is difficult subject and only god-gifted student can be able to understand and learn mathematics. Perhaps, this belief is strongly rooted in our educational practice.

Nowadays, among many people the practice of giving math tuitions has ever increased. If schools secure 100% result and student gain more and more percentage in SLC that school and student is counted in a list of success. Other all are treated as unsuccessful and useless. Here, I am going to present some data about students failure

percentage in mathematics compared with other subjects. This data talks itself about the condition of mathematics teaching learning in our country.

Student group	All subjects	Nepali	English	Math	Science	Social	HPE
All students							
Pass rate (%)	51.53	92.44	76.19	63.01	81.51	89.33	98.08
Score	47.93	44.48	45.11	37.09	49.54	43.22	62.02
CV of score	0.260	0.265	0.386	0.581	0.301	0.288	0.189
Gender							
Female							
Pass rate (%)	45.81	91.78	73.85	56.68	78.83	87.14	97.95
Score	46.23	43.93	43.57	33.46	47.53	41.64	61.11
CV of score	0.258	0.267	0.392	0.607	0.302	0.295	0.190
Male							
Pass rate (%)	56.01	92.98	78.10	68.17	83.69	91.13	98.19
Score	49.26	44.92	46.36	40.02	51.18	44.49	62.76
CV of score	0.258	0.263	0.379	0.551	0.296	0.279	0.188
School Type							
Public							
Pass rate (%)	41.74	90.97	70.71	56.15	77.81	87.03	97.66
Score	44.16	42.27	39.10	31.71	45.49	40.74	59.26
CV of score	0.221	0.257	0.327	0.571	0.272	0.281	0.180
Private							
Pass rate (%)	88.02	98.31	98.06	90.53	96.35	98.53	99.75
Score	61.91	52.75	67.70	57.30	64.78	52.54	72.38
CV of score	0.185	0.218	0.199	0.374	0.211	0.220	0.133

Data source: *www.moe.gov.np*

This data portrays that there is really something lacking in mathematics and there are some difficulties in mathematics. Here, I am going to present subject wise students' achievement in SLC. Study on Student Performance in SLC (SLC Study Report, 2013) book written by Bhatta (2005) "Determinant of student's performance in SLC examination" repaired for the Ministry of Education and Sports/ ESAT by the SLC Study Team. This report makes clear that student's achievement in mathematics is really horrible. And it also proves that mathematics is really difficult subject for students.

As expected, the pass rates for mathematics, is lower than the pass rates in other subjects. Interestingly, although the pass rates in Nepali and Social studies are relatively high, the average scores in these subjects are in the low range. This can be explained by the grading practices in these particular subjects. While exam markers have no problems giving passing scores to deserving students, they rarely assign scores above 90 even to the best students. Note that Mathematics is at the bottom of

the list in terms of both average score and pass rate. The low score in Mathematics is particularly troubling since it is possible for students to secure close to a perfect score in this subject.

I simply want to stress again that mathematics is not difficult subject it is we who make it difficult. In fact, we teachers are making it difficult. In my teaching experience I faced different types of students those who are high achievers to whom we called god gifted and low achiever who are often neglected.

They have different problems which makes them weak in mathematics. They often do not understand everyday situations or phrases found in math books, which are obvious for the majority. In a class there are different types of students having different intelligence.

We have to find out new context for the mathematical tasks for the disadvantaged children and at the same time we have to help pupils to understand the words of mathematical books in use. Some students face language problem spoken by teacher. Some need repetition of same term more than two times. Children do not want, do not dare or simply they are not able to ask. They will not ask during the learning process if they do not understand something, consequently they will not have any answers, and they will fall behind. In addition, as they do not put their problems into words, their way of thinking will be affected. It will not develop. Development of everyday communication skills is an important part of mathematics learning. Students cannot see the point of mathematics learning - they do not understand the purpose of it. The majority does not even see the point of mathematics learning, but they generally know that going to school and studying important role in their future

life. Disadvantaged students need more direct explanations for the connection between mathematics learning and real life.

Statement Of The Problem

Nowadays, in educational research many researchers have been carried out in "learning difficulties" (Qian, 1996). However, most of the research conducted on Nepalese context focused on discussion of psychology of learning, which discovers the lack of connection to concrete content in mathematics. Although, some scholars' mentioned that learning difficulty is a significant topic in the research field (Du, 2003; Tao, 2004), it is still rare in research that focuses on high school students' learning difficulties in geometry. In particular, there seems to be lack of effective strategies to improve those learners who have been struggling to connect geometry in their educational processes. There is also factual but hidden belief that geometry is very difficult subject to learn and to understand also. This type of belief also poses that the anxiety regarding t geometry is directly or indirectly has some impact on their educational achievement as well.

Mathematics anxiety for students as well as teacher is normally common phenomenon in our schooling. Little idea is always dangerous. However, the nature of knowledge is not measured by the amount of little vs. big. But the problem is how knowledge is perceived. So, the amount of knowledge depends on receiver's interest and devotion. Many students have delicate negative beliefs which make it more difficult to read and learn. We always used to say that every student has same level of mind. No one has more or less mind. If it is right then why can't they learn mathematics equally? So, my concern is here; why most students are becoming poor in learning geometry? For

this problem I take many cases from different classes. I talked with low achiever students who read whole year mathematics and at last in exam they get less than ten marks out of hundred marks. What it means is either a student doesn't know anything about mathematics or our evaluation system is totally wrong and failure here? Finally, I realize that the geometric part of mathematics has become problem for students.

As my personal experience, I feel that students are weak to solve geometry problem in mathematics when I tried to search the problem I asked many teachers who are teaching in government and private schools. One main problem they suggested is that geometry is based on study of figure and study of imaginary lines and figure so it becomes little difficult to understand the concept of geometry for students and another problem is that we don't have sufficient teaching materials so it is a problem to teach geometry in school level.

One very common problem is geometry part is kept at the end of the textbook in most of textbook so almost all schools and teachers are unable to complete the course and they leave last chapter geometry without teaching. Students don't have basic knowledge of geometry so they feel very difficult to understand the geometry part in secondary level. Despite all these noble efforts, the problem of poor achievement in mathematics has continued to rear its head.

It is based on this fact that this research identified geometry as a core difficult area where student's performance has always been low. There are many reasons that could cause students to have learning difficulties in mathematics. For example, students with poor performance may fail in mathematical learning from not making sense of mathematics learning. There are different types of learning difficulties in

mathematics in high school level in Nepal. Therefore, it is necessary to apply proper strategies to improve their learning difficulties.

Purpose of the Study

To address the problem as stated above, the basic motif of this research was exploring the learning difficulties of students in geometry and to find out their problems and possible solution. So, the main purpose of my study is identifying the possible factors that contribute to the difficulty in teaching and learning of geometry examining the strategies that could remedy the difficulty in the teaching and learning of geometry. Of course, we learn geometry because it helps to develop spatial reasoning and problem solving skills. Geometry is linked to many other subject of mathematics, specifically measurement and is used daily by architects, engineers, architects, physicists and land surveyors just to name a few. Geometry becomes much more about analysis and reasoning. Sriraman, et. all (2006) and Clements et. all (2001) put that; “The importance of studying and teaching geometry is well established in the literature and is stressed in contemporary mathematics curricula not only as an autonomous mathematics field, but also as a mean to develop other mathematical concepts”. It also used in higher math concepts than algebra, trigonometry etc. So, the basic purpose of studying geometry is for us to learn how to measure the shapes and areas that we see in our world. Just consider the theorems on angles.

My Research Questions

As a nature of auto-ethnographic research; my constructed research questions to meet the purpose of this inquiry are as follows:

- Considering my lifework experience as a student, teacher and fellow-educator, how do I portray the teaching/learning geometry in context of Nepalese classroom?
- How might geometric fallacy create the learning difficulties?
- In what ways can geometry be taught for meaningful understanding?

Significations Of The Study

Of course every study has its own rationale and justification. Well, every work done by its own identity and pleasure. Hence, my work is my identity, my work is my pleasure. So, this auto ethnographic has dual rationale. Firstly, considering the demand of learning difficulties of my learners, definitely my inquiry helps to those learner and teacher who are really expressing learning difficulty in their geometry classroom and any moment in his/her lifework journey. so, the core and contextual significance of my inquiry has deliberate those pupils who have low geometrical performance in mathematics classroom and further more it investigates about the role of family and teachers and their learning achievements in mathematics. Accordingly, my inquiry helps to search the question of "What strategies can be used to help students with learning difficulties in geometry?" This study is more significant for me and as well as to other readers and novice researchers.

It is significant for me in a sense that I will get the opportunity to reflect upon my lifework learning geometry experiences and try to link in geometry in different natural/constructed shape and size with mixing my latent understanding and knowledge of mathematics. So, it is a self-investigation and empowerment. Hence, the first significance of this research is imperative to me, in the sense that, this research will help me by means of the self-reflection to understand myself, my teaching-learning processes and my background regarding the answers to the question: 'why every growing pupil express their learning difficulties in their mathematics classroom?'

Furthermore, this is an opportunity for me to shape my own research practice based on an auto ethnographic inquiry of my personal experiences which is one of the contemporary qualitative research approaches of the postmodernist period. So, the research will transform my worldview from an objectivist (structuralism) to subjectivist (post structuralism/ postmodernism). Thirdly, as Luitel (2009) and Joshi (2013) mention in their inquiry, I hope my writing will stimulate and benefit my readers to think critically and participate in reflecting on themselves via reading my narratives. I hope novice researchers who are working in the field of auto ethnographic research may also get benefits from this study. So, the readers will understand the learning transformation and pragmatic shift and it will encourage them to adapt a transformative educational pedagogy. Fourthly, I expect that this research will help Nepalese researchers to become aware of new approaches of qualitative research in the context of the Nepalese Education System.

It will visualize new avenues of educational research and pedagogical metamorphosis in the context of bridging between the theoretical knowledge and practical-lifework knowledge for empowering their learning outcomes and quality of

education through real-world experiences in their learning adventures. Lastly, I expect that the insights of this research might be useful more specifically to establish qualitative trend against quantitative hegemony in Nepal. It will also help to draw an analogy and to understand Nepalese academic milieu and its pedagogical practice as a whole, and deliver to the practical based learning pedagogy through the mutual collaboration between teacher and learners.

Structural Design Of My Inquiry

My overall dissertation has been separated into seven chapters. I would like to discuss the outline of the chapters in brief. My reflections through narration, dialogue; pictures, stories, and poem are the data in this dissertations. Analysis (Theme) and interpretation, review and citations have been conveyed together in each chapter. My dissertation chapters are mainly structured on following ways:

Chapter I, Offer a broad introduction to research topic, how and why this topic is selected, and to show difficulties in geometry I have presented some numerical data also, significance of the study, purpose of the study, research questions.

Chapter II, Deals with the conceptual and theoretical background, I have explained Burner's theory of discovery and realistic mathematics education theory (RME) to covering literature on relevant to my research agenda regarding to geometry learning.

Chapter III, I am going to narrate my experiences in my method and methodology and paradigm in my project. It controls my research process and situates me in the culture of auto ethnographic genre of qualitative research.

Chapter IV, Contains my personal journey of teaching/learning mathematics. It provides detailed information of learning geometry and encountered by difficulties in teaching/learning and how those difficulties have impact on my mathematics

achievement. This chapter helps me to find out the answer of my first set of research question.

Chapter V, This chapter describe in briefly causes of difficulties. In this chapter I am going to focus fallacy. I think fallacy is the main cause of creating difficulties. This chapter gives the answer of my second set of research question.

Chapter VI, In this chapter I am going to write solution of my first and second research question. I am writing of solution of question like; how can we teach geometry effectively? What are the needs of the teaching learning geometry? I am writing whole chapter on basis of my experience of teacher, student and novice researcher.

Chapter VII, Gives a synthesis view of my research and conclusion to my research landscapes. So, this chapter demonstrates my overall metamorphosis from my research journey. I am going to conclude my work and I am going to write about change on me and my practice, in my thinking, and way of view before this inquiry and after this inquiry.

Chapter Summary

This chapter shows the empirical based learning-teaching experiences towards conducting this research inquiry. It contains my research questions and purpose of my study. In this chapter I have tried to express my feelings and experiences as I faced as a novice researcher. To address the difficulties in mathematics I have given some numerical data as evidence. I have expressed the situation of selecting my research topic and brief description of significance of my study. In the last chapter I have manipulated roadmap of my further inquiry.

CHAPTER II

LOCATING MY RESEARCH IN THE FIELD OF PRE EXISTED DOMAIN

Chapter Overview

In the field of educational research the term ‘literature review’ refers to the work what we consult in order to understand and investigate the proper connection of our research problem. We know that the work cannot be measure any more. So, the main purpose of this chapter is to achieve more knowledge about the subject matter, and research question which is going to be studied. It makes more familiar, closer and easier to understand the relevant terminology on the selected topic or subject matter. Furthermore, it is very extensive search of the specific research field.

Of course, utilizing existing research strategies to make certain that the maximum extent of relevant meaning has been considered. So, in chapter I have tried to articulate some of relevant article, books, theory and papers based on my inquiry. Those articles and books are evaluated by using appraisal instruments and multiple meaning is usually established. Furthermore a literature review sharpens our research focus or we can say it gives a direction to researcher. Primary sources such as un/published journals, thesis/dissertation, articles books, and as secondary source newspapers, magazines, films and audio and video or any publication also are used under this inquiry.

Why This Chapter is Important for My Research?

This chapter is very important for me to get a proper direction of my research and to get support my idea and views. I am doing my research under the different theory's and views of different professional researcher and educationalist. To make my research more dependable and trustworthy I am going to present my data in different form such as poetry, novels, history, biography, and essays. Wiersma (1995)

observed, “It establishes the need for the research and indicates that the writer is knowledgeable about the area” (p.406). So, literature review does not only provide me guidelines for my research moreover it prevents me from duplicating another person’s research un/intentionally and gives me some ontological, epistemological and axiological understanding and insight.

It may be justifiable to say that literature review is important and vital research tool for every successful research. It examines body of literature pointing toward the answer to our research question. I think it is not only essential for building my thesis heavier but it may uncover the stereotypes which provide the fundamental gap between theoretical knowledge and practical knowledge. Here, the literatures I have identified are soulfully read, critically analyzed, consciously synthesized and coherently and logically structured and meaningfully relevant in my study. It also helps me to create a sense of rapport with my reader so they can trust the fact that I have done. Of course, as a fellow-researcher I know about my research but to make it trustworthy to make it valid I need a literature review in my research.

So, this chapter helps me to condense, evaluate, synthesize and paraphrase the idea of exterior sources in my own context.

It helps me to compare and contrast what previous researcher doing in the historical context of research as well as how my research is different or original from others researchers have done. Thus, this chapter is essential for me because it provide me a bigger picture to shape and guide my study in the direction that may not have thought of by offering insights and different perspectives on my research topic.

Fulfilling Research Gap Connecting Some Theories

Being at this stage, I often have had difficulty in determining how broad my literature review should be. I am still confused that all literature directly related to my topic are to be reviewed or not; I do not just know when to quit! I have trouble in determining which articles are 'related enough' to my topic to be included. Unfortunately, I have not found any formulae that can be applied to solve this problem. However, for making my theoretical position stronger, clear and contextual I have used some theory as fulfilling my research gap and linking it into my own context. With the help of some theories and literature I tried to make my narratives more similar to my dissertation readers. Those theories are as below;

Thematic Review

What is Learning Difficulties?

As reading some literature related to learning difficulties, usually the term 'learning difficulties' is applied to students who's learning problems in school are not directly related to any specific physical, sensory or intellectual impairment, some case it may be below the average. Instead, the learning difficulties may be due to external factors such as socio-cultural disadvantage, limited opportunities to learn, a lack of support from home, an inappropriate curriculum or insufficient teaching in the early years. Elkins (2005) also state that; Learning difficulty is a term used to describe any one of a number of barriers to learning that a child may experience. It is a broad term that covers a wide range of needs and problems. As a student my experience about teaching learning difficulties in geometry is lake of understands of problem. I always feel more difficulties in word problem and geometrical figures.

I feel it is my personal difficulties. My school, home, surrounding and my society was my world .when my teacher taught in a class I feel that he was talking

about something out of imagination there is no link between my world and my books so I feel uneasy with my books and my learning activities. I feel weak among other friends. In my secondary level of schooling difficulties is increased as a culture with me. I like language subject very much because there was a story in language subject I used to read same stories in many time and I wish if all my subjects are like language subject or in the form of story I may be good in every subject. Supporting my argument Queensland studies Authority (2007, p. 1) put that "Learning difficulties refers to barriers that limit access to, participation in, and outcomes from the curriculum'. The learning problems these students experience are often further exacerbated by their emotional reaction to lack of success.

These students, in the past, have been referred to as 'slow learner' and 'low achievers." Likewise, Badian (1996) even refers to them as having 'gardan variety' learning problems, meaning that such difficulties are widespread and in no way unusual. We normally refer to these students now as having general learning difficulties. Their lack of success is evident most area of the school curriculum. The term learning difficulty occurs by learning disability of the students.

According to dictionary.com the meaning of word dif·fi·cul·ty [dif-i-kuhl-tee, -k*uh*l- tee *noun, plural* dif·fi·cul·ties] is the fact or condition of being difficult often, difficulties. an embarrassing situation, especially of financial affairs and trouble or struggle a cause of trouble, struggle, or embarrassment a disagreement or dispute. What is a difficulty? Only a word indicating the degree of effort required to accomplish something! A mere notice of the necessity for exertion; a scarecrow to children and fools and a stimulus to real men (Warren 2012). When we do something work and feel trouble to do the work is called difficulties. Classroom educators

already know there is a wide range of student abilities within a year level and with this come significant planning and programming issues.

In fact Booker, Bond, Sparrow and Swan (2004) suggest that most students have a learned difficulty. That is, educators have created their mathematical problems. Regardless of the reason for students' mathematical difficulties i.e. fundamental or extrinsic factors, educators still need to get on and teach. Learning occurs in settings that are supportive and caring. Students with learning difficulties may already have an external locus of control i.e. they believe they can't improve their mathematical capacities. It is when they feel confident to have a go, make mistakes, discuss and question, that engagement and achievement will occur. In my school days when I was feeling difficulties to solve word problem I have not got any solution for this difficulties but as a teacher when I saw students like me are feeling trouble in mathematical word problem then I start connect all word problem to our real world problem as a result I become success to teach word problem.

To be successful in solving word problems, students need to learn how to read such problems. Simply decoding words or extracting arithmetic operations is not enough: students must learn to read between the lines and understand what they are expected to do mathematically.

Causes and Effect of Learning Difficulties

Potential Causes Of Learning Difficulty

Here I have tried to present some possible factor of learning difficulties. Regardless of whether a learning difficulty is general or specific, and regardless of whether a student is gifted or average, several factors can causes difficulties in learning. Twomey (2006) suggests that there are three perspectives on learning

difficulties and their underline causes, each focusing rather different factors and highlighting different characteristics in the students.

The Deficit Model

In this model It is assume that that learning difficulties are caused by cognitive and perceptual weakness within the student. In this model there are different characteristics like below average intelligence, poor attention to task, visual and auditory processing difficulties, weak memory capacity, problem of complex language etc.

According to (Abosi, 2007) deficit model is state like "In addition, under the deficit model disadvantages in the student's cultural or home back ground, such as a dysfunctional family situation, problems associated with English as a second language, low expectations, lack of support, health problems and poverty may also contribute to difficulties in learning."

The Inefficient Learner Model

In this model it believes that learning problem is due to an individual failing to approach school learning in a systematic way, (Twomey, 2006) state that in this model "The individual has not discovered *how to learn* effectively in school.

The Environment Factors Model

This model states that learning difficulties are due mainly to environment influences. The most significant of which is the quality and appropriateness of the teaching that an individual receives (Hotchkis, 1999). In side environment it comes home environment, school environment, and surrounding.

Computational Weakness

Many students are despite the good understanding of concepts knowledge of mathematics. They make errors in miner places like uses of fundamental of basic

operation of mathematics and basic computational even they might have high level of potential for higher level mathematics thinking.

Difficulties in Language

Mathematics problem are inability to easily connect the abstract or conceptual aspects of math with reality. There are different signs and symbols which are different from our physical life and which is too much difficulties to understand and remember and to find meaning of that symbol. Suppose when we talk about half degree angle in class room students can't make figure and image in their mind same way the concept of three dimension or plans.

Incomplete Understanding of The Mathematical Language

The language which we use in mathematics class room and out of the class room is totally different. Suppose to translate the word problem in to verbal and mathematical problem. There are difficulties with the vocabulary of math, language in word problems and they have difficulties remembering assigned values or definitions in specific problems.

Output Difficulties

The student may have the problem in output to unable to recall or memorization of formula, procedure, rules and basic term of the mathematics. Very slow handwriting and rough handwriting may also make difficult to understand the pervious problem and forgetting what s/he done in middle of the problem are difficulties in mathematics.

Attention Difficulties

A student with attention problems in math may be distracted or fidgety during math task. One who has no attention in classroom and lack of the connection of pervious theory, knowledge in new context is bring difficulty in mathematics.

Visual Spatial or Ordering Difficulties

Students have difficulties in visual, spatial or ordering. In mathematics geometry there are maximum problem related to visual and study of figure and to use their own common sense for construction of figures and some imaginary figures which is impossible to draw in paper. So it makes the geometry part little difficult.

Teachers' Perspectives

There is important role of teachers in teaching and learning process. Rarely do they seek to improve the quality of their own teaching, or provide students with guidance in more effective ways of learning (Dettori & Ott, 2006; Elkins, 2007; Westwood, 1995). If teachers believe that learning difficulties are caused by innate characteristics of learners, combined with outside influences from the home and culture, there will be general reluctance to review teaching methods or revise curriculum content (McCowen, 1998).

In addition, they often anticipate that these students will exhibit poor behavior in class, and this leads a teacher to focus on classroom management rather than differentiating or modifying instruction (Bakker & Bosman, 2006).

Teaching Methods and Curricula

In terms of environmental influences on learning, teaching methods and school curricula can often cause or exacerbate learning difficulties. Now days methods of teaching is rarely investigated as a possible cause of learning difficulties. Teachers seems to assume that if something is taught it is automatically learned, and if it is not learned, then the problem must be due to the own ability of student, motivation or persistence, not to the effectiveness of the reaching method. However, all methods are equally used to achieve the goal of learning.

Lack of Encouragement From Parents (or Teachers) and Home Environment

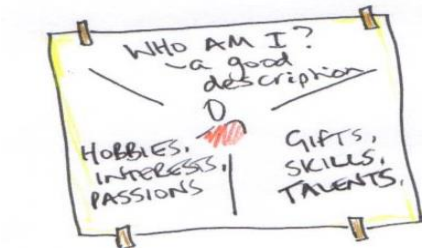
Lack of Positive Role Models

As my experience parents and teachers blame students for being weak in mathematics by making them responsible for not practicing and reading in time. But parents and teachers never try to identify what problem student faced in learning mathematics. As my own experience when I was in IV class I used to read Nepali subject because I enjoyed it but never liked practicing mathematics. And my parents also were weak in mathematics so they like to teach me Nepali, social study, Health etc but never try to teach me mathematics and English. When I tried to read English and mathematics they used to say read yourself I don't have any idea about it. So, most of the time I learned other subjects except mathematics and English.

The Third International Mathematics and science study (TIMSS, 1999) has explained that the student' home environment, attitudes toward mathematics, mathematics curriculum, instructional context and practices and school factor are the significant categories variables in students' achievement they have the potential to strengthen links among the learning environments of school, home and community. Achievement level is the stage of accomplishment in mathematics by the students usually expressed in terms of scores or grade. The mathematics achievement of children varies by ethnicity, gender, location of the school, economics status, socio culture, educational background and occupation of parents is also significant in mathematics achievements (Neupane, 2001 as cited Pardhan, 2009).

Theoretical Review

Although, I have been interested to read some literature based on my inquiry which may help me to conduct my research in a systematic and coherent way. For the essence of this, I am trying to search for some authentic sources, which would help me to simplify my research based on my contextual setting; I could not find a single research similar to my topic.



However, the studies on the similar area were available in different websites**.** When I suffer in internet and different library I gone through different article, research paper and dissertation related to my research I got thousands of research. However, after reviewing those theories and philosophy I found there is a vague gap between my lifework experiences and the utilization of those theories. To flashback to my past experiences, I always hear most of students saying that geometry is very abstract and hard body of knowledge which is found in only god-gifted students. Likewise, my inner belief about geometry was not positive in my junior level schooling. My teacher's teaching style was also traditional and almost all of my mathematics teachers gave one side lecture while taking their classes. He never used the proper connection between geometrical problems into the real world. According to them, lecture method is only the best way to transmit knowledge into reproductive system.

So, they always started our class by imposing formulae, and then taught new lesson without knowing students' interest, and every students were made to sit passively and watch the teacher's work on the board and then copy what the teacher did. And finally, they would give home assignments. So, this is real but vital educational scenarios which create most of Nepalese students disappointed and to develop negative attitude about their geometry learning in mathematics classroom.

In other hand, I also found the significant research gap between most of researches only blame in teachers activity however they don't try to find out about students psychological problem (i.e. lack of motivation, economics pressure, interest about subject matter, gender discrimination division between upper caste/lower caste..etc.).

Reflecting my lifework journey I also found that, learning difficulties is a very general term, used widely and without much precision. However there is still big gap between how

- Level of thought in geometry of pre-service mathematics educators according to the van Hiel Model**:** It is the research the conduct by Sonja Van Putten for fulfilment of the requirements for the degree master in education in University of Pretoria. His finding is based in level of thought of pre-service mathematics educators. This research is aimed to investigate the level of understanding of Euclidian geometry, in terms of theoretical knowledge as well as its problem-solving application, in pre-service mathematics education students at the university of Pretoria South Africa. Finding of his research is every learner has their level for learning geometry. His research was qualitative research he got the students in this study, prior to their completion of the geometry module, lacked the content knowledge, skills and insight in Euclidian geometry that is expected at matric level. The pre-test results revealed that half the group could only be classified as being on Level 0. This statistic implies that, at best, 50% of the group were complement in shape recognition, but did not demonstrate competence in property recognition nor in informal and formal deduction. Of the other half of the group, 75% could demonstrate competence only up to level 1.

- Difficulties, Meaning and Marginalisation in Mathematics Learning as Seen Through Children's Eyes: It is the research conducted by Troels Lange for fulfillment of PhD in Mathematics Education The international Doctoral School of Engineering, Science and Medicine: Technology and Science Department of Education, Learning and Philosophy Aalborg University – 2009. The research illustrate that children make sense of their lived experiences with mathematics teaching in a comprehensive way, from a whole life or coherent identity perspective. Their stories form a valid set of data, which provides interesting insights to mathematics education that are not available in any other way. The United Nations Convention on the Rights of the Child (1989) required children's views to be heard and their stories reinforce the need for mathematics educators to pay attention to them. Children at the edge, that is children whose belonging to the social field of normality was questioned, were particularly insightful. The methodological and theoretical issues have been closely intertwined throughout the project. The assumption that difficulties in learning mathematics were a social construct raised the question about how to research individual experiences of this socially constructed phenomenon. Therefore, the idea was to research the narrative counterpart of children's lived experiences of being in difficulties in mathematics. Narratives are inherently personal and social because they communicate ideas between individuals and they draw upon the discursive resources in the environment.
- Effective implementation of Van Hiele Based Materials on the Students' Geometric Performance And Motivation. It is the research conducted by

Pundary Phuyal for partial fulfillment of the requirement for the degree of master of Education in Mathematics in Kathmandu University school of Education, November 9, 2009.The main purpose of his study was to focus on the refinement of the phases of learning geometry, develop Van Hiele based materials, and implements those materials and philosophies in the class room setting. Thus this study was undertaken to compare performance and motivations of eight grade student engaged in instruction using Van Hiele theory based curriculum to those who are instructed using a conventional curriculum (Phuyal, 2009).In this study he has used procedure of quasi-experiment. There were 83 students of grade eight out of them he took forty one students in control group and forty two in experimental group. This study was conducted in Bhaktpur district in Nepal. He conclude his research on the based on quantity data. He got most of students geometry performance on the Ven Hiele geometry test in both experimental and control group were level 1(Visulization) and level 2(Analysis). No one performed above level 3(abstract) among the students involved in the study. In his study He showed that curriculum based on Veh Hiele theory has more positive impact on students than traditional curriculum and also the students exposed to instruction using the Ven Hiele theory based curricula showed signification growth in their motivation in the geometry classroom.

Bruner's Theory of Discovery of Learning

In my research I have tried to apply burner's theory of discovery learning and instruction. Bruner (professor of psychology at the New York University) made a detailed study of cognitive development of the child. Discovery learning is a method

of inquiry-based instruction; discovery learning believes that it is best for learners to discover facts and relationship for themselves. Jerome Bruner's developed a theory of instruction and discovery of knowledge rather than a learning theory. In my context my school days was painful for me because I was instructed by teacher what my teacher taught me and guide me that thing only I was allowed to do. I don't have any freed to think and discover. Students should be involved in using their prior experiences and structures to learn new knowledge. It may be 3rd Sunday of Push 2058 my mathematics teacher entered in class and announced that all student open mathematics book page no 168 theorem 2: Prove that central angle is double of inscribed angel. (He shouts and ordered us like commander of army like those who are ready for attack in boarder) "Prove this theorem by looking from book and tomorrow you need to do in black board" then we start copied theorem from book and we start learn theorem as suppose that we are going to learn any English song" similarly one day one theorem I learned and finished all theorems in a week. It is a story of my learning geometrical theorems. Teacher should provide feedback that is directed towards intrinsic motivation.

I don't want blame in my teacher I feel may be he leaves us for discover knowledge and discover ways of proving theorem but I can blame him for not provide and make environment of discovery. Now after 12 years teacher and learner are changed but everything is remaining same. Time stand me in place of my teacher now it is my turn to teach my students same theorems but I don't want that my students will blame be as I blame my teacher so I teach my student their destination they will find different way to reach their destination. Suppose If I am going to teach them geometry theorem I teach them what they have to prove and what possible way they can adopt and what their prior knowledge they can use on the theorem. Many times I

was surprised because they discover various methods of proving theorem and solving question which I never expect and think. Bruner (1966) believed that the teacher has to teach the subject so that the students understand the general nature, or "structure," of the subject matter rather than details and facts.

Bruner believed that children have an innate capacity that helps them make sense of the work and that cognitive abilities develop through active interaction. As my experience also when I used to teach geometrical figure and its area in class room student feel that it's totally theoretical and they tried to solve and draw on my method but when I used to leave them for group discussion and interaction between each other by using concrete martial, I feel It is more effective for learning. Unlike Piaget however, Bruner argued that social factors, particularly language, were important for cognitive growth. Bruner was also concerned with how knowledge is represented and organised through different modes of representation. Bruner suggested that different ways of thinking (or representation) were important at different ages. Burner's said that learning is an active process when learner is participate actively in learning process then only learning process become success. Here *active process* means not only active participation of learner it means active coordination of teacher, school environment and home environment also.

Discovery learning is a method of inquiry-based instruction; discovery learning believes that it is best for learners to discover facts and relationship for themselves. discovery learning is an inquiry-based, constructivist learning theory takes place in problem solving situations where the learners draws on his or her own past experience and existing knowledge to discover facts and relationships and new truths to be learned. Students interact with the world by exploring and manipulating objects, wresting with questions and controversies, or performing experiment. As a

result, students may be more likely to remember concepts and knowledge discovered on their own. Models that are based upon discovery learning model include: guided discovery, problem-based learning, simulation based learning, case-based learning, incidental learning, among other. roponents of this theory believed that discovery learning has many advantages including encourages, active engagement, Promotes motivation, promotes autonomy, responsibility, independence the development of creativity and problem solving skills (Burners,1967).

In my view difficulties are generates from teacher and students them self. In my school level and collage level also when teacher teaches me something that I can understand that time but exam time in exam hall I got my mind is empty. There are something in my mind about the question but more confusion always I write just opposite of question in my answer sheet. Now after studying different educational theory I got answer of my question that I feel I never understand mathematics because I was trying to pick up letters from my book and note of my teacher. I never tried to make sense of my study and letters of books and notes. so mathematics is become a difficult subject for me. Same thing I got in my students also, so I always keep problem in front of my students and they discover the solution of problem themselves. In reality, no one can *teach* mathematics. "Effective teachers are those who can stimulate students to *learn* mathematics. Educational research offers compelling evidence that students learn mathematics well only when they *construct* their own mathematical understanding (MSEB and National Research Council 1989, 58)."

Realistic Mathematics Education (RME)

Realistic mathematics education (RME) is a theory developed almost thirty years ago. The foundations for it were laid by Freudenthal and his colleagues at the former IOWO, which is the oldest predecessor of the Freudenthal Institute. This

theory focus more what we study in classroom and how can we use that knowledge in our day to day life. Realistic Mathematics Education (RME) is a teaching and learning theory in mathematics education that was first introduced and developed by the Freudenthal Institute in the Netherlands. This theory has been adopted by a large number of countries all over the world such as England, Germany, Denmark, Spain, Portugal, South Africa, Brazil, USA, Japan, and Malaysia (de Lange, 1996).This theory which works as bridge between classroom learning and day to day activities of student. Freudenthal, (1991) state that "horizontal mathematization involves going from the world of life into the world of symbols, while vertical mathematization means moving within the world of symbols."

In my research I am going to use this theory because I think learners can learn only when they compare and relate their knowledge to this real world or day to day life. As a student I always used to think why this sine, cosine is important for my life why do we need to learn this abstract thing which does not exist in this world? Even my student also searching same answer they need clarification from teacher who develop these thing and why do we need these abstract thing. They want relate their knowledge to their world. And my experience said me that If I able to assure them about existence of the geometrical knowledge and mathematical knowledge in this world they can implement easily and can privilege that no one will be failed in mathematics. As my experience I feel easy to solve the problem of arithmetic rather than geometry similarly as my experience of teacher my students also feel easy to solve problem related to home arithmetic and algebra rather than geometry. For explanation I asked my students they replied me arithmetic is useful in our daily life and real world but geometrical theorem are abstract thing which do not exist in this world. The use of realistic situations is as a means of allowing students to develop

their mathematics as opposed to using contexts as applications of the formal mathematics and, occasionally, as scene-setters to introduce a new topic before moving rapidly on to the theory.

There are three key principles of realistic mathematics education for instructional design specifically directed reinvention and progressive mathematizing, didactical phenomenology and self-developed models (Gravemeijer, 1994). Even for teaching learning process, RME has five learning and teaching principles: constructing and concretizing, level and models, reflection and special assignment, social context and interaction, structuring and interweaving (see De Lange, 1987; Streeflands, 1991; Gravemeijer, 1994).

So, in RME-based lessons, learners should be given the opportunity to reinvent mathematical concepts, and teaching learning process would be highly collaborative. The main role of teachers is to decide in which way an optimal result can be obtained, for example by organizing learners' interaction, individual work, group work, classroom discussion, pupil presentation, teacher presentation, and/or other activities.

According to RME Theory two important points of mathematics must be associated to reality and Mathematics as human activity. First, mathematics must be close to children and be applicable to daily life situations. However, the word 'realistic' refers not just to the linking with the real-world but also states to problem situations which real in students' mind. For the problems to be presented to the students this means that the context can be a real-world but this is not always essential. Second, the idea of mathematics as a human activity is worried.

Mathematics education organized as a process of guided reinvention, where students can experience a similar process likened to the process by which

mathematics was invented. The meaning of invention is steps in learning processes while the meaning of guided is the instructional environment of the learning process. To make our classroom activity and our teaching learning activities effective we can deliver or content to student through RME lesson plan. If teacher are prepared by RME lesion plan then it will be more effective. Here I have prepared one RME lesson plan in chapter V.

When I gone through RME theory I got two types of mathematization which were formulated explicitly in an educational context by Treffers (1987) these are horizontal and vertical mathematization. In horizontal mathematization, the students come up with mathematical tools which can help to organize and solve a problem located in a real-life situation. The following activities are examples of horizontal mathematization: identifying or describing the specific mathematics in a general context, schematizing, formulating and visualizing a problem in different ways, discovering relations, discovering regularities, recognizing isomorphic aspect in different problems, transferring a real world problem to a mathematical problem, and transferring a real world problem to a known mathematical problem.

On the other hand, vertical mathematization is the process of reorganization within the mathematical system itself. The following activities are example of vertical mathematization: representing a relation in a formula, proving regularities, refining and adjusting models, using different models, combining and integrating models formulating a mathematical model, and generalizing.

Van Hiele Theory

Researches on geometry learning have utilized a model for teaching and learning posited by Pierre M. van Hiele and Dina van Hiele Geld of in the late 1950s. Pierre M. van Hiele, and his wife Dina M. van Hiele, developed this theory out of the

frustrations both they and their students experienced with the teaching and learning of geometry. The van Hiele supported composite approach of levels and phases to teaching by defining the subject matter to be learned but at the same time defining the role of the teacher as a helper who guided the student through levels of understanding of the subject matter. Van Hiele (1986) explains that when teaching geometry his students, "It always seemed as though I were speaking a different language" (p. 39).Van Hiele wanted to know why students experienced difficulty in learning geometry and how he could resolve those difficulties. In secondary school geometry involved a high level of thinking and primary school geometry involved lower levels of thinking. After observation and discussion of students' progress, van Hieles concluded that in learning geometry, the students seemed to progress through a sequence of five reasoning levels, from holistic thinking to analytical thinking to rigorous mathematical deduction. They also concluded that to progress from one level to the next, students seemed to pass through five phases from an inquiry phase through to an integration phase.

The solution van Hiele found for his students' frustrations was the theory of different levels of thinking. The theory has three aspects: the existence of levels, properties of the levels, and the movement from one level to the next.

Existence of Levels

According to the theory, there are five levels of understanding in geometry. These levels are described by the van Hiele in various places in both general and behavioral terms, and are used and referred to in this study.

Level 1: Visualization or Recognition. Students recognize figures by their global appearance. They recognize triangles, squares, parallelograms, and so forth,

but they do not explicitly identify properties of these figures. (Squares and rectangles seem to be different.)

Level 2: Analysis. Students analyze properties of figures and learn the appropriate technical terminology for describing them, but they do not explicitly inter relate figures or properties of figures. (Rectangles have four right angles.)

Level 3: Abstraction. Students logically order properties of figures by short chains of deduction and understand interrelationship between figures.

Level 4: Deduction. Students develop longer sequences of statements to deduce one statement from another, and also understand the significance of deduction, the role of axioms, theorems and proofs.

Level 5: Rigor. Students analyze various deductive systems with a high degree of rigor, while understanding such properties of a deductive system as consistency, independence and completeness of axioms.

In my research I am going to use ven Hiele theory to find the level of my students. The van Hiele levels have generally been accepted as a reasonable explanation as to how students learn geometry. van Hiele theory, originally developed using two-dimensional geometry has been shown to apply to other areas of geometry so in school level geometry ven Hiele theory is need indeed. NUWS (2007) state that; Pegg and Davey believe that the Van Hiele levels are basic to improving the teaching of geometry. Therefore, it is important then, that preserves teachers have an understanding of van Hiele's model and are aware of their level of understanding in geometry. This would allow them to teach effectively the subject matter by guiding their students through the phases of each level and through the levels themselves.

Failure to do this would result, according to van Hiele, in rote learning in which students memorise the *right* answer without understanding.

Chapter Summary

This chapter incorporates extensive collection of theoretical background of my research. I have presented various important theories which supports my idea and which helps me to make my research contextual. Moreover, I have tried to present my own experience and others views (students, my teacher friends) of difficulties in learning geometry.

CHAPTER III

RESEARCH METHODOLOGY

Chapter Overview

What a coincidence! Un/knowingly, I found myself in a foot-step of autoethnographic platform put an end to my methodological quest to supply the very discrete nature of my work. I became an auto/ethnographer. So, this chapter deals mainly with the issues like how and why the research work is conducted. It gives the brief explanation how and why I choose auto-ethnography, and proceeds to explain my ontological and epistemological position and derivation of methodology as a transformative researcher- how do I become transformer. Therefore, I have given brief explanation of those necessary areas such as paradigmatic consideration, research methods and methodology, theoretical references, philosophical considerations, ethical issues and quality standards that guide and address my research project in lucidity arrangement.

Forming Myself as an Auto Ethnographer

Of course human life is learning adventure. We learn from our past our present for the purpose of better future. Sometime we learn from pain…from pleasure…from love…from hate…but we all try to escape our life for the sake of upcoming betterment. The same thing I experience when I sat to conduct this dissertation. Remembering the very beginning moment of my research journey, numerous times I just spend my days to vague trouble and confusion.

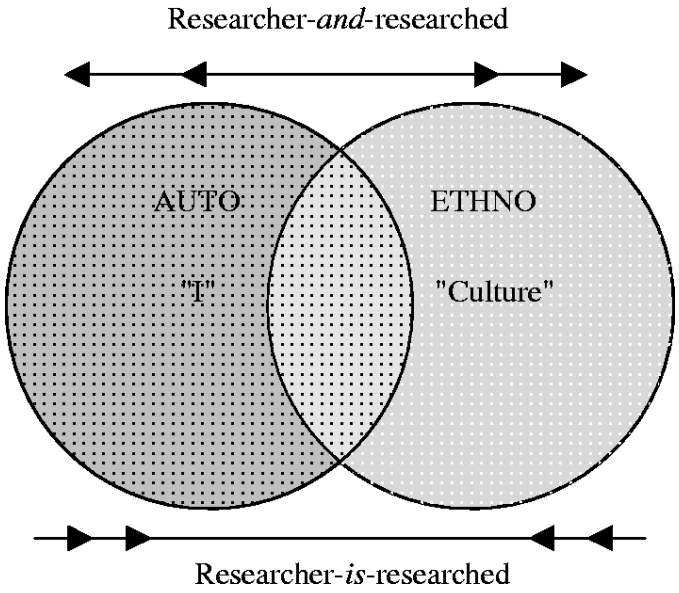
Some intangible forces are hunting me to rise a dozen of questions like Luitel (2009) and Joshi (2013) conveyed, ‘Which method are you going to carry out to conduct the research?’ ‘Are you confident that the methodology you have selected is suitable for your research question or agenda?’ ‘Are you sure that your idea or

perspective is meaningful for others?' Because, it is really great issue to think about whether my ideas are beneficial and meaningful for others or not, and if my ideas are not suitable in upcoming context then what will happen next?

How my personal experiences are relevance for other readers? How my beliefs effect on others' beliefs? How my way of thinking is representing the others' thinking? What are the significance proofs of my way of narrating? How to represent data from my lived experiences? How to present them in a coherent structure? How can other people trust on my own hi/stories? Which life hi/story or experiences are important to put in the research? How can I fit those stories in the research? How it is different from other?

A few days later I just sit in my research class with having jaded mind and unhappy face, at the mean time perhaps, my supervisor understood my pain and he asked me about my progress. Then, again I expressed about my anxiety and appeal him about some help. Perhaps, he appreciated my density and he suggested "ok! You can start to make questioner and select any three high achiever, Three low achiever and three average and furthermore he gave me condition that student should be belonging to different government school and private school as well as there must be equal number of boys and girls. Then I said ok sir, then I started to make questioner and after taking two week long time I prepared a questioner and I gave to different students to fill and I got surprise result.

All students gave me same answer of my questions even those students who got my questioner they didn't know each other. Again, I got trouble. Because, most of students have been expressed similar difficulties in geometry. Then, again I went to my supervisor's office and deliver him what actually I found out. After, cursory reading of my work, my supervisor replied: "Surendra ji why don't you think about an auto ethnographic genre as a method of your inquiry. Because, your data shows that your selected student have expressed similar difficulty and same learning anxiety in their geometry learning.

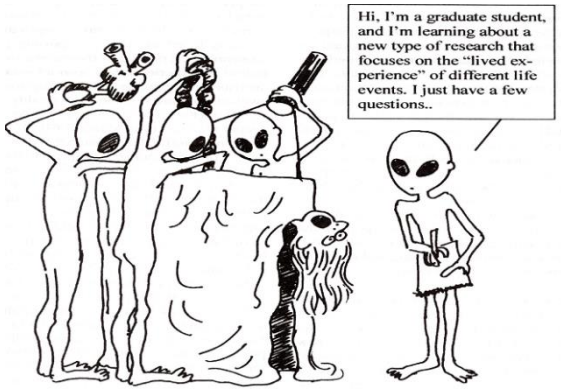


As, you know auto ethnography is the research methodology of choice-telling the stories of others and self for the purpose of arriving at a better understanding of the culture and self being researched. So, I think it may once be possible to conduct your research by using auto-ethnographic genre as the main source of method."

Auto ethnograph is research through self-other inquiry. I felt it is the exact way what I need. Then I feel investigating self may be the best technique for investigating others. Because, we all are the part of same society and once felling is also impact for others live hood. I know most of my students are feeling 'geometry is very difficult subject' what exactly I have felt in my schooling level also. It is similar fallacythat most of time, although, I give more effort to teach geometry but till they feel geometry is very difficult subject to understand. Beside this fact, I also think that

autoethnographic writing helps me to seek the contextual possibilities to link my lived experiences with comparing my students felling in same bucket. Keep it up, I said myself; but ... “What are my stories (lived and grasp) of my own experiences going to be selected for this major research paper and how those inquiries will help me to grasp epistemological, axiological and ontological reality?” again I questioned myself. For essence of this, I had to ponder about how my stories, personal experiences, autoethnography and educational research all fit together.

Soon after I noticed that there are a number of genres of qualitative research in education that specially give focus on narrative inquiry and autoethnographic methodology. When we know the live story of any student then only we can feel the problem facing by students and we can feel their pain. To understand the problem is half solution of problem. So in this study I want use method of study as auto ethnography method. According to Ellis (2004), autoethnography is "an autobiographical genre of writing and research that displays multiple layers of consciousness" (p. 37) by "writing about the personal and its relationship to culture" (p. 37).



Autoethnography blends autobiographical text and ethnographic research methodology by "drawing upon the experience of the author/researcher for the purposes of extending sociological understanding" (Sparkes, 2000, p. 21). As my student life I was also a poor student in mathematic I faced different difficulties in mathematics so in my research I want connect my problems to my difficulties and problems to my students problem.

At the mean time, again I reviewed some thesis related to autoethnographic inquiry evocatively I found, “autoethnography as aspect of methodology, method and genre which consists of three words; 'auto', ‘ethno’ and 'graphy', which signifies the textual representations of one’s personal experiences in his/her cultural contexts via. his/her own way of expression. Similarly, I also reviewed some more theses related to autoethnographic writing. Autoethnography is an approach to research and writing that seeks to describe and systematically analyze (graphy) personal experience (auto) in order to understand cultural experience (ethno).

Ellis (2004) believes that autoethnography provides opportunities to the development of learner and teacher as well and to understand the very possibility of the method that arises from the embodied nature of researcher’s experiences. Likewise, Luitel (2009), Joshi (2013), and Shrestha (2011) put that autoethnography is a legitimate way of establishing inter-subjectivity that escapes the false dichotomy opposing subjectivism and objectivism. So, autoethnographic inquiry has helped my excavation in series of my life events that I have experienced in my teaching and learning, consisting stories of teacher and students, oppressor and suppressor, autocrat and democrat, subject and object, and so on.

Autoethnography has helped me to bring these all helpful and unhelpful dualism together in the shelf of multi paradigmatic research thereby providing space for critiquing, transforming, suggesting, realizing and envisioning. As an auto/ethnographer researcher, I have consulted the various sources of data, my own experiences, and memory of intrapersonal and interpersonal discourse over the time of my educational practice as learner, teacher and researcher, my diary note, text SMS, my expectation, crucial moment pictures, etc. which are also my raw data and the main source of my inquiry.

Constructing Interpretivesm as Generator of Meaning Making

After convening myself as an auto-ethnographer researcher and analyzing many existing-theories related to learning difficulty in geometry, I came to realize that the paradigm of interpretivism promotes common cultural understanding in which each type of knowledge has the same epistemic status with every other type of knowledge, thereby cultivating differences between individuals, contexts and events. I dreamt to situate myself in the lived culture and tradition of research in order to raise my self-consciousness towards the actual understanding of cultural phenomenon which may empower as subjective nature of same society. Thus, a basic interpretive and descriptive qualitative study exemplifies all the characteristics of qualitative research; that is I am interested in understanding how participants make meaning of a situation or phenomenon, this meaning is mediated through me as instrument, the strategy is inductive and the outcome is descriptive.

In conducting a basic qualitative study, one seeks to discover and understand a phenomenon, a process, the perspectives and worldviews of the people involved, or a combination of these. Interpretivism proposes that there are multiple realities, not single reality of phenomena, and that these realities can differ across time and place. According to Cohen, Manion and Morrison (2007) the interpretivist approach is associated with subjectivist view of social science stresses the importance of the subjective experience of individuals, and in this view, interpretive researchers start with the individual and then set out to try and understand their interpretations of the world (Cohen, Manion & Morriosn, 2007). This case study research is guided by interpretivist approach and therefore would be a qualitative research.

Therefore, I prefer to use interpretivism paradigm in my research work because being myself as a creator of my research problem and expressing learning

difficulty in geometry in my lifework journey, I found interpretivism focuses on cultural, hermeneutic, phenomenological and aesthetic sensibilities which help to construct contextual meanings of events or phenomena under the collaborative construction of society. I also found that interpretive research rejects the notation that "……. The researcher and the research can be detached from the phenomena…." (Schaller & Tobin, 1998, p. 42) indirectly suggesting that all research is subjective in nature. What is concept in mind (i.e. Geometry is very difficult subject), I have engaged certain elements of the cultural inquiry thereby investigating the common problem self-belief and awareness which helps to understand actually why those students express their difficulty oriented view about geometry. So, it helps me to learn geometry in meaningfully which also assist me to learn how to see and feel the geometrical problem in a complicated manner to simplistic manner.

Philosophical Consideration

My dissertation is titled as "exploring learning difficulties in school level geometry" and it follows interpretive epistemology. Overall methodological approach adopted for this study is to understand the relationship between sanitation and the teaching learning environment and is supported by my lifework experiences (holistic) as approach of research.

Ontological Consideration

Fundamentally, the word 'ontology' comes from the field of philosophy. Ontology is the basic of reality. Ritchie and Lewis (2003) added "Ontology means what is possible to know about world" (p.19). However, in this inquiry the notion, ontology investigates the nature of my being and becoming. It explores questions such as 'how and why most of students express their negative attitude in their geometry learning?' Thus, ontology, here, deals with the nature of my reality. So, in my inquiry

the word ontology deals about the belief of why most of student used to think geometry is difficult subject and how to remove those types of anxiety from students mind and what can be known about them. So, in my study I am using the term 'ontology' to signify arrangement and conceptualization of geometry for the purpose of uncovering my student's actual perception about geometry.

I believe that, the perception what we called truth is always changeable according to our context, time and demand. So, in my study I have try to connect that that if any student facing a problem same problem is woks as a motivation in another students so truth is changeable according to situation, context. I also believe that if truth is single then there is no any argument truth is differing as the individual and group. My understanding toward the world is depending in my knowledge, culture, environment and more other several factors. In my view we can't see problems, challenge in same point of view and we can't critic anybody anything by standing one point we should multi dimension. Student have different social, family other psychological problem. So data which I am going to collect interview which I am going to take same prospects and same questioner have different answer and different truth.

Epistemological Consideration

The beautiful word 'Epistemology' is the branch of philosophy which deals what is knowledge and how can we generate it? As, Richards (2003) put that epistemology, the science of study of knowledge, refers to the views we have about the nature of knowledge and the relationship between the knower and known (p.35). Being as an autoethnographic researcher and being myself as a main source of data generator I believe that 'Knowledge is constructed through the feelings and expression of the human beings, knowledge is not out there outside of human

periphery, it is deeply rooted inside the mind of human beings. So, it cannot be tangible and knowledge can be created by the active interaction society, individual, environment and the world. Epistemology deal how knowledge acquired and how is generated and how it can transform or communicated to one to another people. The acquiring knowledge various epistemology is different .In My Epistemology I favor the side of subjectivist because I believe that knowledge is created with interaction individual and nature rather than transform to one person to another person. I guess that Students are weak in mathematics because our teaching method is traditional we teaches all subject science, English, Nepali, HPE, social study, mathematics by using same method. As my experience students are feel bore because same thing repeats time to time so If teacher make learning environment for student then only they can learn and create their knowledge it is better to use constructivist and collaborative method of teaching rather than traditional method.

Axiological Consideration

Axiology is the theory of values. Values are different according to place and environment. Suppose we do not eat beef because we worship cow but in some country beef is famous food. It separate the values are different according to the situation place and culture. Value is different according to culture, tradition, education, situation, society and individuality of a person. Value is depends on our own perception and participation. We always used to say that all human being are equal and they have equal mind no one is talent and weak. But we teacher our habit and culture is used to separate them in two ways low achiever and high achiever. So we should provide same value to all students and avoid biasness.

Locating Myself as a Source of Main Data Constructor

Field of my research in my own school where I worked and where I am working, my experience and memory is my field of research. It covers the various moment of lifework journey from the very beginning of my childhood level to present days. So, my whole existence is my working field and my various lifework experiences are my main data sources.

Every researcher needs data which can be analysed, and which results in finding and conclusion. In this research, I have used the data collected from the participants and my memory from my school days to analyse and interpret. My research is an auto ethnographic. So I am the primary source of data. My data sources are narrative writing, self-reflection stories, reflections, my different lived images, different art-based writing and pictures. The phenomenological notion of lived experience is understood better by turning the consciousness to things themselves. The notion of transcendence can also be understood as a clarification of how the meanings of things are constituted in and by consciousness (Husserl, Rojcewicz, & Bernet, 1989).

Data Analysis Approach

Narrative Inquiry as a Generator of Thinking

According to Clandinin & Murphy (2009), narrative inquiry holds that human experience is the most fundamental reality. Narrative inquiry has emerged as a research methodology within qualitative studies because by this methodology people are supposed to experience and understand their life. Since the 1990s narrative inquiry as expanded as a cross-disciplinary approach to research in the human sciences that draws from “realist, modernist, post-modern, and constructionist strands” (Clandinin & Rosiek, 2007, p. 37). I think that knowledge is not what we read in book because it

may be wrong one day it has not ultimate truth, I think that knowledge is that thing what is happening in our life, what we experience, by which problem we encounter and how we used to deal with these difficulties and problems that our lived experience it is true knowledge. In my research I want to apply Philosophical Strategy as Interpretive Research Paradigm because it supports highly personal and individual nature of the humanistic model; I believe that an interpretive approach will be best for my case study. My fundamental assumption of the interpretive scaffold lies in the view that there are multiple truths. In compare to the positivist frame, my interpretive seeks to understand students and their social authenticity, social interpretation and understanding.

I think that there are different individual in different person. All have unique capacity and capability. I think truth is not unique it is different according to the situation, environment, prospect and thinking view of person so my belief is that there are multiple truth.

Quality Standards

In the field of autoethnographic research; quality standard is very important part of research. Perhaps, in auto ethnography; without quality there is no worth of research. All research is based on some underlying assumptions about what constitutes ‘valid’ research. The paradigm using in research is identify the quality of research. If we do not use any paradigm in research then it has no value and nobody believes in the research. So, in my inquiry ‘quality standards’ raised from interpretative and critical research paradigm. I have used trustworthiness, pedagogical thoughtfulness, verisimilitude, critical self-reflexivity and praxis for this research which is based on the nature of autoethnographic inquiry.

Trustworthiness

Guba and Lincoln (1989) are of the notion that a disciplined inquiry process must be publicly acceptable and open to judgments about the 'Compression and rearrangements process involved'. In other word the 'trustworthiness' of the research can be achieved through credibility, transferability, dependability and conformability factors. In order to adopt strategies to create worthiness for this dissertation, I made it a point to do extended lifework reinvent experiences as far as possible, which includes generation of data from my past experiences over a my lifework teaching-learning journey. So, my various experiences based on my lifework journey have given me the good platform to verify the insight and make it more realistic and contextual.

Pedagogical Thoughtfulness

In my understanding a pedagogical thoughtfulness is; "a reflective self-examination by an individual set within his or her cultural context". So, the term 'pedagogical thoughtfulness' in my inquiry helps me to make sense of my own past experiences which points out a simple truth about my practices, and the study of self-in-relation to others (Bullogh & Pinnegar, 2001). I believe that this is an appropriate design for this study since I am the main source of data and (Ellis & Bochner, 2000) this examines how my existence in past practices was endowed with meaning rooted in positivist thinking. Furthermore, this is my attempt to see critically myself as others eye and mind (Joshi, 2013). Hence, I engaged with contemporary pedagogical thoughtfulness which ensures that my writing will resonate with the minds of my readers on its applicability in their own unique context (Guba & Lincoln, 2005). I think the reflection on my self-belief gives way to a more scientific inquiry in my personal and professional journey. In addition to this I believe that it may be a situation for the readers where and when they can learn and analyze various things.

Therefore, it can also help other people to understand and affect themselves emotionally and intellectually within their pedagogical practices.

Critical Self-Reflexivity and Issue of Transferability

I have used critical narrative inquiry, a type of self re-examining in which I do my own critiquing while telling my life story investigation using different genres of writing other than an objective-scientific style. I decided to try my very first story to make this inquiry to be more engaging. The critiquing focused on my experiences as a learner, a teacher, and a practicing researcher. As Brookfield (2000) writes, "critical reflection focuses on adult educators as inquirers on their own, and others' practice". So, data generation through critical self-reflexivity is the process of gathering information for the purpose of research through storytelling. This enables me to explore the research problem by understanding my past and present experiences and envisioning the future (Creswell, 2008). Joshi (1990) believed that humans are storytelling organisms who live storied lives.

For this purpose, I used the first tradition of criticality which is the critical reflection as ***transferability from one situation to another***, which critiques my old thoughts, beliefs, practices, and old understandings in doing educational research. I used this to reconstruct my old understanding and ideology and form new meaning (Brookfield, 2000). With this, I engaged with critical reflexivity as critical reflection on my own ideologies, how my former ideologies were unconfined by the standards of social justice in educational research, and critical reflection as a means of meaning-making (Brookfield, 2000 as cited on Joshi, 2013). My critical self-reflection and ideology follows every chapter of my life story, especially from Chapters one, fourth, fifth and sixth which centre on the story of my past experiences in doing research. So, I shall engage myself in critical reflection about the meaning of my past, present and

future possible experiences as I come face to face with what truly are my beliefs and assumptions towards mathematics via unpacking my self-reflexivity. In other hand, transferability is the degree to which the findings of this inquiry can apply or transfer beyond the project (Lincoln & Guba, 1985).

Praxis

Denzin and Lincoln (2005) are of the opinion that any qualitative research must adders the notion of praxis. The central idea regarding praxis is the transformational nature of a research. Praxis foregrounds the issue of practicality or transforming idea into practice. I have observed my students by very near also my teacher too. Praxis is the practice or the way of doing. The action should be full of thought and the thought full of action. (Quantz, 2003, as cited in Luitel, 2003) put that "Specially, in the educative context, praxis means a series of thoughtful practice that becomes a matter of continuous reflection for the educator/teacher'(P.14)." And I closely observed the implications of the beliefs and opinions expressed by the participants.

After the session I wrote subjective reflection on the class observed and organized feedback sessions with the participant to discuss the strength and how some area could be improved. Praxis is a problematical series of connections between the representation and the legitimacy. Praxis is the nexus between the representation and legitimacy of the research (Luitel, 2003, cited in Belbase, 2005)). To some extent praxis may deal with the notion of the theory-practice dualism critical traditions (Quantz, 1992, cited in Belbase, 2005)). Van Manen (1990, cited in Belbase, 2005)) points out the notion of praxis as "thoughtful action: action full of thought and thought full of action. With the help of those researchers, I have summarized the issue of praxis in relation to my research as following:

I reflect upon my own actions with pedagogical contexts and thoughtfulness (input).

I maintain reflexivity- how I have represented the experiences (process).

I maintain reflectivity-what experience have I reflected (product).

Verisimilitude

Barone and Eisner (1997) point out that one of the features of qualitative research of this expressive kind is that its texts are presented to the reader as -virtual realities, seeking to provide a recognizable representation of the real world. The quality of such texts is to be found in the strength of their -virtuality: "In a text with verisimilitude, the reader recognizes some of the portrayed qualities from his or her own experiences and is thereby able to believe in the possibility, the credibility - of the virtual world [presented in the expressive text] as an analogue to the 'real' one (Barone & Eisner, 1997 as cited on Joshi, 2013 p.84)." Thus, in my inquiry, I have used this notion to define my fact of narrative of any phenomenon and textual representation by using the data from my own experience challenged me to make it lifelikeness to others. For this connection Joshi, (2013) put that; "verisimilitude helped me to search multiple possibility of my data generation to represent it in verisimilar manner where the fact or quality of being verisimilar structure, the appearance being true or real; likeness or resemblance of the truth, reality or a viable facts likelihood (p.85)." So, being an autoethnographic researcher, I have tried to narrate my own stories and beliefs to verisimilitude other readers. Of course, we all have different experiences but the main thing is how those experiences are perceived. Thus, sometimes my stories may not be exactly same for others' stories even in same context and some phenomenon, but they are likely to have life-likeness

with other peoples' feeling and experiences. However, in this inquiry, I hope that my readers will reflect upon themselves and see the image of their life while they are reading my stories.

Ethical Consideration

Representation of truth is based on ontological and epistemological world views, yet it carries important implications for ethics. Since ethnographic methodology deals with multiple realities that are constructed, the simple recommendation of "telling the truth" is no longer sufficient. With no single truth available, researchers are confronted with the question of *whose* truth: The Researcher's 'truth? The truth of the participants? *Which* of the participants? These decisions shape research design and data collection, define the allocation of time and energy for different voices, and shape the form and voice of any research reports. L. Bresler *Studies in Art Education*, (Spring, 1996, Vol.37, p.3.), It is the very difficult to identify whether the researches data is true or false? And the research also difficult to identify what ought and what ought not to be done. Autoethnographic research generates fears, doubts and emotional pains, especially in the context of the regime guarded by positivism. There are two types of ethical position; absolutist and relativist ethical position (Cohen at all, 2007). So my stories and my data make to reader to believe the situation and research. So, exploring the issue of ethical consideration, I mainly maintain the following standards;

Honesty and Trust

I have remained truthful throughout my research period to the participants, the institution and my readers. I only gave them true information regarding how the research was going on.

Harm to The Participant Anonymity and Confidentiality

All the name of character of my story, poem and drama whatever name or scenario I have presented here artificial. The various stories, poem and drama are based on my lifework experiences but their name and address are not truly maintained. Knowingly or unknowingly, the finding may herm the participants in terms of their dignity. Professional skills and employment are taken so that negative implications were avoided throughout the research.

Chapter Summary

This chapter deals about methodological and philosophical consideration that was used in conduct this research. So, it controls my overall research process and situates me in the culture of auto ethnographic genre of qualitative research. It describes the rigor of my research and its nature. It provides detailed descriptions of the research design, procedure, quality standards, philosophical and ethical considerations. Driving myself in the field of autoethnographic research platform, I have designed a critical autoethnography and narrative inquiry to bring an integral perspective to my research. Critical autoethnography has helped me to represent my personal experiences, self-narrative and relationships with others. Thus, autoethnographic research design has facilitated me to envision myself and my metamorphosis to engage the reader via pedagogical thoughtfulness and critical reflexivity which can stimulate the readers to reflect on their own experiences in order to improve their students' learning.

CHAPTER IV

GEOMETRY IS MEANING LESS SUBJECT

Chapter Overview

This chapter portrays learning difficulties in geometry reflecting on my lifework teaching-learning experience. Conducting research on autoethnographic landscape, of course this chapter includes various scenarios in the form of narrative, dialogs, stories and poems. This chapter talks more about value of geometry and interest of students in geometry learning. It also emphasis on my different experiences allied to learning geometry and teaching geometry. More typically, it also portrays the linkage between geometry and its use and appliance in real sense.

Catalyzing the Problem Connecting With Real Incident

When I went through different articles, books, paper and history of mathematics, more surprisingly, I got result that development of mathematics started from geometry. In ancient period, before number system developed when human being was on the way of civilization they started agriculture and livestock farming that time People used to scratch line and circle for counting numbers. All most all human history even east and west they all have used some type of geometrical manipulation for their progress.

So, less or more we can say that geometry (although geometry is formally recognized on the period of Pythagoras era) is the first virtue of human cultivation. And we can also say that geometry is ‘soul’ of all most all knowledge whatever human being convinced. When a child starts his formal education or we can say first time when child takes pencil in his hand S/he scratch line, curve or geometrical shapes after passing through these geometrical shapes s/he is able to write his/her first letter and starts his/her formal education. But genuinely, the question arises on all

most all educators what type of geometry we teach and how we connect geometry in our day-to-day activates. In my teaching learning experience frequently I have faced same questions from my students like; "sir why do we need to learn geometry?" For this I am going to elaborate my lived experience based on my professional practice;

28 years ago I was born in middle class family in far western part of Nepal. My formal education started from small government school in village. In my school days, I used to think that geometry is really meaningless and useless subject because I never got a soulful chance to learn geometry based on my physical and cognitive domain. Most often I felt unhappy and that added more pain to my life.
Mostly, I learned geometry by ***parrot method***[2]*. I learned all theorems and questions with solution but I never got meaning of these theorems. It was my daily routing to memorize at least one theorem without knowing how it could be applied. I only wanted to memorize it for the sake of crossing exam pass mark border. Sometimes in exam I wrote half part of solution from one question and remaining half from other questions. But, I hardly got the motivational chance as my student questioned above "sir why do we need to learn geometry?" Of course, I don't want to blame my teacher (perhaps, my student does not want to blame me but the question is really rational) because I am also responsible for that. But, somehow my teacher also is responsible for my weakness because he always trained us that; "you need to memorize theorem but he didn't say anything about process, concept and application, he didn't say anything about how to learn he said only '****LEARN'.****"*

The above mentioned story shows that how '*parrot-memorizing method'* is often to be used on our educational system**.** I don't want to say total mistake did arise

[2] Parrot methods (representation of bird parrot) in some school of thought it is process to learn or memorize something without knowing its meaning.

from the side of teachers, and it is not wise to shout teachers did not show/use any teaching materials, because what school administration and policy gave them and what our culture and environment guide them they did. However, the remarkable question is that '*only teacher's effort is enough for that'?* The demand of 21st century may be or perhaps learning should be based on '*visual-based and living world-based'* but I don't know where we mislead this slogan. Still, most of schools are using 'teacher as a matter' based learning and very few are believed on learning comes from pupil's own interest and context.

Turning Point of Thinking

The turning point of my professional life to think about geometry and its application starts from my studies of M.ED level in K.U. *It could be any day of 2012; I am busy collecting data for my research. Just, yesterday one of my teachers had informed me that today we have a class of guest lecture Prof. X so I reached university before half hour than that. I want to meet the professor. X personally but unfortunately I missed. At 4.30pm, professor enters in our class room. Class room is full of different mathematics teachers, students and educator. Professor X starts his presentation. His outline of presentation is use of multivariable equation or mathematics equations like vector equations, matrix equation and differential equations in real life and representation of these equations in geometrical shapes and figures.*

He presents his slides how we can apply these equations in our daily life and what is the work of the equation in our day to day life and which is the case of my research also. Professor X shows different types of differential equation and their use in daily life like different forms of liquid and their work in physical life how can we control the form of liquid by differential equation. How can we change the shape and

size of different geometrical figures by changing variables in equation? What will happen when we change the variable and constant in equation? And uses of mathematical equation through geometry and uses of equations in field of engineering and construction like making power house and cannel and to control flood, safety driving etc. which is very interesting and surprising.

Till now I used to think that these equations have no uses in our real life. We study it for our creativity. After the presentation I appreciate what I am studying these all things have some value in my life and it is not worth. Sometimes small things also change our perception and way of thinking in life as same here after the presentation I got change in my way of thinking. Everything has its own value but we know the value of the thing only when we need that thing. Now my thinking is changed. If I was aware about the uses of these all things in physical life and these all Theorems, axioms and geometrical relations are really used in our life. I guess, I may be more curious and have more interest in learning mathematics and learning these theorems and equations of mathematics in my schooldays also in collage days only had I known about them . So I became surer about it if the students had known the value, application and uses of mathematical knowledge it makes interesting and enjoyable study of content. I got some change in myself as a teacher because in my past days. If any student raise me question I used to ignore the question and I don't care much about that, but nowadays I love to talk to my students and to know about their problem. Nowadays, to take part in any conference, to be part of any workshop, to talk with researcher any professor has become my hobby and interest.

After his mind-blowing presentation, it is very remarkable for me to find the expanse where geometry is not used. I found that geometry is used everywhere in nature to human construction but we are not able to compare our theoretical or book

knowledge with our surrounding. So, I realize that the actual problem arisen from proper implementation of geometry not on its theorem. Real life problems may help students construct meaningful understanding of mathematics (Boate 2007, as cited in Poudel, 2010). So this presentation helps me rethink about the dozen of question likewise; why we are unable to connect geometry in student's real life even geometry is everywhere.

THEME 1 (Use and Application)

This story shows radical change in my thinking after knowing the value, use, and application in geometry in real life. I have seen huge number of students and learners in my teaching learning journey who want to know value and exploit their knowledge in real life. They improve and they enjoy learning only when they know they are learning something useful for their life. Same view point is of Abdul-Aziz "It is my hope that implementing this curriculum unit will help teachers to teach geometry in a way that will excite students, assist their connection and application of "**real world"** scenarios to the concepts, aid their use of various strategies, and extend students' abilities to solve math problems in other contexts (Abdul-Aziz, 2013)."
In the story, Professor X presents his slides about uses of mathematics in real life or physical life. Real-world application problems that provide students an interesting and relevant way of translating mathematics from an abstract, theoretical approach to a concrete, applied approach (CORD, 1999). If teacher can convince the students about the use and application of geometry in their life then only students will be interested in geometry. Nguyen Ngoc Anh (1999, p. 18) emphasizes a role of mathematical application in teaching and learning mathematics in school; however, he claims that mathematics teachers do not train their students in applying mathematics in real life or in other subjects. As a teacher I feel now to relate geometry in real life is not joke, it's

very difficult job. I think only trained teacher and professional teacher can do this job very well. I got change in my view towards geometry after knowing real value and use of geometry in real life same way it happens with my students also. Before this event I was teaching geometry just in traditional method solving problems and proofs of theorem which makes them memorize the statements and proof of theorems. Now days I give students more chance to think and discover their own level of thinking. So, after this moment I used to think that teaching geometry is based on student's interest, experiences and teaching should be based on learning by doing approach.

Geometry is Worthless Study

It can be any day of July 2012, I am teaching class nine compulsory mathematics triangles and axioms. Yesterday I had already taught about four axioms, SSS, SAS, ASA, RHS, so today I am focusing on exercise and problem of exercise. Out of 42 students Ashish is sitting second last bench of left row and his body gesture shows that he is out of learning attention. I am trying to taking their concentration on problem. But, Ashish is busy looking out from the window and probably watching nice views outside. Although, it may be a minor thing for students not to concentrate in class in case of Ashish I take it seriously because he is good and high achiever student in my class and he never shows these types of activities before in my class. So, I have decided not to disturb him and ask about his problem after that.

After finishing my task I asked him "Do you understand Ashish?" "Yes sir I understand" He replies. "Ok tell me which axiom we used here?" One student slowly from the back side says RHS and Ashish answers "RHS sir." I asked again why?" "I don't know sir" he replies me with his soft voice. It has taken 20 minutes for me to explain this question now I feel my 20 minute is wasted here because I started my lecture with high expectation. I wish all my students understand what I am teaching in

classroom but unfortunately I am not getting success enough. How I am teaching geometry here, by drawing figure and explaining! Student cannot understand anything but they are agreeing they have understood." But just before you told me that you understood! I asked him, He couldn't answer my question and became silent. "After couple of minute, Ashish asks me why we are studying this geometry and theorem sir? Where do we use this theorem in our life?" He questioned quite angrily. At this moment, I felt helpless and I just replied "because geometry increases your creativity and thinking capacity so it is important." But it is clearly shown that he is not satisfied from my answer. At the same time, one student silently replied' "It is just for our headaches and worthless studying which is no use in our life." I tried my best but I am not happy from inside. I guess my students respect me so they are saying they have understood, perhaps they are feeling shy to ask question again and again.

THEME 1(Lack of Interest in Learning Geometry)

In this story we can clearly see that students really feel difficulties in geometry and they have lack of concentration in geometry class. The similar situation Bhatta (2005) put that mathematics is the most difficult subject for the majority of students, the loss of instruction time associated with teacher training and lack of continuity in instruction due to teacher turnover has the greatest impact in this subject. They have difficulties in visualization of problem what I am briefing about the figure of Ashish '*looking-outside'*. Perhaps he cannot connect a geometrical theorem and figure as a result he is not enjoying learning geometry. Balderas-Canas (2001) also describe participants creating visual images which are personal and affect-laden (though their work was not focussed on geometry) may be considered geometry more difficult than other subjects (though these participants' notions of geometry was more like measurement than theorem proving).

So, learning is real sense comes when students involve to the use of geometry in their daily life. They want the use of geometry theorems in their real life. As my experience as teacher many time students asked me about use of geometry theorems and I replied them it increase your creativity and thinking capacity. They replied; “sir video games and some computer puzzle are help us to understand some geometry related theorem.” In the same connection Jones (2002) states that geometry can increase our creativity of mind from there also. The study of geometry contributes to help students develop the skills of visualization, critical thinking, intuition, perspective, problem-solving, conjecturing, deductive reasoning, logical argument and proof. Geometric representations can be used to help students make sense of other areas of mathematics: fractions and multiplication in arithmetic, the relationships between the graphs of functions (of both two and three variables), and graphical representations of data in statistics.

Similar view also supported the Shanghai Primary and Secondary School Curriculum Standard (Shanghai Education Committee, 2004) specifies, for the lower secondary school level (Grade 6 to Grade 9; students’ age 11-15 years), put that; “the process of proving should be emphasized for the students experience the developmental process from intuitive geometry to experimental geometry and then to deductive geometry; to establish the relationship and recognize the distinction between intuition and logical thinking; to perceive the meaning and the use of inductive reasoning, analogical reasoning, and deductive reasoning…; to experience the process of ‘experiment-induction-conjecture-proof’ (p.35, translated by Ding). The story makes clear that geometrical theorem and geometrical axioms are not used there in daily life so they think it is worth reading. It makes student less interested in learning geometry so this is one difficulty in geometry.

THEME 2 (Lack of Visualisation and Study of Figure)

Visualisation is the most important part for learning geometry. 61% of the learners felt that geometry is complicated and confusing (Shanghai Education Committee, 2004). If learner cannot visualise geometrical figure then it is very difficult to teach them geometry. Instated to draw figure in note copy if we provide our students paper for making geometrical by folding and cutting they learn more than drawing. This is an inexpensive and practical way for the students to explore the properties of simple geometrical figures and learn a neat craft.

As my experience when we draw figure in board and explain then student understand fewer. Because what image we are going to draw and which image we are going to explain it may different in student's minds.

So it is better to give opportunity to students to draw/ made geometrical figure by using card board or papers. Bruner's discovery learning is generally associated with constructivist teaching principles with its emphasis that students learn best when engaged in active social learning processes that help them to form new ideas based on existing knowledge (Clabaugh, 2009; CUREE, n.d.). Knowledge is existing in this world just we have to discover and environment in the important factor to discover knowledge. I think teacher has only one work that is create environment for their students. When students touch and feel geometry and geometrical figure than only they can learn. And to touch and feel geometry they need to play with geometrical figure by drawing by making etc. Otherwise geometry will remaining abstract thing for students.

THEME 3(Feeling Shy in Peer Group)

As my experience; I found that most of the students don’t want to share their difficulties with teacher in front of class and friends. They think asking question to

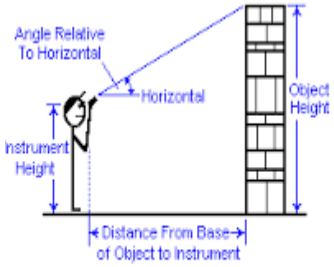
teacher becomes fool among friends. It is the culture developed in Nepal's schools classroom especially in high school. This tradition/belief supports to increasing learning difficulties in mathematics. Shy children also are an evidence of lower level of math achievement. For instance, in a cross-sectional study of preschool children (Dobbs et. all, 2006) found that shy children scored significantly below their more outgoing peers on mathematics achievement tests. The associations between a shy temperament and lower levels of mathematics achievement persist into elementary school. I think this is age factor of students.

English-Centric Phobia

It may be a day in May March 2009; I was starting my teaching profession as a mathematics teacher. First day of class I become too nervous in front of students because before that I don't have any teaching experience. My educational background started from one small government school which is very remote area. Later on when I joined my secondary school education that was also government school. So, teaching mathematics in English language is the challenging task for me but I accept the challenge and went in class room. First day I got first class in class eight to teach additional mathematics.

After entering in class students wish me good morning sir, I reply good morning and sit down please and I said open your optional mathematics book please. At the same time, one student ask me a question, sir I don't know this question please teach this question. But I am also not prepared about this chapter and more importantly it was first time when I got a geometry question in English language because in my schooling I learn geometry in Nepali language.

So, as protecting myself, I replied; let we start the trigonometry from first chapter and probably next day we will go about our question. But he said sir we already study these things from previous teacher so please let us teach about the solution of this question. Then, I said ok! Can you repeat the question please then he read; if a man 1.8m tall, standing 50m away from the tree observes that the angle of elevation of the top of the building is 30°. What is the height of the building?



At first I read the question loudly and started to explain questions. Then I made a figure of the question like as figure mentioned.

One student from last bench, Sir is it necessary to make figure and without figure can't we do this question? Yes you have to make figure because it carries separate marks in exam then student becomes quiet. Another student sir is this important question? I replied yes it is important question again same student asked sir how many marks does it carry? I said this is four marks question and he replied so difficult question sir only four marks? I become answerless.

I said ok! At first you need to understand the pattern of question then only you can be able to understand how to solve it. Then I started to elaborate;

Here, in triangle ABC, Let, AE be a building and BD is a man standing on the point D and having height and the angle of the elevation ABC is 30°. The distance between C and B is 50m.

Now let take,

$\tan 30° = AC/BC,$

$1/\sqrt{3} = AC/50$

$Ac\sqrt{3} = 50$

AC=50/√3

AC = 16.66 m

Now, we know that height of the Building is height of AC +CE = 16.66 + 1.8 = 18.466m

Hence height of the building is 18.466m.

After completing the solution of the question students start to copy from board but they dont ask any question to me but some students request to me to explain the question in Nepali language. However, before entering the classroom the school principal already warned me that except English other languages are strictly restricted into the classroom. I declare to students Nepali language is not allowed because it is school policy. So without having any self satisfaction on my answering again I try to explain the solution of question in English language.

One girl from second bench said; "sir our mother-tongue is not English and our previous teacher is also contracting out by the problem of English language. But, sir! We don't understand completely all questions in English. So, please try to use Nepali language also." It is my first day and first class of school so I am more careful about principal's order. I tried more than four times to explain the same question but neither was I satisfied from my teaching and I guess nor my students. It is totally meaningless to study because what teacher is teaching that student is not able to understand and student searching meaning of question for shake of exam-oriented and teacher also dutiful with principal's order.

THEME 1(Difficulties Created By Language)

In this story I have tried to present the fallacy through language prospective. The school policy is not worried about student's soulful learning but they are concerned about the median of language. And the story also clearly shows that teacher is not teaching here he is trying to transform subject matter or content to student. So, the story emphasizes on how most of students who have no mother language as English were facing difficulties in English based teaching learning process and curricula.

As a same view Luitel (2001) put that "since my primary, education, I constructed the image of mathematics is '*foreign-subject'*. In my experience, as a mathematics teacher, I faced a dilemma of teaching against my culture (Luitel, 2004)." Same view Joshi, (2011) figure out that "most of time in my educational praxis, I recall being taught by the people who were regarded as the fountains of all knowledge in their subject matter and our job was to soak up all their imparted knowledge like wipers. They wrote things on the blackboard and we seriously noted it down. It was upon us to learn the materials but as long as the teacher covered the curriculum material and had passed the materials onto us, they had done their job as a *great-winner*. The assigning system of our school is totally based on *'euro-centric or fashion-centric pedagogies*' and school culture is feeling succeeded when their students are given English speech quite fluently (Joshi, 2014, p. 148)." There are some mathematical terms which are very difficult to explain in English for teacher to give proper concept to student but school rule tells that teacher should not talk in English. I got difficulties through language how language brings

fallacy in students. Students understand some terms of question only and some terms are left.

If they do not understand all terms one by one it brings more problem in next classes also it may give wrong concept also in student. It's very difficult to teach and learn geometry if English is second language and now days it is going to be biggest challenge for students and teacher in school level. Students can't explain and understand what is asked in question what they have to find and what is given there. Of course, uunderstanding the problem is half of the solution of the problem but how clearly and confidently teacher can explain the content and student adopt the learning phenomenon. The question is remarkable. For instance;

In a right angle triangle among two acute angles one angle is 10°degree more than the another acute angle then find each angles of a triangle in degree.

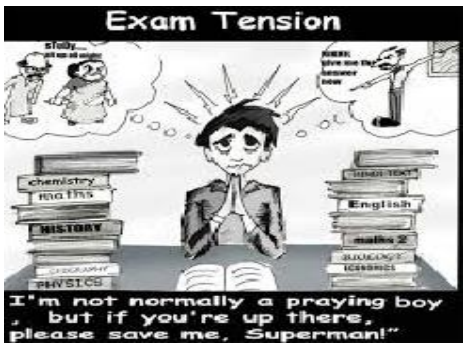
Here students need to understand or figure out the meaning of words given in question such as right angle and relation between two acute angle and mathematical relationship between them like addition, subtraction of angle. English language learners typically experience difficulty in understanding and therefore solving word problems, and this difficulty increases in the later grades of elementary school as the word problems become more linguistically and conceptually complex.(math solution 2009, English language learners in math class, grade K-2).

THEME 2(Changing Exam-Centric View)

The above mentioned story also discovers another issue like how students are focusing in their mind on exam-centric view rather than the implementation on their living world. So, this story also figure out why student's concept in learning is not to bring something change in their knowledge rather the issue of passing and promoting to the next class. So, if government already declared that students should not fail in

primary level even SLC examination also then school and teacher should try to convince their student that we are not studying for exam. This is the preparation of our future life then only learning environment will change.

We can give students points for home assignments (e.g. making drawing for geometrical figure and presenting it in the classroom, solving a problem sheet) and give points for these and make them form a considerable part of the total score (e.g. 55% for the exam, 45% for all other assignments). In private school we can divide our 100 marks exam in different category. Of course, then reading all these will increase their workload and some students may not like such assignments as they have to work in addition to learning for exams; thus, their evaluation for our course may go down. If students only learn for exams, they are not probably very interested in what they are studying.



THEME 3 (Lack of Education and Teacher Training)

This story talks about the new teachers who don't have educational training and experiment. So the story theme shows that difficulties are also created by teachers. If teacher enters in class without enough preparation of subject matter, enough teaching material and lesson plan. In Nepal especially in private schools anybody who just passes college level education and without having enough idea about teaching methodology and producers could become a teacher. Quoting government officials the media often report Nepal requiring tens of thousands of teachers if it were to meet the goal of Education for All (EFA) although the number is contested from various quarters for being grossly inaccurate (Bhattrai, 2009).

Difficulties from Teachers Perspective

It may be a day of second week of June, 2003. I am standing in front of S.L.C. (School living certificate examination) this year I have to pass the 'Iron Gate[3]' anyhow not only for me for my parents too. So, I used to wake up early morning 4 am and after having a cup of tea I needed to go for my mathematics tuition class and used to go to school. After school I attempt coaching class and extra mathematics class then I am supposed to go combine study with friends. At late night I have to complete school assignment. My daily routine is finished all most all at 11 pm at night. At this moment, I do not worry about other subject but mathematics is the matter of tension because my friends who has passed SLC examination they said me most of students failed in mathematics. So, don't take it easy because it is Iron-Gate.

Today is the first day of geometry class Mr Geometry is the teacher from another country. He is supposed to experience qualified mathematics teacher. He has more than 25 years' experience of teaching mathematics in same school. I face main problem of the teacher is language problem I do not understand his speech and language properly. So today Mr Geometry is going to start geometry chapter.

Mr. Geometry entered into the classroom...

Students: Good morning sir! (All students stand and wish to teacher)

Mr. Geometry: Good morning all of you Sab Baith Jaao[1] (sit down).

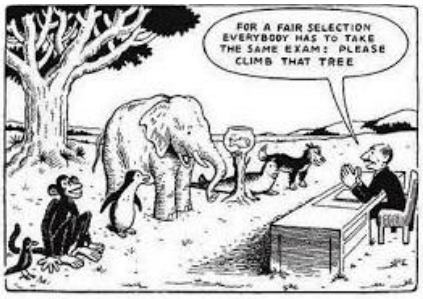
Mr. Geometry starts to write in black board theorem 5 and theorem 12 is important.

Mr. Geometry said all of you copy this theorem in your note copy and tomorrow I am going to call you one by one in front of class and you all have to do theorem 5 and theorem 12 in blackboard.

[3] In Nepal, School level certificate is perceived that the gate of Iron.

All student start to copy these two theorems of geometry and Mr Geometry sits in front desk. After school whole day I start to memorize these two theorems and finally 12am of night I become success to memorize these two theorems. I become so happy because I am success to memorize the theorem. Tomorrow morning when I tried to memorize again I become confused and start to memorize.

Next day in class Mr Geometry start to call from last bench of class I am sitting in second last bench of class, I am sure today my turn will come to solve theorem in blackboard. Finally my turn is came Mr Geometry give me task to solve the theorem 12. I did this theorem in board but many of my friends who are not able to do this theorem got punishment. This process is continued up to 2 months. Then two months before starts SLC examination we passed test examination and we qualified for attend SLC board. Among 350 students only eighty students are qualified for attending SLC examination. But our study is continued till SLC. After passed test examination we decided to complain with principal about Mr Geometry. One monitor of our class and other students decided to give complain letter to principal. My friend wrote complain letter to principle that Mr. Geometry should be displaced from school. We all (more than fifty) students sign there and gave complain letter to principal. Mr. Geometry transfer to another school and he quiet our school.



THEME 1(Language Problem)

This story focuses on how misconceptions are generated by teachers prospective. First part of story focus on language problem of teacher. This shows that how students do not understand teacher's language, or what teacher is explaining in not give any sense for students. It creates more difficulties in class room. In fact it is not fault of teacher it is the fault of school management and policy maker. Government of Nepal ministry of education **school sector curricula reform** plan 2009 to 2015 clearly mentions that; "mother tongue literacy courses, utilizing the Curriculum Development Centre experience and resources, will be introduced in local languages. The partnerships will be the basis for implementing such activities." Government of Nepal has declared that primary education, textbooks and 95 learning facilitation materials produced in different languages.

Moreover some teacher's speech is not clear and some have soft voice. In my teaching learning experience; I have meet such types of teacher whose voice is not clear and small but they are educated so this types of teacher can use alternative method for teaching. They can take help of technology and alternative method of teaching learning.

THEME 2 (Teaching Methodology)

In the story Mr. Geometry is influenced by traditional teaching method. He is teaching his students how he learns even he is evaluated as experienced teacher. He passed out more than 20 batch of SLC with good grades. I don't want say he don't have knowledge.

This dilemma shows that the students' disengagements in mathematics education even they are facilitated by quite experienced teachers. Despite many other facts, this dilemma shows that how our education system is far from our pupils'

destination. It also raises the question on traditional teaching style and its practice in our education system. The majority of students in our schools are unable to make connections between what they are learning and how that knowledge will be used. This is because the ways they get information and their motivation for learning are affected by the traditional methods of classroom teaching. The students have difficulties in understanding academic concepts (such as Mr. Geometry's concepts) as they are commonly taught (that is, using an abstract, lecture method), but they desperately need to understand the concepts as they relate to the workplace and to the larger society in which they will live and work. Basically, I have found these practices of teaching/learning mostly focused on deductive system in teaching and learning process. This is because we are simply deducing truths from truths and this leads us to believe that mathematical truths are certain truths.

Furthermore, it also emphasis on how memorizing technique is mostly famous on school level teaching-learning practice. As Mr. Geometry applied single method for everyone and he wants students should remember the all-important theorem because they are the indicator of success. Same view Putten (2008) elaborate that; "Teacher concentrated exclusively on rote learning of the theorems and used the textbook exercise in a do-them-for-homework-write-down-the-correct-answers-the-next-day sort of process which, I claimed, led to no insight at all. This student achieved zero for the theorems and their riders in the pre-test."

"Mathematics" A Big Problem

I feel cry

When I do multiply

I become mad

When I do add

I think it's better to watch big boss

Than to do profit and loss

I think I am in tiger cage

While doing percentage and average

It's better to polish a boot

Than to do square root

It's better to get mother stick

Then to do arithmetic and statistics

I think I should work in factory

Then to do geometry

It's better to play lottery

Then to do trigonometry

I think I am losing my ability

While doing probability

It's better to involve in fashion

Then to do geometrical algorithms……

THEME 1 (Mathematics Anxiety)

It is a poem written by one of my grade ten student. He forwarded me this poem in the beginning day of my teaching experiences. However, the poem **Mathematics "a Big Problem"** which distinctly figures out as Luitel, (2009) refer decontextualized nature/tradition of mathematics and its academic practice in the context of Nepal, where the curricula are formulating such types of traditional format and expect transformation is matter. It is raising the question on the contemporary teaching learning practices in Nepalese schools. It questions directly to the traditional approach of teaching. Are we learning for our needs or for others'? I have tried to find the real meaning of the differences between doing mathematics and thinking mathematics and even more teaching mathematics. The poem is really painful, isn't it? Can we imagine the soulful learning which takes place without the learners insight interest (even he enjoyed working on factory)? So, it discovers and critique many question to the people who made mathematics curriculum. Why my students are not enjoying learning mathematics. Why they are saying polish boot is better than study mathematics? I am thinking about students who are studying in very isolated area of nation and start to compare actual scenario on top most school of capital city are expressed such then what will be in remote area. It is really questionable.

However, now it's time to change the thinking of students and society toward the mathematics. Mathematics is not a difficult subject. If we teach and learn mathematics by using student lived-based methodology and visual-based teaching materials I am sure everyone will enjoy learning mathematics. And it remarkable that, to make students friendly mathematics curricula is not easy job but we need to change rethinks about it. CDC should develop curriculum as need to society and students.

When they develop curriculum teacher from different environment, researcher, professor, subject specialist and policy maker should be present there. Curriculum should be revised as need of society, student and country. Government should provide training to teacher's subject wise. Then only we can make mathematics also student friendly subject.

Chapter Summary

This chapter shows that teacher's view is also the most important for student's conceptual learning achievement as well as how it affects student's progress in their meaning-making process. So, this chapter includes different scenarios reflecting on my lifework experiences based on difficulty creates on teaching-learning Geometry. This chapter includes three stories as my data sources which elaborate the actual problem and solving remedy for those problems. From the above data it is clear that students are searching the meaning of their study but teacher are not able to make concert meaning of their students. As a result, it brings less interest in geometry and more difficulties in learning. In next chapter five I am going to elaborate about the fallacyin geometry and how fallacyoccurs and what problems should be created by misconception.

CHAPTER V

HOW IS FALLACY BORN?

Chapter Overview

In this chapter, I have tried to present the fallacy transpired from learner and teachers perspectives. As oxford dictionary mentioned; “fallacy is a view or opinion that is incorrect because based on faulty thinking or understanding.” So, this chapter discover how geometry related fallacy is created and how it will affect on students learning achievements. So, in this chapter, I have tried to find out the fallacy through students side and teachers side excessively and tries to find out the reason which in/directly brings fallacy on them. Furthermore, I am departing my data as form of story which I get from my lived experience and my educative practices. Plotting those different stories in my inquiry, I have tried to represent the different extraction of fallacy and its collision on learning difficulties.

What types of fallacy we hold? The story begin ‘*finishing course of study’*

Reflecting on my 25 year educational practice, I am encountered by many different situations which are very difficult to say that it is fallacy or not. Probably, the definition of fallacy is measured by the people’s long-term and short-term mental disability to generate the proper sense of knowledge. However, student didn’t understand concept of dividing in primary classes may not be the fallacy but in higher level if he demonstrates same ability that may be the result of misconception. Same types of fallacy reflected in the following story:

Probably it was Friday in the month of June, 2013. All mathematics teachers of my school are gathering in meeting hall meant for attending "general meeting" for publishing result of terminal examination. All mathematics teachers including me

were called for necessary presence on meeting because this time student's performance in mathematics is comparatively worst among others subjects.

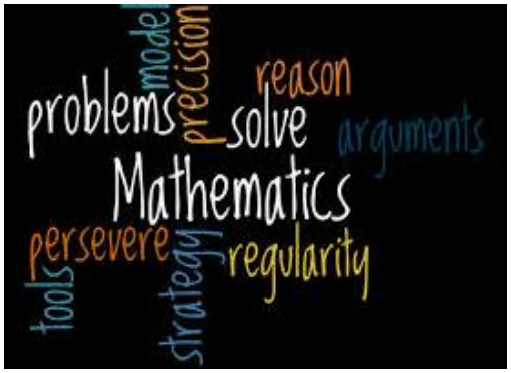
Generally, mathematics result of our school is not good in previous examinations also but this examination makes whole school to think about the mathematics performance of students. Meeting starts by question from principal to teachers "why students are weak in mathematics? One of my co-teacher replied "Sir our student's base in mathematics is very weak. So it's very difficult to teach them. They don't know simple mathematics operation also. And we have not sufficient time to elaborate every segments of problem because we need to finish our content in time. If we teach them basic thing which they have study in pervious classes, it's difficult to complete course. (It is the voice of the teacher who teaches in grade ten) secondary mathematics teacher." On average, only 93% of the course is completed by schools before the SLC exams. And the course completion rate is lower for the weaker student group (MOE, 2005)."

Principal asked same question to lower secondary mathematics teacher. Lower secondary mathematics teachers also answered almost same like secondary teachers. Similarly, the same voices came from primary teacher; "In grade four and five if they don't know simple addition and subtraction how can we teach mathematics tricks and other simplification?" Here difficulties are started from beginning. Then we discuss about different class room problem like students interest, behaviour, discipline, different teaching materials and further process of improvements.

THEME 1 (belief related to subject matter)

From above mentioned story we can visualize that how our contemporary educational practice values for the finishing of content in time rather than the actual improvements of students learning outcomes. And it also figures out about our whole educational system regarding to the tradition of teaching content rather than serve of students.

As my teaching-learning experience as a student and teacher I found most of students felt weak in mathematics. If students are not complete their minimum achievement in lower classes then they feel very difficult in higher grades and fallacy instinctive here. Same situation Bhatta, (2005) put that; “Student academic input that can have a notable impact on performance is the student’s prior knowledge base (p.123).”



same way, our education system impose curriculum to learners. National curriculum framework for school education (2005) criticize that mathematics was found to be difficult especially at the secondary level. Overall, the analyses have found the revised primary level curriculum (2003) to be more systematic.

Our teachers are not trained enough. My teacher taught me how his teacher taught him similarly I used to teach my students how my teacher taught me. I believe that if teacher is trained then students can learn more knowledge. "Teacher training has a positive impact on the teaching practices of teachers, which in turn helps the students to learn better (MOE, 2005).”

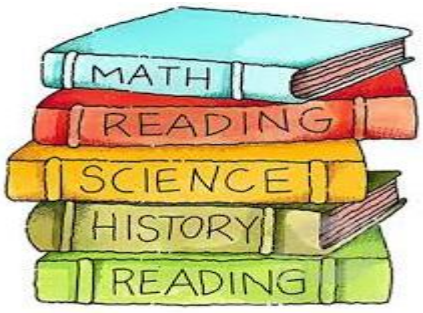
Here we are transforming knowledge from one generation to another. Early days of my experience of teacher I taught my students what was written in book and I

used to think that I am a good teacher because my students like me. I got change on me when I joined in KU for my M.Ed. degree. I learned that knowledge is creation. As theorized by Lev Vygotsky, knowledge is not transferred from person to person. The individual does not passively receive knowledge from the environment, but is an active participant in the construction of his/her own mathematical knowledge. Now I realize that I am no teaching my students I just trying to transform knowledge to my students. My career is going to start now because up to now I was transforming information written in books. I am feeling knowledge is creation we have to create knowledge and find out new idea and new knowledge. Knowledge is creating by experiences and environment. Everyone have their own experience and they have to face different struggle and face different environment which is the best idea to create knowledge is not transmitted it is created by own way.

Everybody has capacity to create knowledge but people like others creation because they think that their own creation may be wrong or not good. It is a problem of self-confidence and habit to love others creation. In last two years I have got change in me. I think till now I am transforming information from my mind to my students mind. Now days I create environment for my students, I am working as helper and coach. I am not superior to know everything I learn me\any things from my students also my students discover and create knowledge. I am not saying I am totally constructive teacher But I can assure that I am going to constructive way.

THEME 2 (To give more priority to test book rather than curriculum)

Very few teachers go through the curriculum and plan for annual instructional programme. Most of the teachers basically use textbooks alone as curriculum and deliver instruction as a routine task (MOE, 2005). We teach students exercise and problem solving. Most of text book has not explained about mathematical terms used in a chapter. They focus more in problems. For example we are teaching similar triangle. We focus more how to show triangles similar rather than what is similarity. "Manipulative are tools that can be used to help students to progress from Bruner's enactive (action) stage of learning to his iconic (pictorial) stage of learning to his symbolic (abstract) stage of learning.Our text book also emphasis in exercise and problem solving (2005)." CDC has developed curriculum for every subject. In my teaching learning experience, neither my teacher as a teacher nor I follow curriculum. We (teachers) just following text book. "I was upset when I sometimes heard of school leaders who said that he (it was usually a he) could put a mathematics textbook into the hands of any teacher and send them into a year one class to teach mathematics. I felt that teachers with a restricted understanding of what is at stake for these children learning mathematics could do considerable, far-reaching harm (Troels et. all 2009)."



Misconceptions Born in mind and simply Transform to other mind

It's towards the middle of March 2011; this session was also going to finish. With the end of this session my one year teaching experience is added in my resume. My school days were normally passing because course and content were finished in time. Only students were involved in preparation for final examination. It is the

starting of summer season; the school environment is looking beautiful and romantic. My first period is in class nine I enter class nine. Students are busy in their own work. Some are doing assignment and other students are solving question from the question bank. School administration has decided to promote all students in grade ten. Yesterday's staff meeting principal has told me "sir focus more in low achiever student they must pass in mathematics." Ravi is the student of my class who failed in the exam of mathematics in last year. I call him and ask "Ravi what are you doing? Tell me your problem what is your difficulties in mathematics? Can I help you? He replied "Sir Mahesh is teaching me and i hope this year I will pass the exam. He also adds Mahesh is good in mathematics and he is the first boy of class. Does Mahesh teach better than me? I ask "No sir! But I understand him." I just observe him and after ten minutes. I look at his copy.

He is doing a question from the chapter of triangle where length of two sides is given and he has to find the length of third side. In this question he is using Pythagoras relation but triangle is not a right angled triangle. I ask him "Ravi which triangle is this?" I pointed the figure of triangle. He said "obtuse angled triangle sir" he replied. Again I asked; "But do you know Pythagoras theorem is used only in right angle triangle?" "Yes sir But answer is right I checked in my book look sir" He seems to be very confident on his solution and he shows me his text book, with question and answer. Then, I give him three more similar questions to solve him. This time answer is wrong. "Sir I know now Pythagoras relation is used for only right angle triangle it was coincidental in earlier question right sir?" "Yes! You are right" I reply.

THEME 1 (Peer group learning)

I think students have more influence of friends than teachers. In above story a student has difficulties in triangle but he wants to ask his friends rather than teacher. Friends always may not right. If he learns anything mistake from friend it will be problem for student. They trust in friend sooner than teacher and they valued more friends above than the teacher because of more attachments with friends. Students spend more time with friends than teachers. At school, students do many things. Not only do they concentrate on study but they also spend time by hanging around with friends and taking part in club activities.

In this story Ravi is feeling easy to learn from his friend than teacher. Research has shown that students who work in cooperative groups do better on tests, especially with regard to reasoning and critical thinking skills than those that do not (Johnson and Johnson, 1989). But one condition applied there. In the process of collaboration learning teacher should present there. All activities should create by teacher directly and indirectly. Then only collaboration learning will be success otherwise fallacy will develop among students. And Difficulties are created by misconception.

The influence of the peer group upon knowledge development and use has, until recently, received relatively little attention in the field of education, as individual, cognitive representations of knowledge have pervaded theories and practices of learning (Zevenbergen, 1996). But we are now, as Resnick has claimed ‘in the midst of multiple efforts to merge the social and cognitive’ (1993, p. 3), which has meant that significant attention is being paid to the

students peer learning in which pupils operate and the 'negotiation of pupils with each other and with the resources of their environment' (Joshi, p. 84). Situated theories of learning have added a fresh and radical perspective to debates about knowledge, but such theories are still in their infancy and whilst important contributions have been made to further our understandings of situated perspectives (Lave, 1988; Brown, Collins and Duguid, 1989; Hennessy, 1993; Young, 1993; Greeno and MMAP, 1998), knowledge of the precise ways in which theories of situativity can inform events within mathematics classrooms remains elusive.

THEME 2(Communication gap between teacher and student)

Above mentioned story also shows that students have a lot of fallacy in small thing but he is feeling hesitation to ask question to teacher. Actually these types of behaviour we can see in traditional mathematics teaching classroom. Teacher is supposed to be source of knowledge. Fallacy is "a line of thinking that causes a series of errors all resulting from an incorrect underlying premise, rather than sporadic, unconnected and non-systematic errors" (Nesher, 1987 as cited on Confrey, 1990, p.35).

These are small effects but these small effects create big problem. It shows that there is communication gap between student and teacher so student not asking question to teacher. Difficulties are not problems but these types of small thing create difficulties in geometry learning. I think difficulties can be correction, make less and can be improved but if there is Communication gap between teacher and students it may be great problem for students. Supporting my view like Authority (2007) explore that; "learning difficulties refers to barriers that limit access to, participation in, and

outcomes from the curriculum. The learning problems these students experience are often further exacerbated by their emotional reaction to lack of success (p.98)." Dahal, (2012) also clarify that factor effective relation between teacher and student are presented in different ways which are my beliefs, my surrounding society, my teachers' image, context based mathematics teaching and teacher's reflection towards mathematics teaching.

THEME 3 (Miss Print of Text book and other reading Materials)

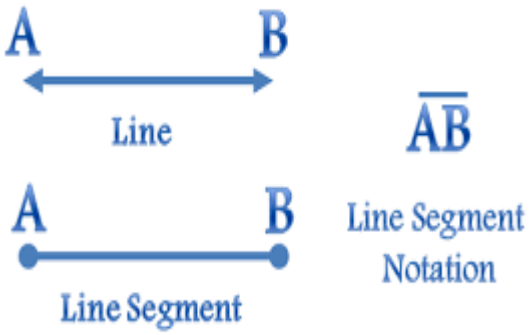
As a teacher I become happy if student is able to understand what I teach. Also, the learning environment includes availability of qualified and trained teachers, curriculum and textbook materials, teacher's time on task, extra-curricular activities and so forth (MOE, 2009). However, in my carrier I found that most of students' beliefs in book rather than teachers. In my lived experience, many times I encountered by wrong question and answer printed in book but students' trust in book more than me. Book also written by a teacher and sometime there must be wrong answer printed but students are used to think book is always right. Less or more this perception of students also leads them to encounter by misconception.

So, I feel that there are various causes of fallacy related to from textbook, teacher, and student themselves and pair groups etc. In the same way, when I gone through different articles written on fallacy I got fallacy is occurs in different sources. It is the main cause for creating students learning difficulties. To evade fallacy teacher should change the teaching methodology. I think new approach of teaching learning can evade misconception. Constructivism and collaboration study can evade somehow fallacy in mathematics.

Misunderstanding

It can be any day of August 2012, I am busy in my research work. I have chosen some particular student for my research but I decided to know the view of all students about my first research question. As this purpose, in my class I decided to ask a question overall students.

Yesterday, I have finished the chapter 'Congruency of triangle' so all student request me "sir we will start new chapter today." I said ok then I started to ask student what is your learning difficulties in triangle chapter. Student X said "Construction sir, how we know the problem in which we should construct the geometrical figure." He replied quite interestingly. After listening some other problem related to construction of geometrical figure I replied; "It depends on the nature of question and you should use your own creativity and common scene." In the mean time another student Y replied; "If we use our creativity and common scene in our exam then our time will be finish in a single question!" the whole class starts to laughing.



Again student X added; "sir I feel geometry is difficult. I don't know why but figure of geometry are very complex to understand and I also feel visual dilemma in geometrical figure. I never understand the difference between line segment and straight line."

Theme 1 (Difficulty Created on Visualization)

The same above mentioned scenario, two Dutch researchers, Dina van Hiele-Geldof and Pierre van Hiele, suggest those students' geometrical understanding progresses through various levels, which cannot be skipped. These levels are now known as van Hiele levels. Other research supports their theory, and has found that most students enter high school geometry with a low Van Hiele level of understanding. Thus, they cannot possibly understand the teaching, since writing formal proofs requires at least a van Hiele level 4. I recommended his contribution in my inquiry in following five levels of van Hiele;

Level 1 -Visual Misunderstanding: Geometric figures are recognized based on their appearance - not based on their properties. For example, a rectangle is "something that looks like a door", and not a figure with four sides and four right angles. A student in this level would not recognize a rectangle that is rotated so it's 'standing on its corner', or a very scalene triangle that does not look like the 'prototype' triangle kids are often shown - the equilateral triangle.

Level 2 - Descriptive/Analytic Misunderstanding: Students can identify properties of figures and recognize them by their properties. They cannot tell a difference between the necessary and sufficient defining properties of a shape, and extra properties of a shape. For example, a student might not understand that for a definition of rectangle, it is enough to say it has four sides and right angles. Instead, the student might include in the definition also the fact that the opposite sides are equal and parallel. Also, student cannot categorize shapes hierachically; and cannot understand why a square is also a rectangle.

Level 3 - Abstract/Relational Related Misunderstanding: Students can now understand and form abstract definitions, distinguish between necessary and sufficient conditions for a concept, and understand relationships between different shapes. They can, for example, tell that all rectangles are parallelograms, but not vice versa. Students can justify their reasoning informally but not yet construct formal proofs. A student needs to be at least on this level BEFORE taking high school geometry course.

Level 4 - Formal Deduction: Students can reason formally using definitions, axioms, and theorems. They can construct deductive proofs starting from the givens, and producing statements that ultimately justify the statement they are supposed to prove. This is the level that a typical high school geometry course is taught.

Level 5 - Rigor/Mathematical Based Misunderstanding: Students can reason formally and compare different axiomatic systems. This level is needed in college mathematics.

So, this theory what I found mostly applied on my research and it seems to concrete image the progress of student's geometrical thinking. However, it important point is that *a lot of the geometry taught before high school does NOT foster students into higher level of geometrical thinking.* A lot of the geometry problems in text books are just calculations of the type, "Calculate the area/circumference/perimeter/radius etc. of this figure." Textbook problems concentrate too much on calculating and using formulas, and not enough on analyzing concepts, making conjectures about the properties, testing them, and studying lots and lots of figures and shapes experimentally.

So, the story emphasized on visual based problems of students' geometrical thinking capacity. For instance, when they see the figure of straight line and any other

geometrical figure they think these figure are exist only in book, copy and white board. So, it is better to give some live example for every figure then they can learn something useful and durable. Bruner explained that learning 'subject structure' is about learning how things are related. He explained how in mathematics for example, students learn basic rules, such as how multiplication is commutative (i.e. that 2x3 and 3x2 give the same answer) but that subtraction isn't (i.e. that 3-2 does not give the same answer as 2-3). They then apply the rules in different situations, although they may not know what the rules are called (GTC, 2006).

Theme 2 (Student's Cognitive Development)

This point ties in with the previous one, but has more to do with the general cognitive development instead of just geometrical reasoning. According to the psychologist Jean Piaget's theory about cognitive development, a person needs to achieve a certain level (called formal operational stage) to be able to reason formally and understand and construct proofs. If a high school student has not achieved that, then it will be very hard to understand the geometry course. Sadly, there is some research suggesting that even most college students have not achieved that level (Ausubel, Novak, and Hanesian 1968). This story shows difficulties create by teacher’s cognitive process as well. In the story students are not able to identify straight line and line segment. So, I think it is better to teach practically rather than to teach definition. It is easy to teach student that how we multiply two numbers but it is more effective when teacher teach student if what is multiply?

Now days when introducing new terms in geometry, and mathematics in general, especially if students already have knowledge of alternative meanings for them, teachers can insist on students using them verbally in their explanations of solutions to problems etc. as much as possible. When students use them in context

verbally as well as in their written solutions they become familiar with the proper terminology that is used. Teachers can associate new terms with upgraded diagrams/representations/symbols etc., which students can connect easily to.

Teacher as a Role-Model

Students have been trying to copy almost all the ideas of teachers. They copy style, handwriting, and way of thinking, solving, drawing and presentation. I am an evidence of this fact;

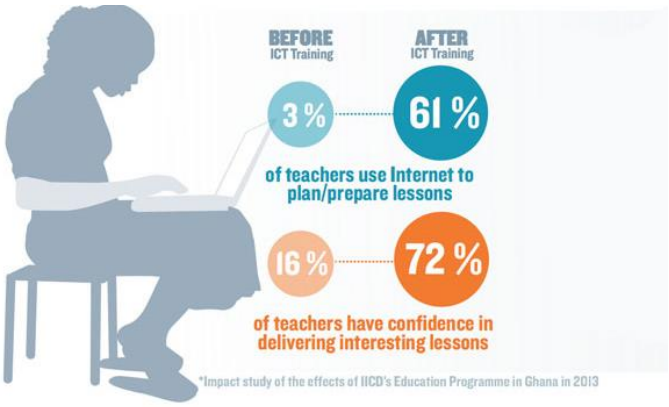
I was very week in handwriting. My handwriting is very worst. It's very difficult to read for others. But my handwriting is improved from grade eight. I don't want to give this credit to my English teacher. His handwriting was very nice and I am highly impressed by his handwriting and I follow him and I copy his and finally I got improve in my handwriting. Similarly I have an evidence of drawing also I feel very difficult to draw geometrical solids in white board. One day I saw very nice drawing of cube in my student copy .I asked to student who draws this solid he said I draw sir our mathematics teacher Mr Y taught us shortcut method for drawing. I requested to Mr Y and I Mr Y taught me very easy method for drawing. Nowadays I enjoy of drawing solids.

Above story shows that students follow teacher and they highly inspired and motivated by their teacher. So I feel that teacher should be more careful about their habits and their way of presentation. As teachers learn more about the problem, context, they can change their own behavior in ways that will influence positive change in their students. After determining what triggers a problem behavior, a teacher can teach the student a better way of responding (Sombarriba, 2010). In the story teacher is not using scale to draw straight line and geometry figures so students

also doing same. So, teacher has great role to improve students' habits and personal behaviour which leads to minimize their misunderstanding.

My Experience as a Novice Trainer

It can be any day of February 2012; It is last semester of my M.Ed. studies. As demand of our curriculum at the end of semester every student should conduct 3 days' workshop (Teacher training) related to our subject area. So we are organizing 3 days mathematics workshop with my 3 colleagues. We are little nerves because we are going to give training to more than 20 teachers. Some of them have experience of more than 20 years and some have more educated and knowledgeable. Even we are well prepared in our content and workshop schedule but we are stressed. Finally we start our workshop and it is totally based on use of technology in teaching Mathematics, mostly focused in geometry teaching. First time I am going to teaching geometry by using different computer software. In three days we introduce our participant to different geometrical software and their use. At lastly at the end of session we give a paper to participant to write about their views about workshop. When we collect their response paper it's surprise 90% teacher give us good comment about Geogebra software. Then we discuss more about Geogebra software. They said it is the best way to teach students geometry and reduce fallacy in geometry.



They said it is the most practical way to teach geometry. Then I also start to teach geometry through geometry software I got students has less fallacy in geometry. Especially when I taught geometrical theorems and their experimental verification I

got it is more fruitful for students. I teach mathematics by using different geometrical software as possible and as a result I got less fallacy in student's knowledge.

THEME 1(How to Reduce Misconception)

This story gives the solution to reduce misconception. Traditional methods of teaching and learning are still dominant in Nepal, so professional development in more modern pedagogical practice is an area deserving close attention. When we teach geometry by practically and demonstration method it will be more effective. The potential for using GeoGebra to teach and learn mathematics in Nepal is very large, as evidenced by the participants' attend workshop impressions and enthusiasm about, and willingness to use, dynamic geometry software, despite many constraints and difficulties associated with accessing advanced technology (Mainali & Beth, 2012). Knowledge is expanding day by day so teaching becoming one of the most challenging professions in our society. While learning mathematics learner expect from facilitator to facilitate meaningful learning rather than just knowledge and skills. In this modern period the use of ICTs in teaching mathematics has provide a new possibilities in teaching profession. Different research indicates (Bansal, 2007) that ICT can change the way of teaching and it is useful in supporting more student-centered approaches to instruction and in developing the higher order skills and promoting collaborative activities. That is why, mathematic teachers should be provided with different professional development trainings including use of ICT in the mathematics classroom according to the demand of time.

As I mentioned in above, most of fallacy start from the lack of proper connection between visualization of problem and the solution of problem. Most of the

students were not able to understand mathematics due to their negative perception towards math. Basically in most of the mathematics class, the way of teaching was problem solving method and there was not appropriate visualization of the things used in mathematics and it is oriented towards marks only. In most of the traditional math class teacher teach the student only for getting marks so they just solve the problem. Use of ICTs has a very positive impact in teaching and learning mathematics. Flecknoe (2003 as cited in Paudel, 2014) also indicate that ICT assists student to learn. Use of ICTs is helpful for students and also for teachers to teach mathematics effectively and dynamically as they are more visual, interactive and stimulating. In addition, student also becomes excited and motivated while ICT instruments are used in teaching. The effectiveness of ICTs in teaching mathematics also depends on the teachers' interest, ability and knowledge about it.

On another way, the student's perception towards mathematics is as a hard and boring subject because when they start to solving problems mathematics than they are not able to visualize the problem so they fails many times while solving the problems. I think to visualize the problem is the main problem of student while solving and understanding the problem so they feel anxiety towards mathematics. The role played by technology is not fixed and can be changed over time when teachers become more experienced (Laborde, 2001). This means teachers will have increased flexibility in what they want to do and how they do it. By use of range of modern ICTs based learning methodology we can develop the geometrical thinking and skill of students and surely, it will diminish misconceptions of students learning difficulties.

Chapter Summary

In this chapter, I have tried to elaborate the different learning difficulties crafted through the fallacy of students' as well as teachers side. So, in this chapter I illustrate the use of a particular situated fallacy produced from the different interpretation in my analysis of the data from my lifework experiences. The 'constraints and affordances' provided by different environments are shown to be key analytical tools in understanding the ways in which students develop and make use of knowledge. Various classroom incidents are analysed, demonstrating that the particular constraints and affordances of formalised mathematics classrooms, to which students become attuned, contribute to the development of learning identities that are peculiar to the school mathematics classroom and of limited use to students in the 'real world'. An understanding of the mathematics classroom as a child-centric of practice is central to this analysis. Furthermore, the chapter includes the use of ICTs and its positive impact on students' fallacy reduction process.

CHAPTER VI

LIFE LIKE GEOMETRY IS THE NEED

Chapter overview

Children know how to learn in more ways than we know how to teach them.

-Ronald Edmonds (1991)

In this chapter I will try to connect geometry in real life experiences. For this, I started with reflecting my lived experience with representing many stories, dilemma and first thing that comes to my mind is 'how to connect geometry that will enable my students' to minimize their fallacy regarding to learning geometry'. Similarly, it could be make my research more transformative and educative. So, under this chapter I will try to explores a auto-ethnographic reflection of my lived experiences as a mathematics teacher where I have tried to identify the complex geometry learning issues (i.e., fallacy issue and its matter, geometrical problem visualization issue and its anxiety in exam, passing vs. failing matter, learning vs. teaching matter) and how one of my students has been depressed on her mathematics exam. It shows how the mental perception of one student had been influenced by the negative image of learning geometry and how most of student suffered by geometry anxiety. As I am gradually engaged with the literatures on educational research and started my autobiographical excavation, I feel that there are more important things that I need to consider other than satisfying myself with technical desires that is giving up some of my dreams for the good of everybody.

My Different Experiences About Geometry

Reflecting my past experiences, I have found that we all have different learning experiences about geometry. Some students of mathematics may feel it quite useful and easy while some others may take it as boring-subject and moderately difficult. Similar perception of mathematics teachers' also expressed. As the same sense, I have constructed in my schooling when I always used to think that why I was learning geometry and where I would use in my future life.

Then, many times I tried to ask my teachers about the utility of geometry but I couldn't satisfy myself with their answer. I was one of the low achiever students in my class. So, I didn't want to be fooling among all my friends and more typically, in eyes of high achievers. When my teacher used to give class-work to attempt the problems of geometry and to prove some theorems of geometry, I could not able to attempt those tasks successfully and I used to feel humiliation. It might be because I could not understand the clear concept of geometry, diagram and geometrical language. Similarly, I used to imagine that the geometrical concepts and the diagrams would be limited only in the books and I could never relate the geometry with daily life. Yet more, my teacher never used any teaching learning materials to teach geometry (e.g., he used to draw angles without using protector and compass) and he could not motivate us properly.

Likewise, when I started studying geometry in higher secondary level and bachelor, I could attempt the problems of geometry but yet I couldn't relate the concepts with real life. Children can bring a lot of local issues of application of mathematics from their household practices to classroom that can help students to

understand the value of learning mathematics and also it makes learning mathematics a fun (UNESCO, 2008).

With the passage of time, fortunately, I happen to become a mathematics teacher in a private English medium school. As I mentioned above, I could not have much more interesting experiences of my schooling level. Initially, I assumed that my students would have the similar difficulties that I had faced as a student. The result comes in same way what I assume; my students also explore similar experiences what I constructed in my schooling. They also get irritated with geometrical concepts, theorems and diagrams in comparison with other parts of mathematics. They often ask me what could be a possible use of these theorems and diagrams in our real life. They are curious to know application of geometry in daily life.

I don't want to keep my students in that situation which I faced as a student. So, I start to motivate them by using different students' context based teaching methodology. Similarly, I try to relate geometrical concepts in their lives as far as possible. For instance, I try to make as example of triangle with roof of temples, rectangle with rooms, circle with rings, etc. I try to draw the diagrams with the help of instruments only. However, for building this concept many love-hate experiences comes in my professional experiences. Some nodal experiences are explored in following segments.

A Story of a Mason and Geometry

It could be any Saturday of mid November 2008. It is merely 6 a.m. in the morning. The weather is extremely cold outside. I am feeling warm as I am using quilt to prevent the chilly cold. I am sleeping in bad. At the mean time, someone is knocking at the door of my room with strange sound, "Knock! Knock! Sir! Sir! Are you there sir?"

Firstly, I cannot recognize the voice of his but I guess it may be some of my neighbour. I wake up and open the door. As expected, the man is one of my neighbours whose name is Dhane. "Dhane Dai, in the early morning, what happen to you?" I ask. He comes inside and starts to talk to me; "Sir, Look, I am old man and wake up at 6 a.m.in the morning and went morning walk. Now I return back from morning walk. Sir, you are so young having hot blood in body but still sleeping, it's not good". I am replying "You are right Dhane Dai. From tomorrow, I will also go with you in morning walk, please inform me, when you will go"?

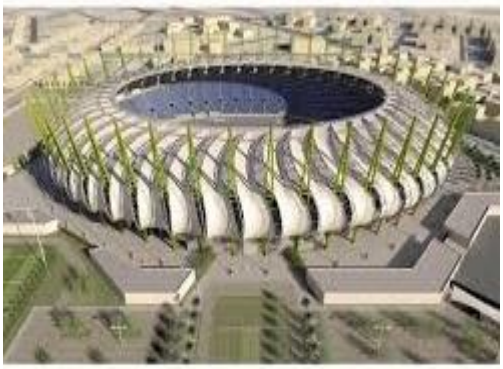
Now, he starts to share his problem. Actually he is not here for his own problem he is asking some help for his friends. "Sir I have a friend, he is a mason. And his job is building house.

The owner of houses pays money as an amount of per square feet. Then, the owner cheats the mason by miscalculating the area of the house, i.e. he always calculates the area of room, walls, roof, door, windows, etc. by deducing length, breadth, radius, etc. and he pays lesser money than required amount."

Dhane Dai further adds by showing pity upon the mason; "He don't know to find the area of different shape and size, and he is frequently cheated by the owner, so please teach him how to calculated the area of triangle, rectangle, and quadrilateral in square feet as you are mathematics teacher." Then I replied ok let me try to teach him and I also add if possible, Dhane Dai tomorrow made a chance to meet him tomorrow. In next day, we meet each other and I try to help him how to calculate the areas of different shapes and sizes.

THEME 1 (Everyone Needs Geometrical Knowledge)

Generally, the above mentioned story shows that how our society suffers from the mathematical based skills. In this story Dhane Dai's friend is distress from cheating and frauding because he has not proper mathematical knowledge. House owner used to cheat him by using his mathematical knowledge and used to pay less amount of wage. Although, he knows that they make some wrong calculation when they find the area of these thing but he cannot have any concrete solution of it because he has not sufficient skill to defend them.



So, the story shows that how (even in more than forty years old guy) each and every persons' needs to having some types of mathematical manipulation. In next day, I prepare to share this story in my classroom because for the purpose of motivating students and alerting them how geometry related knowledge is working in society and their further life as well. After, listening this story all students' are become so happy because they are feeling that today they are studying really useful thing. So, in later, all students' become actively participated.

In another way, I hope this story may help to the readers and students to know the significance of the geometry and relating geometrical concepts in their daily lives. They will also realize the value of teaching and learning of geometry. This story portrays only an example of mason but in daily lives we come across many such

instances of applying the knowledge of geometry in real life situations in different sectors like architecture, medical, interior design, road construction, furniture work, and so on.

This story has some meaning through this story I want to proof that the uses of geometry in our daily life is how important? And lack of the geometrical knowledge how can people

To find the area of triangle: length of base × length of height.

To find the area of circular objects: length from centre of circle to circumference of same circle i.e. (r) and π whose values is $\frac{22}{7}$ then multiply by square of radius is called area of circle.

So area of circle is (A)= πr^2

A = $\frac{22}{7}$ × square of length of centre to circumference.

Same way to find the area of semicircle is by dividing the area of circle by 2 is area of semi-circle will come.

Same way to find the area of four wall and window door also by using formula I teach him.

And then he learns calculating the areas also. then after one month he came to visit me and said me sir now no one can cheat me he tell me sir after learn this all thing from me I myself measure and calculate the area so they afraid to cheat me So, afterwards, the mason is saved from cheating by the owner due to knowledge of calculating area.

Use of Geometry In Real Life is Our Need

Venue: Roof top of a house situated in Kalanki

Time: 4pm evening time of sun set

Character: Ravi and Kamal.

(Ravi and Kamal are two friends who are growing in same place even they have studied same school from class eight. Now days they are doing M.Ed. together from a famous collage and they are full time student as well as they are full time job holder too. They used to teach mathematics in different two private school of Kathmandu. They are full time student but because of their job they do not to go collage and before three months of exam they used to go tuition class and they attend examination.)

It could be any Saturday of June, 2012; being busy schedule of life Ravi and Kamal usually Saturday evening they used to meet each other.

Generally they talk about their school and their parallel teacher of school and their study. Today they start their conversation from their class room problems.

Ravi: I am really fade-off with my students. They do not understand geometry. Even 10 times I repeat same theorem but they do not understand. What to do?

Kamal: exactly! I am also facing same problem. 3 to 4 students are good they understand clearly but remaining 23 students are very weak. I don't know how they will pass SLC examination.

Ravi: I am really anxious. They do not regularly practice mathematics at home. Then how they will learn and understand? In our school days we are not like our students we wear very hard worker.

Kamal: yes really our teacher didn't teach us geometry. We did our self.

Ravi: This generations students are really less intellectual than our because our students have facility of extra coaching class and we teachers are focusing them personally.

Kamal: Yes! You are right. We have never got chance to ask and consult to teacher about our study.

Ravi: yah we got out text book also 3 months late then our only 80 percent course was completed .Do you remember Ravi?

Kamal: Yes; but now days we finish our course 5 month before SLC examination and we make them practice whole 5 month.

Ravi: Ok, Kamal what do you think should be done to improve their geometry learning.

Kamal: I think we need to give them more practice questions and when they have problem in calculation also so we need to give more practice exercise.

Ravi: What we learn in our M.Ed. level did you try to apply that knowledge and methodology in your class room?

Kamal: No, it is impossible to apply in class room. We have big number of students in class if we go through collaboration and constructivism method class room will be disturbed and noisy. Then principle will shout us. So these methods are applied only in developed countries schools and rich schools where less number student will keep in classroom.

Ravi: Why we are studying this rubbish? You know we have done great mistake by studying M.Ed. If we were study MBA we may get better opportunity, but by doing M. Ed. again we will be teacher only.

Kamal: Yes you are right.

Ravi: Leave it. Let's talk something else.

Conversations between Ravi and Kamal is over here.

THEME 1 (Teachers are Highly Pretentious by Traditional View of Teaching Learning)

Above conversation is between two practice teachers. They are studying their master degree and teaching in private schools. They are students of mathematics education but their view toward mathematics seems conservative. They both passed their school level education from their village school. They are searching their generation on their students' generation.

They are blaming their students for their failure to achieve success. If students are not improving and feeling difficulties in learning geometry they think there is problem in student not teacher. They think teachers duty is teaching in class they don't need to take responsibility of students. It was found that teachers tend to behave in ways that indicate more pity and less anger when they attribute a student's low achievement to her or his low abilities, whereas they express more anger when attributing low achievement to the student's low effort (Wiley Periodicals, 2002). Ravi and Kamal are students as well as teacher also they have knowledge of different educational theory and pedagogy but either they don't want use in class room or they don't have knowledge of application in classroom. The quality of education [in Nepal] is generally poor…schools often lack child- and girl-friendly facilities, and child-centred teacher-learning environments. Only just over 50% of teachers are trained, they rely on simplistic teacher-centred classroom practices' (UNICEF, Global action Nepal, 2011).

We have well educated teachers and they have enough pedagogical knowledge but class room application is not satisfactory. The supportive view (Luitel, 2011) explore that the teachers have a key role in facilitating the smooth progress of students in learning; and particularly poor learners' progress depends to a great extent on

teachers' competence and confidence in the contents and skills to be delivered, as well as the professional expertise required for smooth delivery – combined with their commitment translated into action. I think to understand the learner's situation and problems is as important as knowing the subject matter to be taught. We can understand students problem better way only after careful diagnosis.

In this connection, teachers' competency in identifying students' learning problems must be considered a 'master competency' essential to be developed and indoctrinated in them. as my experience I feel that in most schools, due to various reasons, teachers are unable to identify the learning problems, isolate the causes of learners' learning difficulties, and work out solutions towards the improvement of situation regarding students' learning participation and achievement.

THEME 2 (Catch-22 Between High Achievers vs. Low Achievers Students')

I think successful teacher are those teacher whose are less involving in "*teaching*," and providing *more* feedback and it gives better results. There are problems seen in *multiculturalism* and heterogeneous classrooms and its true our class room are multiculturalism and heterogeneous. *(Subedi, 2010) explain that m*ulticultural issue in the present context is a global issue of socialization. It has not yet been materialized into the education system in Nepal. The education system of a country should prepare students to function in today's diverse society. However, we (all teachers) are focuses on only high-mark holder students. Same example can be noticed in the context of Nepalese research conducted by Luitel (2009) and Joshi (2014). Luitel have introduced the image of mathematics as "*foreign subject*", and Joshi have constructed image about "*God-grant subject and Horrible mathematics*" to talk about students' diminishing well-being in mathematics thereby the help of this metaphoric image. However, Joshi's image as "*God-grant subject*" is constructed as

an analytical and contemporary educational practice scaffold. In his initial journey of learning mathematics, he has constructed this image of mathematics where he had struggled to make concrete sense of mathematics within his co- learners (especially high achievers) platform. I think after ploting above mentionaed dialogue between Ravi and Kamal, I found they have also the same image of mathematics what Joshi (2014) and Sam (1999) have expressed in their learning teaching-learning and research journey. Thus, my abovementioned stories also represent the parallel meaning to Joshi's '*Mathematics is choice of gifted mind'* and Sam's *'dark down and dark gloomy color*.'

THEME 3 (Messiness Between Learning Objective)

The above mentioned story also unfolds the issue related to learning objective. I think those two teacher Ravi and Kamal are only focusing on how to teach geometry rather than focusing what students want to learn. They are not relating their content to real life. According to CDC the general objective of mathematics in secondary level is to develop the necessary mathematics skills and to solve the general problem in daily life. Students should be encouraged to make sense out of real problems and the mathematics instruction should be designed accordingly. Solving real- world problems and to discuss these with other students. Finding solutions to real- world problems is not the end of mathematics lessons in this approach. Teachers help the children to develop their informal strategies into more formal approaches which they can use in other situations (Treffers, 1987 as cited Quaiyum, 2011). If we able to make our students to apply classroom knowledge in real life situation then only we can success in teaching learning process.

Relating Geometry With Culture and Locality (Real Life)

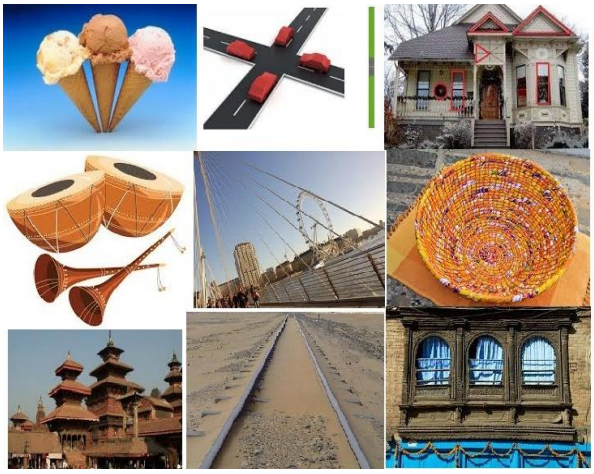
It can be any Tuesday of February 2013; I am spending my holidays in my hometown. My senior brother Rajkumar (Actually he is my villager but I call him brother we know each other from our childhood) was requesting me to conduct small workshop program for mathematics teacher. Rajkumar dai is founder of a private secondary school of my village. He is running a private school in village and he knows about me that I am teaching a reputed school of capital city and student of mathematics education passed from reputed university of Nepal. He wants to conduct a small workshop.

Today I am going to his school to share my experience and to discuss some mathematics problem and classroom activities. Actually, the school is poor in infrastructure. I am thinking of presenting in power point presentation. Due to the lack of projector I prepared my plan in paper. I reached school sharp at 11am with small piece of paper. There were only five teachers present in classroom. I start my presentation with my introduction and there too.

In first session I started sharing my experience as mathematics teacher and some problems which are frequently repeated in classroom. Then, second session, I have tried to solve their problems. As expected, most of problem they asked related to the difficulties in geometry teaching. I got same problem from every teacher that is; students do not try simple idea and problem of geometry.

I replied them (what I experienced in my teaching-learning adventure); "try to connect geometry in their real life experiences." We know that geometry is not a foreign subject because what we learn in geometry all shape and geometrical figures belong to our culture and society. But, we need to connect those shape and size founded in our locality into our classroom. We can more success and our class room

will be more effective if we can relate the geometry with our locality and our society then student will feel their own subject and they feel easy to learn geometry. Immediately, among them one Teacher 1asked me; "Sir is it possible to relate to every geometry topic to our real life? And how to connect those different phenomenon into our classroom?" Then I replied; Yes sir! We can relate every problem into our daily life situation. Observe and compare with your surrounding you will get everywhere geometry. I explain an example of our one local community based music instrument (named Sanahi) and try to solve the problem of finding the area of Sphere.



Of course, children in the villages were found to play different games/play after or before school in groups. And nowadays for the development of ICTs, some children were got chance to connect mathematics in multimedia and although, even playing fight on video games on a geometrical pattern. That showed application of geometry in children's games/play. There were various geometrical concepts such as lines, parallels, perpendiculars, squares, rectangles, parallelograms, triangles etc. in the frame they used for playing. The children used to play fight that has interesting geometrical pattern. The play fight is not physical play but a mental play like chess. It can help a lot in the teaching and learning of geometry in the classroom. Students know application of geometry more than the teacher but they can relate book knowledge and real life activities.

I conclude my presentation with solution that we can teach mathematics very effectively in classroom if and only if we can relate to mathematics with students' real life culture and society.

THEME 1 (Connecting Geometry in Real Life Situation)

Through the aforementioned story expression, I have tried to demonstrate that the existing nature of geometrical is not closely linked to our contexts and lives. The story also shows that how a most of mathematics teacher is unable to construct knowledge of mathematics according to their own (and students') wish and his own activities. However, constructivism says that knowledge is the result of the human action and the history of mathematics can be a source of inspiration for solving experientially real problems for which they do not know the standard solution procedures yet (Joshi, 2014, p. 146). We human being realize geometry is needed for survive and part of our life so early people developed it and we are doing more study on it. In my teaching experience, I got most of teachers is in dilemma whether geometry is used in real life or not; If it is uses in real life than; where we can use it? How to relate it with real life? There are mainly three issues in teaching and learning geometry in reference to Nepalese schools. These are: emphasis on learning geometry, contextualization of learning geometry and change from the traditional one-way classroom to two-way interactive one (Luitel, 2003). Moreover, the story also shows that how teachers are highly guided by traditional method of learning or their experience of school level. Realistic Mathematics Education (RME) suggests that we must construct the learning activities involving the parts of each constructed among guided reinvention, didactical phenomenology, and emergent modeling to help

a better understanding of the students in the topic of area conservation (Gravemeijer, 2004 as cited Joshi, 2014). If we can relate to our day to life than only we can teach it batter way. Same scenarios Luitel (2009), expressed; "number of students in class also determine gap between high achiever and low achiever students. The number of students in a classroom was about sixty, which was very difficult for managing such activities. The teachers were trained in the traditional way of teaching. They had different conceptions about problem-solving activities. For example, they thought to start the activity by giving a simple solution and they did not have the idea of presentation of the students. Despite the difficulties, all the teacher and students gained from the problem solving strategies (Luitel, 2003)."

THEME 2 (Teaching Geometry in Contextually)

The majority of students in our schools are unable to make connections between what they are learning and how that knowledge will be used. This is because we teachers are focusing more problems solving rather than its application. The students have difficulties to understand academic concepts such that geometry concepts as they are commonly taught in classroom. But I think they should desperately need to understand the concepts as they relate to the workplace and to the larger society in which they will survive and work.

We Nepalese are rich in culture and we have enough geometrical shapes in our society to convert our theoretical knowledge to practical knowledge. Realistic Mathematics Education (RME) is rooted in 'mathematics as a human activity. The term 'realistic' refers to not just the connection with the real-world, but also an emphasis that RME puts on offering students problem situations which they can imagine. The underlying principles of RME are guided reinvention, didactical phenomenology and emergent models. These principles are based on Freudenthal's

philosophy which emphasizes reinvention through progressive mathematization (Freudenthal, 1991 as cited Kwon, 2002). In the story students are playing video game actually they are playing video games for fun but unknowingly they are applying geometrical concept in the games. If teacher helps them to connect their classroom activities and their outdoor activities (real life activities) then we can make or teaching learning activities in effective.

That there are many opportunities for the curriculum practices of school mathematics to be supplemented by resources drawn from the local context in order to enhance the emotional and intellectual engagement of years 6 & 7 students. Local context can help students understand mathematical phenomena from the perspective of their own lived experiences. The above socio cultural contexts of farming, local business, games and play and cultural rituals can be connected to school mathematics in various content areas such as geometry, algebra and arithmetic in order to make mathematics much more interesting and worthwhile for all students, especially girls. Adding meaningful contexts of local activities that make sensible connections with classroom mathematics can bring a change in the attitude of teachers and students in the teaching and learning of mathematics. The meaningfulness of contextualizing mathematics in real life or in applied contexts is of growing concern worldwide, and this study has identified specific possibilities of such contextual links between day-to-day practice and school mathematics (Luitel, B.C., & Taylor, P.C. (2007a).
Finally, I want conclude theme of my stories that we can teach/learn geometry more effectively if we can able to contextualize geometry in our educational practice.

Chapter Summary

In this chapter, I have presented some of my life experiences from teaching learning-journey as reflecting on my own experiences. And same thing in geometry also when I explain uses of geometrical figure and line point in our daily life then I got my students become more curious to the task . So, I guess learning is reflected on our cultural understanding where s/he works and same way when learners know the value and benefit of the knowledge then only learning will be meaningful and effective.

CHAPTER VII

LOOKING BACK TO MY RESEARCH JOURNEY

Chapter Overview

This chapter concludes the summery, conclusion, implication and findings of my research. It concludes my inquiry and sets from the beginning to the future possibilities. Under journey of self-inquiry, I have tried to scrutinize my real life experiences as a student, teacher, teacher trainer and novice researcher. Thus, under this journey, I exhumed and reflected critically on my past experiences, beliefs and ideologies towards oppressing situation and teaching learning pedagogy. Moreover, this chapter focus on accomplishes and conclusion of my research. It also sketches how purpose of the study was exploring the learning difficulties of students in geometry and how I came across to address those issues of complexity. I have gone through my own experience and practice in the phase of this study.

Focal point of the study

This is final section of my inquiry. So, it reflected from my previous chapters where I have tried to accomplished my various experience regarding the learning difficulties of geometry. I hope, those chapter soulfully envisaged the answer of what types of difficulties and fallacy I have grieved and I have faced for learning geometry. And as a teacher what types of difficulties I got for teaching learning geometry and what types of learning difficulties my students gets for learning geometry. I have used my life experience as a student from my beginning days of schooling to M.Ed. level and my experience as a teacher in different level and different schools (private boarding school and government schools). The phase of this study included the settings of different classrooms and schools (private boarding school and government schools) as well as discussions with students and their achievement and class room

observation, copy correction and their project work. And data text deliberate as lived experience from childhood to today's stage in different level as student/teacher/facilitator, teacher educator and educational researcher. Moreover, under this journey, I have recalled all activities from the initial stage to the final stage of preparing this document to represent my ways and final product of this research; including my research experiences as a novice researcher, my pedagogical shift, inquiry implication and windows of future possibilities.

My Research Experience

When I joined Kathmandu University as student of M.Ed. level, really and radically, I got unforgettable chance to understand how to develop our professional skill and how to develop the sense of actual professionalism. Before entering KU, I used to think that I am superior and I am a good teacher among all teachers and my students like me but now I am feeling that I am still learner. So, thanks KU for transforming my beliefs into wider horizon. This is also one of my great experiences. At the starting phase of my research journey, I started from ***observation*.** I have planned to observe my students' classroom activates and their responses. I observe their interest in topic and what changes I got on them by using different teaching method. During scheduled observations of the classroom, I learned that it was important to both have a goal before observing and to reflect on the experience afterwards.

Then I started to talk with them frankly. I wanted to know real feeling of my students toward geometry. Many times directly and indirectly I talk with my students, my friend and colleagues.

I started collecting my lived experience and events which are really remarkable in my life. As an auto ethnographic researcher; I started to write these experiences in the form of story and poem and drama.

Change On Me

At this stage of my life, I have practiced huge changes in my thinking, viewing, behaving and observing, including my teaching learning after this research. Before I was totally traditional teacher but now days I am in the way of constructive teaching. For example before I felt very angry in classroom if any students said, 'I have not understood what you taught in class?' I thought even though I teach in the very simple way still why they can't understand my teaching. Now days, if any student say, 'I have not understood something'. I feel really happy because I enjoy teaching them. Now, I realize students feeling, excitement after they understand any question and show happiness with the solution. It is the best feeling in the world when you teach something to your students and they understand it and reply, 'thank you sir! With innocent smile in their face.

In the phase of research, I got change in me. Before this journey of self-discovery, mostly I used to think geometry is very abstract and hard to teach subject but now I don't have any pressure nor do I have any problem. Before that stage, I also used to think that my duty is teaching in classroom and high achiever students are only able to solve geometry related problem. But now days I think that high achiever students are good but I need to care about low achiever as well and I need to make my class interesting. Now days if any student is not concentrating in classroom then firstly, I have try to improve my teaching methodology. And this journey also helps me to improve myself from the perspectives of transformative researcher.

Accordingly, in this stage, I understand research is not only finding of any new thing. Moreover, it brings the change on researcher also. Three years ago; I used to teach only based on the books and black board. But now, I teach by using computers and a projector which gives more impact to learners' cognitive process and meaning making process. I have used this technology in my class. I think the students are more interested in studies now. The students are more actively participating in classroom activities. I know technology is not everything by using visual based learning and context based learning surely it gives more efficient results.

Crafting a Research Summery

In my teaching learning journey I thought geometry as most difficult part of mathematics and as for as students and as a teacher. In this scenario I selected this topic for research. I have presented the data in the multiple genres of writing like essays, story, dialogue, and poem. So, my research project was guided by multiple paradigms such as interpretive, criticism, and postmodernism. Critical paradigm allowed me to point out dialogical and dialectical thinking and critique between our teaching and learning paradigm. Critical reflection became a *third eye view* of my project (Joshi, 2015). I have Practice exploring real meaning of my lived experiences. As Luitel, (2009) mentioned "I have presented dialectic, narrative and metaphorical logic to enhance my reflection" as same way I have tried to do. So, critical paradigm helped me to find my research problem to critically reflect upon my teaching and learning experiences. So, it focuses on discovery based learning. Discovery learning is a method of inquiry-based instruction; discovery learning believes that it is best for learners to discover facts and relationship for themselves. The discovery learning mode requires that the student participates in making many of the decisions about what, how, and when something is to be learned and even plays a major role in

making such decisions. Instead of being 'told' the content by the teacher, it is expected that the student will have to explore examples and from them 'discover' the principles or concepts, which are to be learned. Many contend that the discovery learning versus expository debate continues a timeless debate as to how much a teacher should help a student and how much the student should help himself (Snelbecker, 1974, p. 425)." I have used RME theory of learning to relate geometry with our society and to show use of geometry in real life. Realistic approach, a real-world situation or a context problem is taken as the starting point of learning mathematics. And then it is explored by horizontal mathematization activities. This means students organize the problem, try to identify the mathematical aspects of the problem, and discover regularities and relations. Then, by using vertical mathematization students develop mathematical concepts (Zulkardi, 2010).

I have used quality standards of critical reflectivity, verisimilitude and pedagogical thoughtfulness to measure the quality standards of my project. In this research, I have tried to present critical reflexivity and it reflected my own experience and practice in my inquiry. I tried to present my narrative inquiry as a realistic and true story, where readers can find the realistic way in my story, it reflects to their own context and it seems real and sounds (Luitel, 2009).

Reflection of My Research Questions

I started recollecting my past and present critical movement and remarkable moment about my practices in educational situation which became the source of my research data and research questions. The context of teaching and learning different theories and their application do not get same value and may not be applicable for all. There is no single truth. There are multiple realities. I support Luitel (2003) , "… my research is a continuous dialogue with my research questions….in such a dialogue

research questions are questioned and answered many times' (p. 119, as cited in Chaudhary, 2009). Therefore, focusing on these things, I don't say my answers of research questions that had been scattered in different dimensions in the process of drawing above chapters are valid to all and true to all.

My first research questions *"Considering my lifework experience as a student, teacher and fellow educator, how can I characterize the teaching/learning geometry in context of Nepalese classroom?"* To address this research question, I have used different narratives stories, poem, fiction, pictures etc from teaching learning journey as mathematics teacher as well as student it could address my question to some extent. It is not only collection of reflection of my past but I feel free to say, it was real lived experience of my life as student and teacher at different time period and different private and government schools . In similar fashion, I have used narrative like "*Turning Point of life", "Geometry is worthless Study", "My First Day in Class as a teacher", "and Difficulties from teachers prospective", and "Mathematics" A Big* Problem and other many more metaphorical pictures.

As a solution of this research I have characterize the geometry as a difficult subject and how difficulties creates and how can we eliminate difficulties in geometry is the main issue of this research question. I have created different lived experience as a student, teacher and novice researcher. I have characterized various factors which help to create difficulties in learning geometry for example: language, visual, lack of pre knowledge, weak base of mathematics, lack of interest, teachers teaching pedagogy and teaching materials etc. To solve this problem I have given some possible solution which I tested in my work field and which are really effective for example: knowledge is discovery and constructive rather than transformation,

different teachers teaching pedagogy and use of technology in classroom might be solution of difficulties in geometry.

My second research question is *"How might fallacy create the learning difficulties in geometry?"* To address this research question, as my teaching learning experience I got fallacy is the main reason and main factor which creates the difficulties in geometry. So, under this research inquiry, I have mainly focused on geometry related fallacy and looking for the solution of plummeting those fallacy i.e. how misconceptions creates in teaching learning process and how can we eliminate fallacy in geometry is the main issue of my second research question. To reveal problem and their possible solution I have *created stories range of story based on my lifework journey such as "Weak Base", "Misconceptions born in mind and simply transform to other mind", "Misunderstanding" and etc.*

Solution of this research question I got fallacy as the main reason which creates difficulties and fallacy occur from students, teachers and environment etc. To avoid fallacy we should avoid traditional teaching method and we adopt new teaching pedagogy where students create knowledge themselves and teacher only works as a helper. Uses of technology and new teaching material are more useful for avoiding misconception.

My third research question *"What is the need of teaching learning geometry in secondary level classroom?"*

Solution of this research question I have tried to write on the basis of RME theory. I have concluded my answer in short form **LIFE LIKE GEOMETRY IS THE NEED** of teaching geometry in classroom. It is needs of human life and day to day life so geometry is compulsory and needs of geometry in classroom to solve the problem of human life by which they are suffering in their daily life. For this I have

presented my narratives as story like "A story of a mason and geometry", "Use of geometry in real life is our need"," Relating geometry with culture and locality (Real life)". According to the national council of teachers of mathematics, geometry is one of the "content Standard" of the school mathematics, which aims at developing spatial reasoning, problem solving skills, and communication (Sellke, 1999). In my view geometry is very important for human life because it helps people have more complete appreciation of the world in which they live. It explorations can develop problem solving skills like spatial, reasoning etc. Geometry plays a major role in the study of other areas of mathematics and it is used by people in their professional lives like artist, land developer decorate design of house room building etc.

Implications

The outcome of the study indicates that having students in learning difficulties in geometry in school level is from various factors. My research may not be highly beneficial for professional teacher and researcher but it can offer some insights to the readers, novice teachers, novice teacher trainers and novice researchers. I do not want to claim that I have no authorship but you possess more authorship than me as I am encouraging you to make your own meaning out of my text (Luitel 2003, p. 129). I hope my readers can get some advantage from my inquiry and get on the right track of their learning mathematics and exploring learning difficulties. I have used my own ideology which I developed from my experience and my knowledge which can empower my future generation as well as my readers. I hope they can also get encouragement through my different texts poem, stories, diary notes, interpretive-reflective texts as referents for developing themselves as transformative humanistic teacher-educators.

Future Direction and Possibilities

I expressed the hope that the work in this enquiry could be a 'first step' towards a general purpose inference system. I will also suggest some future research directions that could provide the next steps along the path to a practical and widely applicable inference system. I got change on me during this research period and in my past three years. I think there are so many teacher those who have thinking and education back ground like me. I belong to the society, system, environment, school and nation there are so many trainee teachers, novice teacher and trained teachers who belongs to same context as like mine .I know that in the context of Nepal many more of the teachers are suffering problems in geometry teaching as mine. My enquiry is useful for these all teacher. I hope after reading my inquiry reader will get something useful and surely they will motivate and they can get change in their thinking.

In my study; I took my experience to construct my identity as a mathematics teacher and conveyed how my identity brought about changes in my classroom performance. I tried to present my narrative inquiry as a realistic and true story, where readers can find the realistic way in my story, it reflects to their own context and it seems real and sound (Luitel, 2009).

Change will occur when mathematics teachers envision themselves as the caretakers of their practices and seek to examine/improve them. My inquiry shows the empowerment of one's self to enact the examination and change of their practices. My inquiry has implications for changing the ways mathematics teachers take ownership of examining and changing their practices from teacher focused to student focused. My inquiry has implications for mathematics teachers to develop a multi-dimensional pedagogical identity through the use of constructivism teaching. I think knowledge is increased by shearing experience to each other. My difficulties and

problems are similar to others also how I encountered in classroom many others also can face same situation so my thesis helps all students, teachers and novice researcher.

At last, in term of this slight inquiry, it has helped me to improve my teaching methodology, and it brought change on me to transform traditional to constructivism, it change my thinking and way to see my students and mathematics. My journey of possibility is;

i. Connecting geometry to students' lives and make sense of ourselves;
ii. To improve the teaching methodology and uses of ICT in classroom;
iii. Linking geometry with our culture and locality;

Flash back in my research Journey

I agree with Luitel (2007) that standing upon different nodes of time; I am using narratives to connect between past, present, and future; between yesterday, today, and tomorrow; between birth, life and death; and between many dimensions, facets, and incidents. My narratives are reflection of myself, my experience, my past, present and future. I always remember a speech mark of Dr. Luitel "**Keep writing"** when you feel happy write; when you are sad write! In Every situation keep writing.

I support the view Nicole (2011) in doing Writing is an important practice of doing research. In my research journey I was engaged in regular writing. The assignments of the different course of M.Ed. level I was taking included a literature re-view a research design and narratives, and a final report that included my results and a discussion of implications. In addition to these inquiries, I kept up dated most in an endnote of thesis in library. I was learning throughout the research process. Reading

and writing are creative processes. By engaging in the process of reading and writing on a daily basis, I also came to understand how creative energy is needed before, during, and after designing and conducting research.

Final Reflection

This study has addressed learning difficulties in geometry in school level. The main of aim of study was identifying possible difficulties and their solution. I have mention different factors which are creating difficulties in geometry classroom. In this Inquiry chapter IV is focused on difficulties in geometry teaching and how students are weak in geometry. Chapter V focused on how difficulties create in geometry and I have focused on misconception. I think fallacy is the main cause of creating difficulties. In chapter VI I have written as solution of my research question as life like geometry is the needs of the students and humanity.

In closing, I want to conclude overall research journey with deliberating the view of Joshi (2015) declare that “conducting an individual research project as provided a plethora of learning opportunities with empowering one’s soul, heart and mind. Over all, the final endeavor of my inquiry is to address learning difficulties in school level geometry and their possible solution. I have tried to connect geometry to or daily life because most of students think that geometry is meaningless and useless subject.

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