

Chapter-I

INTRODUCTION

Background of the Study

Mathematics is a discipline which looks as a difficult subject. It is directly related to the human life and it helps to solve day to day problem of human being. It is taken as a compulsory subject in school level. The progress of math is related to the scientific progress. In this age, scientific progress tends to nation's progress. In developed countries, the output acquired by nation in math is appraisable but any developing country is not able to get required output (Pandey,2011).

Mathematics being problematic subject, in every class the rate of failure is high. S.L.C. exam is also suffering from poor mark of mathematics. Government has established the teacher service commission to appoint qualified teachers. Teachers are trained before the service and in service also. In service training and TPD, action research and other training are done. Teaching material are provided to improve the output of mathematics. I think professional development of the teacher is the long life impressive factor to promote mathematical knowledge. In this research I would try to explore the quality of professional development of secondary mathematics teachers up lifting the present condition of mathematics in secondary level of Nepal, which helps to increase the percentage of passed students in mathematics. There are many motivating factor of the quality of teachers. Teachers should be imaginative, innovative, communicative, commanding, competent, confident, courageous, critical and creative. Professional development is directly related to these given factors. These factors can be obtained through discussion, dialogue, interaction and interpretation. Again I would like to explore the motivating factor of professional development of secondary level of mathematics teacher. If teacher being professional,

quality of mathematics and percentage of passed students in mathematics can be improved. I would try to find the motivating factors of professional development. These factors may be promotion grade and incentive Salary, rewards and appreciation and political influence these factors would help the teacher for continuous learning. A good professional teacher is a learner. The habit of learning creates confidence in teaching which an important weapon to manage problems is. Devotion is required so as to be the professional teacher. A teacher with talent and commitment can certainly give better result in teaching and learning process. Professional development is possible through dedication self confidence and continuous learning. Teacher must professional.

The professional development of teacher is life long process which begins with the initial preparation that teachers receive and continues until retirement (Acharya,2015). I would try to find the motivating factor of professional development. These factors may be promotion, grade and incentive salary, rewards etc.

Therefore initial as well as models of in service training and other learning experience that enhance teachers' practices and professionalism throughout their lives. Only in the past few years has the professional development of teachers been considered a long time process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession.

This shift has been so dramatic that many had referred to it as a "new image" of teacher learning, a 'new model' of teacher education, a revolution in education and even a new paradigm of professional development (Cochran-smith &lytle 2001, Wallng&Lewis 2000).

Professional development often refers to general skills offered through continuing education, including the more general skills area of professional

development. It can be seen as training to keep current with changing technology and practices in a profession on in the concept of lifelong learning.

The modern age of science and technology demands creative, dynamic as well as multi dynamic and multimedia approach. This reminds me a poem that

A poor teacher informs

An average teacher gives knowledge

A good teacher explains

A better teacher demonstrates

An excellent teacher gives experience

A great teacher inspires (Mohanty, 2003, p. 25)

Statement of Problem

Mathematics is backbone of education system and it has great inner power to sharp human knowledge and mind. It launches not only number system but also logic, deep thinking, analyzing over any subject.

It teaches knowledge, skill and capabilities of the student.

In one side, we are facing social economical and cultural problem but on the other side we have tough problem to increase Mathematical output in secondary level students.

Classroom dominative or cultural minority groups face many problems which directly affects the educational system (Acharya, 2011). As the problem mentioned above a question is occurred in my mind that inspires to conduct the measurement on the topic "Professional Development of Secondary level Mathematic Teachers". To the extent that teachers are regularly asking themselves how can I become a better teacher? How can I enjoy my teaching more? How can I feel that I am helping learning? They are thinking about wages of developing. It is a self reflective process

because it is a through questioning old habit that alternative ways of being and doing are able to emerge. Developmental activities are common experience among teachers to feel several years of teaching that they need a fresh impetus to encourage them to go on learning and developing. In the context of teachers' professional development the teacher is the backbone of the society. He/she works for welfare to the nation. Therefore, teaching in order to be effective and successful must influence the thoughts and action of pupils must remarkably and perceptibly. The successful teaching must be effective with help of various modern media, means and methods. The age of talk and chalk has gone. There were very few research that I studied. So I conducted this research on this area.

Objectives

The research purpose of the study were:

1. To explore the quality of professional development of mathematics teacher.
2. To explore the motivating factors for professional development of secondary mathematics teacher.

Research Question

In order to tackle the problem and address the objective of this study, I have sought to answer the following research questions:

1. What are the qualities that make secondary level mathematics teacher really professional?
2. What are the motivating factors for professional development of secondary level mathematics teachers?

Significance of the Study

The world is changing, so are the innovations in science and technology. The society, school and methodology of teaching and learning are also changing. So, there is a paradigm shift towards the ongoing development of teaching skills in order to help teachers adjust to changing needs of schools and society. There is an increasing need of providing support to new teachers through induction programs to the school and career needs. After 1990, a trend has emerged to move from teacher professional development and a move from teacher training institutions to the agents of professional development. Teaching is a profession. Teacher is the hero of matching subject method, skill/idea to building knowledge of student. At the secondary level student can analyze his/her mistake and they can take best line.

I think professional development is the backbone of profession. Teacher always should be up to date on his/her profession, new ideas, concept, method and technology these are the tools of good teacher. Acquiring new idea and finding the easiest way to transfer knowledge to the student is the work of teacher which is acquired by professional development.

The access of school mathematics should touch the community requirement or demand. School is a home of different ethnic groups. A mathematics education must view mathematics within the context of total education of the individual.

So, Research on professional development is needed for any mathematics teacher and teacher is the bridge part of transferring knowledge to the students. Every teacher should construct the strong bridge in such argument.

I want to find out the factors and problems of mathematics teachers suffering in transferring of knowledge. Professional development makes mathematics teacher capable, competent and confident. The power communication and presentation is indispensable to become effective and efficient teacher, only the competent teacher

can teach confidently. A good source of learning is always required in order to become professional teacher.

It is the process of thinking, meditating, critical questioning, recalling the class room activities and creative writing process. It helps mathematics teachers to plan act and reflect the teaching and learning activities this study has presented pedagogical implication, psychological implication, training implication, research implication, and sociological implication. This research establish a new idea and though among the teacher, educator and learner.

The main significance of the study are as follows:

-) Its findings help to improve the performance of teachers and up to date the teacher's knowledge.
-) It's finding open the doors to transfer the acquired knowledge to the student.
-) This study helps teachers to acquire knowledge and increase their teaching knowledge and skill efficiently.
-) Its findings also helps to the curriculum designers, teacher-students policy makers while designing the mathematics curriculum for their and other stake holders related to education.
-) This study is useful on implication of Training, Research Pedagogy and Sociology.

Delimitation of Study

Every study has its own limit. As this study also have some limitations. This study has following limitations:

-) This study was delimited to the scope of quality of professional development of mathematics teacher and motivating factors for professional development of mathematics teacher.

-) This study was limited to Gorkha district only.
-) This study was included the study of secondary level only.
-) This study was limited within the certain periphery and in particular area. So, the findings of the study may be generalized in some areas and not exactly used in other areas.
-) Findings of the study weredelimited on the basis of students, teachers, school inspector, and resource person.
-) The data were collected by using interview only.

Definition of Key Terms Used

I have used number of terms with their specific meaning in my research. The terms I have used in my research imply contextual meaning to clarify my perspective thought they have other meanings in accordance with their specific registers.

Professional Development: In a broad sense refers to the development of a person in his or her professional role. According to Lille (1992) teacher professional development requires growth in knowledge, skills, judgment and the contribution teachers make to a professional community.

Motivating factors: Those factors which cause the teachers to bring change in their professional behaviors which lead them to enhance and sustain their quality of teaching mathematics throughout their teaching lives. Various things, actions or people can leave everlasting influencing on the teachers that enable them to review and renew their purposes, values and practices for the better performances of their own as well as the greater achievement of their students' learning.

Learning: Learning is the process of obtaining or acquiring knowledge through different experiences. Knowledge or skill gained through education is also known as learning.

Transfer : Passing knowledge from one person to another person.

Chapter-II

REVIEW OF THE RELATED LITERATURE

This chapter describes the review of the relevant literature relating the various aspects linked with mathematics anxiety. This chapter includes the description of the different literatures and theories. This chapter also includes the conceptual mapping which shows the process of the research and theoretical understanding.

The literature review helps to avoid the duplication of the work and to synthesis the previous work (Acharya, 2011). The basic purpose behind the literature review is to identify the gaps of the research, develop the conceptual and theoretical framework. A careful and systematic review of the relevant literature and studies is both essential and helpful for a thorough understanding of the subject of one's study. According to Creswell (2007) literature review is the study of higher ongoing dialogue about a topic, filling gaps and extending prior studies. To this end, a researcher must have knowledge of already established theories and researches related to the problem chosen by him or her. Review of literature is an exacting task, calling for a deep insight and clear perspective of the overall field (Wagley, 1995). So, the review is inevitable in any investigation.

Literature review helps in undertaking new research problems in a way to provide continuity with the past research by avoiding unnecessary duplications. Such a review is likely to enable the researcher to view the study in hand against the background of previous research. The knowledge acquired from earlier research helps in locating sources, for example, selecting procedures and methods, delineation of the problem, interpretation of data and selection of literature. Finally acquaintance with the concerned discipline and their trends helps to update the researcher's knowledge as well. Keeping in view of such importance of literature review, an effort is made

here to present some significant views, studies and practices which help in improving its relevance. Cooper (1998) suggested that literature review relates to a study to the larger ongoing dialogue in the literature about a topic, filling gaps and extending prior studies. I reviewed different literature by categorizing empirical and theoretical.

Empirical Review

Ghimire (2013) conducted a research on the topic Promoting and Demoting factors for professional development of mathematics teachers in Nepal. He raised the research questions: How the math teacher mean by professional development? What are the areas of their professional development? What efforts have been made for the professional development of mathematics education? What are the encouraging and discouraging force? What are the obstacles for the professional development of teachers? He used mixed research design. He found that professional development as skill for time management, as a tool for developing contents and pedagogical knowledge, as a skill in the use of information technology, process for modernization. In the same way, professional development ensures the continuous attachment with academic community, method of survive, method of self satisfaction, a skill of balancing the household life and social life. From this research, he concluded that the motivation towards students success, level of experiences, nature of the job, qualification of teachers, opportunities for professional development and career development, requirement for the promotion and maintaining the hierarchy on the post, capacity to develop the decision making, access to benefit, preparation time, financial factors and attitude of teachers were the influencing factors for professional development.

Attreya (2006) did a research on the title "A study of problems faced by Mathematics Teachers to Maintain Positive Discipline In Secondary

LevelClassroom" with the objectives to examine the discipline of students in mathematics classes at secondary level and to identify the problems faced by mathematics teachers maintain positive discipline in secondary level classroom. The design of study was mixed in Nature. The researcher gathered information from classroom observation and interview questionnaire for teacher. He analyzed the classroom observation result by using mean weight age and questionnaire through the related theory. He found the conclusion, mainly the problems are attributed to crowdedness of students in classroom, unavailability of furniture, unarranged seat planning, lack of proper teaching materials, lackness in enforcing school regulations, unsystematic teaching methods, poor evaluation of homework and class work, limited co-curricular activities, punishment system, poor guidance at home, unsuitable family environment.

Bhattarai (2005) conducted his descriptive research entitle "A study of problems faced by the mathematics students in existing curriculum" with the aim to identify the student's problems on mathematics study in existing curriculum. He used questionnaire for students and teachers. He concluded that problems were arisen due to the inadequacy of textbook, highly idealistic curriculum, lack of proper teaching materials, deficit classroom situation, high enrollment of students, lack of supervision, untrained mathematics teachers, dissatisfaction with the job and other facilities and so on.

Basnet (2003) did a research on "Teaching problem faced by the mathematics teachers in existing curriculum of grade eight". The objective of this study was to find the teaching problems faced by the mathematics teachers of grade eight and the problems faced by students on textbook, teaching learning activities and physical facilities. He used simple percentage for analyzing the data. He concluded that

mathematics teaching and learning is not satisfactory at grade eight in Jhapa District. The teachers and students faced many problems due to the lack of training, orientation opportunity for the mathematics teachers in existing curriculum, inadequate textbook, lack of instructional materials, and lack of physical facilities in the classroom, large class size and defective evaluation system and so on.

Pandey (2011) carried out the research on the topic 'Professional Development of Teacher through reflective practice. The main purpose of this study was to explore, analyze and identify the qualities of professional English language teachers and their professional development through reflective practices in the higher secondary schools of Nepal. He used qualitative research design with phenomenology approach. He collected data through in-depth interviews and observation. I tried to maintain rigor criteria of addressing the triple threats of qualitative research: crisis of representation, legitimating and praxis. It has revealed that professional qualities are inherent and indispensable to materialize the teaching process. The teachers have positive perceptions pertaining to reflective practice for the professional development of teachers. Reflective practice enhances the teachers' professionalism. He also found that the significance of cooperation and collaboration both in reflective practice and professional development of teachers is tremendous. Reflective practice is highly significant, pertinent and dominant for their professional development it makes them highly imaginative, innovative, communicative, commending, competent, confident, courageous, critical and creative. Further the study found that a professional teacher is able, capable, competent and confident the power of communicability and preventability is indispensable to become effective and efficient, teacher, only the competent teacher can teach confidently.

Wagley and Panta (2003) studied on teacher development of secondary education in Nepal. The sample for the study was selected from among the existing secondary schools of the two districts, Doti and Humla. They found that there were not many teacher development opportunities available for the teachers. They did not find any tendency of peer observations and exchanging of ideas among teachers. Monthly meeting held in some schools were concentrated on administrative affairs rather than teacher development issues. The teachers did not have access to any other materials other than the textbook. They have heard of seminars and workshops but they have not got the opportunities to attend them. Although the study was focused on secondary teachers, these study findings are still relevant to primary teachers. In the context of increased system accountability, it is imperative that systems provide teachers with opportunities to participate in professional development that assist teachers in the implementation of curriculum initiatives.

Wagley (2007) in his article "viewing Nepal from the current trends in teacher education" suggests that we have to follow the academic tradition, social efficiency tradition, the development list tradition and social reconstructionist tradition as claimed by Zeichner and Liston (1990) to raise the status of teacher education in Nepal.

Timsina (2061 B.S.) in her article "teachers' professional development" says that the quality of education largely depends on teachers' ability, qualifications, commitment, motivation and devotion towards their profession. She concludes that professional development of teachers is a continuous process of training and reflexive practices.

It is through teachers' ability, qualifications, commitment motivation, devotion and training, the continuous professional development of teachers take place. It is the process of going back and forth in the process of teaching and learning.

Paudel (2063) in his article, "understanding teachers' professionalism" says that presenting, analyzing, describing, asking, responding discussing, researching, reflecting, constructing, interacting, sharing, collaborating, visualizing, observing, resolving, assessing, managing, planning, implementing, supporting, consoling etc. are some of the potential skills that need to be addressed for our professional development.

Theoretical Literature

There are so many theories which can be used to understand the problems in learning mathematics such as sociological theories, learning theories, cultural theories, everyday life theories and cultural difference and discontinuity theory, social constructivist theory and so on. So, for the analysis and interpretation of data, I used different theories which are described briefly below:

Constructivism

Constructivism is a theory of knowledge that argues humans generate knowledge and meaning from an interaction between their experiences and their ideas. During infancy, it was an interaction between human experiences and their reflexes or behaviour -patterns. Learning means the relatively permanent change in behavior, which occurs as a reinforced practice. It considers both physical and mental process. Behaviorist mentioned that learning is the interaction between human being and external environment. They take learning is the interaction between human being and external environment. They take learning as stimulus response process. If

response to the stimulus is reinforced or rewarded then a kind of habit is informed. The cognitivist mentions that learning is an innate capacity of human being.

These scholars believe that each and every child learns from society through social interaction with family and environment knowledge can be constructed through the active participation. This new thought is given by constructivism following the theories, actions, reflection and socialization. The constructivism theory is based on observation and scientific study about how people learn. People construct their own understanding and knowledge, through experiencing things and reflecting on those experiences. In general case, it usually means encouraging students to use active techniques (experiment problem solving) to create more knowledge and then to reflect and talk about where they are doing and how their understanding is changing. Constructivism transforms the students from passive receipting of information to active participant in learning process. Constructivism categorizes students on its three axioms that are as follows.

- i. Learners learn knowledge from their active participation.
- ii. Learners gain knowledge while reflecting on their own action.
- iii. Learners gain knowledge when they try to convey their solution to others.

Vygotskian Social Constructivism Theory

Constructivism is the new theory. Vygotsky has developed Socio-cultural theory and he believed that children are active seekers of knowledge. In this theory, rich social and cultural context deeply affect children's cognition knowledge is constructed in social situation of discussions rather than being the reflection of the objective reality, which is known as social constructivism. In social constructivism theory, each human being makes sense of the world in a unique way. According to Vygotsky, the children's development cannot be understood by studying the

individual that it needs to examine the external world. Child can capture every kinds of information which is needed from the context to construct the knowledge. The role of experienced person is to assist the child providing the structure and questions that provide the assembly of the information and organizations.

According to social constructivist, Vygotsky knowledge is constructed in two ways in the social situation. Firstly, social interactions influence on the nature of knowledge that is constructed and process of individual use to construct the knowledge. Thus, the construction are socially centered and involve process of understanding, constructing meaning and making sense, children construct knowledge not only from individual but also from the context and the interaction with others who have more knowledge. The child needs some mediator like parents, teachers, adults or peer to uplift his knowledge from the knowledge s/he has.

Thus, Vygotsky proposes that child's knowledge could be predicted if we could understand a social context. Thus, Vygotsky's child is a social, outer culturally determined child.

Bernstein's Language Code Theory

Basil Bernstein made a significant contribution on the study of communication with its sociolinguistic theory of language codes. Within the broader category of language, codes are elaborated and restricted. The term code, as defined by Stephen Littlejohn (2002) "Code to a set of organizing principles behind the language employed by members of a social group" (p. 278). That is to say that the way language used within a particular societal class affects the way people assign significance and meaning to the things about which they are speaking.

Filling the Gap

As I know that very few researches have been carried out on the professional development of secondary mathematics teacher in the qualitative paradigm. I studied many previous research works. They have not discussed in their area. I found the gap between the reviewed literature and my proposed title of study. Thus, to fulfill the gap, I would like to study on this topic. So, I believed the topics for the dissertation is suitable for carrying out a research.

Conceptual Framework

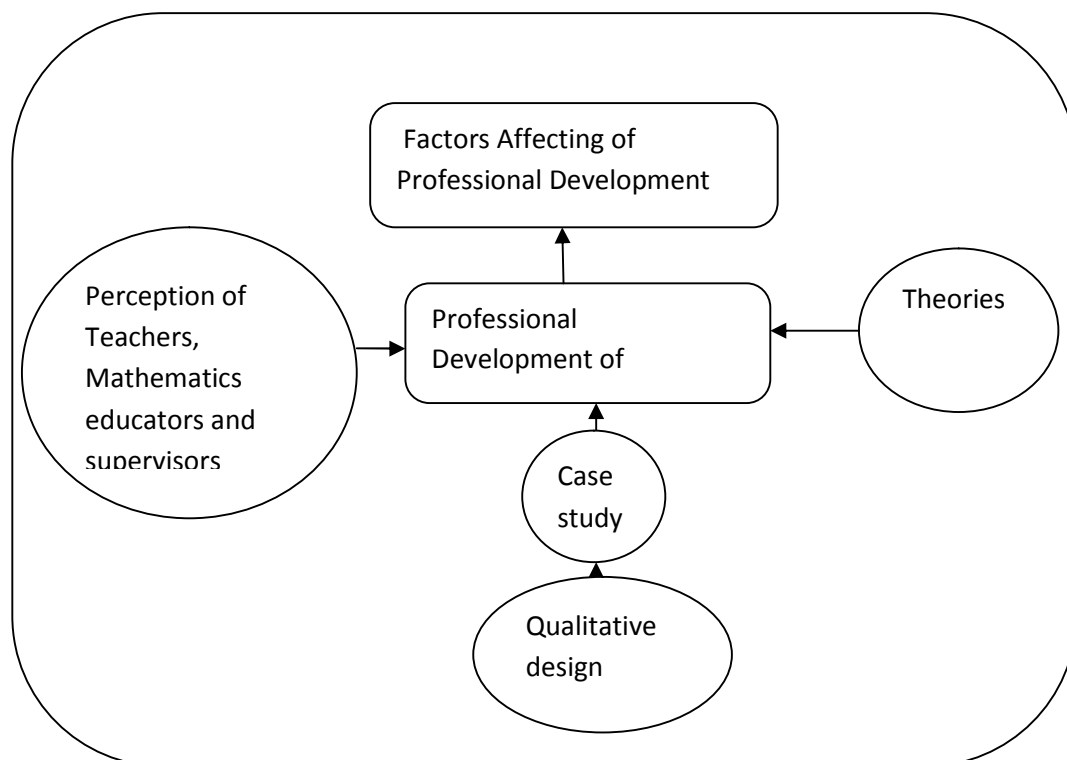


Fig1: Conceptual Framework of the study

Conceptual framework stems from the theoretical framework and concentrate usually on one section of the theoretical framework which become the basis of our study. The later consist of theories or issues in which our study embedded whereas the framework describes the aspect that we select from the theoretical framework to become the basis of our inquiry.

Chapter -III

METHODS AND PROCEDURES

This chapter describes how the present study was conducted in the course of answering the research questions, particularly explaining the methods, design, sampling process, sample, study area, tools, data collection process and analysis was used while addressing the research question.

Research Design

Research design can be divided into fixed and flexible research designs (Robsan 1993). Other have referred to this distinction with quantitative research designs' and 'qualitative research designs' the research design this study is qualitative with case study. It is specific form of qualitative inquiry. It enable us to research the realities embedded in professional development of mathematics teacher. Generally, it is understood that case study is a research process or method and product with deep interpretation of the researched and researcher's interpretation. Qualitative research can be regards as 'naturalistic inquiry' in a sense that it is concerned in natural setting by trying to avoid any intentional manipulation and distortion of the environment of the information by researcher.

This chapter deals with the procedures adopted to carry out the study. It start with the foundation of my study, it has emphasized the Reason of adopting the qualitative method in the study. Then it describe the study site, the research design, nature of the data and sampling techniques. It also highlights the research tools technique and data generation procedure, it contain the data interpretation and analysis procedure, data triangulation and validity and reliability of research.

This study was designed to reveal the qualitative of professional development of secondary mathematics teacher and to explore the motivating factor for professional

development of secondary mathematics teacher .Qualitative research method was used to analyses interpret and derive meaning from the data: primary data were collected through interview from experienced Teacher, Research Person, and School inspector. The obtained data were analysis by linking different theories and literature.**Research Approach**

There is different approaches for conducting qualitative research. Among these, I applied case study approach. Case study is universal, broaden and as one's thought. In the case study I asked question of the 5 experienced teacher, 2 research person and 2 school supervisor of Gorkha District I designed a questionnaire framework related to my research that help to find out the research question case study isalso research which help to think deeply I tried to find the quality of professional development and motivation factor for professional development of mathematics teacher.

Sampling of the Study

This is the qualitative research. In qualitative research mainly used purposive sampling, quota sampling and snow ball sampling, in my study I used purposive sampling.

Study Site

My study is related to Professional Development of secondary Mathematics Teachers the site selection is also a very important task in order to find the appropriate information. I have choosentthree school of Gorkha district is the study site of my study.

Sample of the Study

This is qualitative inquiry. So, the sample size in this study is small. According to Anderson, (et.al) there are no rules for sample size in qualitative

research (Anderson et. al 2001). Qualitative inquiry typically focus in depth relatively small samples, even single case (n=1) can be selected purposefully. So, the sample size of this inquiry depends upon the researcher what s/he want to know, what is the purpose of inquiry, what can be the credibility of the study and what can be done with available time and resources. So, the respondent of this study will be 5 Mathematics teacher, two school supervisors and two resource person.

Research Tools

One of the most important parts of study is data collection. There are many tools for the qualitative research to get the information from the people about their experiences, ideas and believes. Data is collected from experienced teacher, resource person and school supervisor. Interview was the main tool used for the data collection.

Interview Guidelines

Interview is also the method of which is the most commonly used to collect primary data. It is the means to express internal thought, interest, and concept thinking of a person. It is a tool to find out experiences, efficiency, knowledge internal thought of person according to their acting, looking and facial expression. The interview may be regarded as a systematic method by which a person enters more or less imaginatively into the inner life of a comparative stranger.

Interviewing is a data collection procedure involving verbal communication between researcher and respondent either by telephone or in fact to face situation (Echardt, K.W. and M.D. Ermann. 1977).

Interviewing is an art of extracting actual information form a related person about a particular thing. Interview is taken as major tools for collection information in educational research. In this study the interview were taken with the mathematics teachers, School supervisors and research person(RP).

Quality Standard

After completing the construction of the research tools, it is necessary to maintain quality standard. For quality standard prolong field stayed, member checking and triangulation have been applied in my research.

Data Collection Procedure

I went to the related field of my study and collected information with the help of interview guideline. I went to 3 schools and asked questions with the 5 experience mathematics teachers, 3 teachers who have master degree in education and two were bachelor degree in education. I went to resource center and collected data with 2 research persons and I took interview with two school supervisors. They helped me for the research giving their internal thought about professional development of secondary mathematics teacher. All the interview guidelines were concentrated to the objection of the research.

Patton (1990) says that interview can be taken through informal conversation interviews semi structure interview and standardized open-end interview. Tape recorder is an indispensable vehicle to record the data another way of data collection is through observation, observation provides knowledge of the context in which event occurred and may enable the researcher to see things that participants themselves are not aware of or they are unwilling to discuss.

Data Analysis Procedures

As Patton (1990, p.379) mentioned;

Analysis of qualitative data is a painstaking process requiring long hours of careful working going over notes, organizing the data, looking for patterns against the data, cross-validating data source and findings and making linkage among the various part of the data (p.379).

In qualitative research, information is also synthesized through different forms of theories and literature. Denzin and Lincoln (2005) see "the qualitative research is process, which go by a variety of labels, including theory, analysis, ontology, epistemology and methodology". They further stated that data analysis includes creation of field text consisting of field notes and documents from the field, recreates research text, produce working interpretative documents and finally public text. The different stages of data analysis are confessional, realist, impressionistic, critical, formal, literary, analytic, grounded theory. In this manner, data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial proposition of a study. While I started to analyze the field information, I tried to understand the whole information in the form of the themes. I read one or more times. First, I tried to put the information into number of categories. While developing the themes, I read a number of research books, articles, research reports and other relevant materials. While doing so, I reorganized and rearranged the collected information. I also realized that it was necessary to link the field realities and findings with the theoretical knowledge (Strauss & Corbin, 1996). As argued by Patton (1990), theory implies facts, models or laws about the phenomenon and attempt to represent the reality adequately. In doing so, I brought literature and field together and tried to understand their connections and inter connections. Different theories and literature helped me to analyze and interpret the data gathered from the field.

Chapter-IV

ANALYSIS AND INTERPRETATION

This chapter is mainly focused on the analysis and interpretation of the collected information. In this chapter I have addressed my research questions; what are the qualities that make secondary mathematics teacher really professional? What are the motivating factors for professional development of secondary mathematics teachers?

In order to answer first research question systematically. The qualitative information was collected for answering the research question related to qualities for professional mathematics teachers. I reached the respective teachers and schools supervisions and research persons. The interpretation of analyzed data was done using different theoretical perspectives as explained literature review section. For this, this chapter is organized in to two sections. Section I discussed about the qualities of professional mathematics teachers and section II discussed Motivating factors for professional development of mathematics teachers.

Section I: Qualities for Professional Mathematics Teachers

In this section I deal the qualities of professional mathematics teachers. For this I took the interview with mathematics teachers' school supervisors and resources person.

Qualities of Professional Mathematics Teacher

My first research question is what are the qualities that make secondary mathematics teacher really professional? To answer this research question, I have received information from the mathematics teachers. Pertaining to the qualities of professional teachers, I have produced and presented the following themes on the

basis of the responses I have collected, analyzed and interpreted from the respondents.

Respect and devotion to the Profession

Regarding this, perception of teacher who has fifteen years of experienced in teaching, explained how the sense of respect to the profession plays a crucial role so as to become a professional teacher:

The theory of motivation helps mathematics teachers develop professionally. Intrinsic theory of motivation says that when there is inner desire in the case of becoming a professional teacher, sense of respect and devotion prevails towards profession. Here, I really agree with Khera (2001) who says that desires become strong when they are supported by devotion, dedication, direction determination and discipline. It is respect and commitment towards profession that decides the real professional development of teachers. The devotion of time is very crucial on the part of teaches .In the same vein, teacher A, further explains this as:

Devotion to the profession is a must. One who doesn't give time to students can't be considered as a professional teacher. Truly speaking one shouldn't teach only for money. We aren't professional teachers since we are teaching only for money. We run and rush rather than giving body and soul to the institution.

By examining the above opinions, what I can understand is that as a mathematics teacher we should give proper attention to devote more time to bring out better results both on the part of students and teachers. Very few teachers are "born teachers". They are committed towards their profession more than they love their spouse and children. Teaching is a passion for them whatever people tell. Teaching is like the flow of blood into their heart vessels. However, there are other good teachers who are "made teachers" who always work hard for the welfare of others whatever

pain they need to bear. Some teachers are so flexible, they enter into the teaching profession, dislike it and make it a "jumping-pad". Teaching has been the most enjoyable profession for me for the past 20 years; it was, it is and it will be.

Teacher as a Learner

Let's see the following perception of teacher B, who is a M.Ed. in mathematics and has the experience to twelve years in teaching Mathematics in this regards he said,

A professional mathematics teacher should have the characteristics of a good student. A teacher is a learner in the teaching and learning process learning is a must. There is no limitation of perfection and learning is the continuous process.

From the above information I came to know that learning is the continuous process continuous process. I believe that a professional teacher is a learner. Only a good learner can teach the mathematics effectively. The result of preparation is always sweet. He or she is in a constant quest for knowledge. He or she keeps up in his or her specially areas, and haste insight to integrated new knowledge. He or she takes knowledge and give skill understanding deep thinking. A professional teacher is good reader. As we know the fact that a good reader is a good leader. A good writing comes only after a good reading. A professional teacher has to learn much so as to tackle the situation. In the same vein, Teacher C who is an M.Ed. in Mathematics says:

I believe that a good professional teacher is a learner. The habit of learning creates confidence in teaching. Another important quality is patience which is an important weapon to manage problems. Devotion is required so as to be the professional teacher. A teacher with talent and commitment can certainly give better result in teaching and learning process. For me, professional development is possible

through dedication. Self confidence and contours learning. I always tried to do the same for my professional development.

Until and unless the mathematics teacher is committed towards the profession, he or she cannot achieve success in the process of teaching and learning. The joy of learning that comes from the struggle is rally sweet. In this connection, Teacher D says:

I always remained a student during my teaching career. I always tried to learn more and more for my professional and carrier development. I face challenges to leave a easy place like Kathmandu and went to remote places like Gorkha and Dhading not because I could not get job in Kathmandu but because I wanted to develop my care at different levels such as department head and then school principal through learning and facing challenges.

Academically, I always remained to share ideas about teaching and learning. I shared difficulties among friends and always tried to learn from them. I never quit a job because it is difficult but I quit it because there is no hope to go ahead. I preferred to change that job of teaching in that particular institution to join another on face more challenges and develop my career. "

Learning is a cognitive process. The theory of learning, we simplify comprehend, describe and analyses the situation. After analyzing the above opinions. What I can comprehend is that as a mathematics we should see gain even in pain. The fact is that fortune favors the brave people. In this sense teachers have to show and ardent interest both to earn and learn new things which are necessary for leading the life successfully. It is through learning professionalism of the teachers fosters.

In this regard, Full (1991) defines professional development as the sum total of formal and informal learning experiences throughout ones career from pre-service

education to retirement .Basic qualification and skills required for entrance in preparation and professional development is the upgrading and broadening of knowledge, skills and expertise, which is obtained from education and experience. I consider the following principles to promote teachers' professional development meetings or discussions with a colleague or some colleagues which may take the form of spontaneous, informal chats, or a kind of more formal interaction. It is sometimes felt that more formally structured meetings enable everyone's participation; conscientious professionals are always looking for solutions to problems and most colleagues are likely to be sympathetic and suggest solutions or encourage their peers to look for their solution ; individual presentation made by a member of the staff on new teaching ideas, classroom experiences, something they have read; etc. observation of other teachers' classes, in this particular case, certain understandings need to be negotiated ahead of time since observation has always been a sensitive issue; journal writing which can be carried out alone or in groups if teachers build in some ground rules on the entries to be included; a teacher has the responsibility to be up-to-date with respect to recent developments in her or his field; a teacher regularly engages in a process of reflection on her or his own professional activity in order to improve her or his own practice; a teacher collaborated with other teachers in the practice and also share experiences with them; a teacher is expected to engage in professional development throughout her or his career in an autonomous way.

Qualification

In this regard, E teacher who is a B. Ed. in mathematics has been teaching for seven years, says:

Regarding the professional attributes of Math teachers, I believe that devotion and commitment towards teaching, academic qualification, adequate training,

experience, mission and vision in mathematics teaching, balance between work and life fluency and accuracy, ethics and sense of human values, better incentive, job security , good planning and having adequate knowledge of modern methods, reflective attitude, techniques and strategies in teaching Mathematics, play crucial role to make mathematics teachers really professional.

A professional teacher is a learner. He or she had to earn the academic degrees the quality in teaching is possible by the qualified teachers. The sense of timeliness matters a lot in teaching learning process. As we generally believe that success in life depends on the right use of time, hence punctuality is the sign of success.

I understand that ability is nothing without opportunity of teaching. In this connection we should not forget the fact that commanding people are always demanded more to open the door of opportunity. Furthermore, a resource person says: *Academic qualification help teachers to get and opportunity or entry in the teaching profession. Fluency and accuracy maintain the better command of mathematics teachers. Ethics and human values help the teachers to shape positive attitude and high morale. Better incentive motivated mathematics teachers towards the professional .Job security maintains continuity to the profession. Planning helps teachers to make teaching effective, productive and successful. Finally, the knowledge of methods, techniques and strategies help mathematics teachers to bring verities and novelty in mathematics teaching. "*

I think that time for staff development must be provided outside of the school day. Teachers can concentrate on instruction, collaborate with peers, and focus on training objectives without the normal demands of the day. Training provided at the end of the school day in a two or three- hour module has proven useful, however, in follow-up training or to focus on special topics such as using scanners.

Punctuality

A professional teacher is the mixture of so many qualities. She or he should have positive attitude, planning, managing and teaching skills to become a professional math teacher. Regarding the punctuality of a professional teacher, a resource person R₂ who is a M.Ed. in Mathematics says:

To my perception and observation Mathematics teachers should be good in managing the time. They should be punctual, up to date, creative, productive, reflective and constructive. They should be responsible to create conducive environment for better learning.

A professional teacher should create favorable environment so as to cultivate the seeds of knowledge both on the part of students and teachers. As we know that fortune favors the brave. In that sense, the mathematics teachers should be courageous enough in tackling the difficult situation.

Teacher as a Problem Solver

In this connection, Teacher E who is a B. Ed. in Mathematics has been teaching for ten years, makes the following opinions:

When I feel problems I can teach better. If I take problems slightly I can't learn more. Naturally, if I can't learn more I can't solve the problems raised by the students.

Problem based learning approach is dominant to give solution of a problem. A teacher's ability is identified through problem solving skills. A mathematics teacher has to problematize the problems. While analyzing the above remarks a math teacher to my perception has to deal, discuss and solve the problems which come across in the time teaching and learning process. A good mathematics teacher should see an relation of question that given part and required part.

A professional teacher to my understanding is solves of a problem. Classroom itself is a complete world of problems. A teacher always gives special attention to the problems that the students often face in the teaching and learning process.

Here, I really agree with the ideas presented by Schon and Fullan (1991). Professional practices is a process of problem solving (Schon, 1983). Problems arise from the complexities if the situation and professional should have capacity to judge, analyze, develop, alternative and make decisions even in uncertain and problematic situation, professional development thus, addresses to develop their capacity to work even in the unpredictable and complex situations and resists outside interference as well as to handle the complex classroom situation. Professional development experiences are built on collegiality, collaboration, discovery and solving real problems of teaching and learning situation the strength with staff, instead of just challenging them to measure up to somebody else's stand (Fullan, 1991).

Section II: Motivating Factors for professional Development of Mathematics Teacher

My second research question is what are the motivating factors for professional mathematics teachers?

To answer this research question, I have received information from the mathematics teachers resources person and school supervisors. I have produced and presented the following themes on the basis of the responses. I have collected, analyzed and interpreted from the responses.

Promotion

Promotion is the most important factor that influences the professional development for mathematics teacher. Actually human being become ready for more success. To indicate this means behavior all the teachers need promotion. If only we

can provide suitable environment we can develop professional development. By the professional development of mathematics teacher, there will be effective development in mathematics teacher. As a result, the outcome of secondary level mathematics teacher becomes appreciable.

When I asked 5 years experienced mathematics teacher A, holding M.Ed. degree in mathematics education he said;

To uplift the professional development of mathematics teacher, to make teacher engage continuously and laboriously on the work promotion is one of the influential element."

To develop professional development of each every level mathematics' teacher, we should provide suitable environment of promotion. Promotion is only of the recognizable and acceptable factor for secondary level mathematics teachers.

Grade and Incentive Salary

Grade and incentive salary is the motivating factor to the secondary mathematics teacher to be creative and continuously practitioner to get required achievement. Every person has family and has to face economic problem to maintain his/her life. So grade and incentive salary has been a good factor to motive every mathematics teacher for professional development.

An experienced mathematics teacher who is also a resource person he said,

Government should be careful to manage grade and incentive salary in properly. Then it helps teacher to make teaching and learning effective and successful.

From the above information I found that if government provides adequate salary then the teacher encourages to develop their profession.

Reward and Appreciation

Reward and appreciation are the self-respect characteristics of human being. Maslow categorize self-respect is needed factor of human being. So, reward and appreciation motivate mathematics teachers to develop their professional development. Mathematics teachers should be creative, continuously laborious up to date in knowledge. Their regular practices reflect in the output of the student and percentage of S.L.C result. In this way level of mathematics go on upward. Then it can help to fulfill the requirement of new age. In this issue a five years' experienced school supervisor S_1 says,

There is no categorize between good teachers and other teachers. So teacher could not be active, creative and laborious. Who can give high achievement is mathematic result should be rewarded and such kind of trend should be established. Those teachers who follow the politician, such kind of teacher should not be rewarded. Such trend should be banded. Lanka marne hanuman jash paune dhaduwa' if such trend are in Nepal, how mathematics teacher be active? Reward and appreciation should be managed properly.

Exactly I supported such trend that our school supervisor explain here. It is the important motivating factor for professional development.

Political Influence

Political influence is the negative factor for professional development. We must control this factor. Due to the influence of this factor, teacher won't be laborious in their work. A teacher who follows the political leader, will never progress in education.

In the context of our developing country like Nepal, for the professional development of teacher. We should keep the teacher away from political influence.

Teacher organization should be constitutional. We should make teachers accountable, respondent, creative, laborious and professional. A five years experienced teacher D said,

Teacher should be taken out from the political influences, it is an important work for this purpose teacher selecting organization should be constitutional.

From the above view of the teacher I concluded that political influence of mathematics teachers play a negative role for professional development. So political influence should be stop in the institution.

Teaching Material, Method and Technology

To Increase teacher's professional development, with the path of new age, modern technology, computer, projector, internet, e-library training etc. should be given. We should make research and apply the new innovative methods. Teaching material and method is one of them MMT is important motivate factor to increase teachers' professional development. Teaching material, method and Technology matters teaching method simple to understand and to make other understand. Teaching materials method and Technology is equally important to match with modern age to make competitive student. Mathematics teachers says that for teaching mathematics teaching material method and technology helps to make practical learning and teaching activities simple, fruitful and behavioral.

In this direction one of the supervisor S₂ explain his view,

Appropriate teaching materials, suitable methods and using technology enhance to foster the professional development. If such things are not available in the intuitions definitely it affect the teaching –learning. Ultimately it affect the professional development of teachers.

From the above information I came to know that appropriate materials, methods and technology affect the professional development of mathematics teachers. I really realize that teaching material, method and technology are the important motivating, factor for professional development of mathematics teachers.

Chapter- V

FINDINGS, CONCLUSION AND IMPLICATIONS

In this chapter, I have drawn findings, conclusions and implications of my research in terms of opinion of teachers, resources person and supervisors for professional development of mathematics teachers. The major findings of my study were:

The qualities of professional development of mathematics teachers

) Respect and Devotion

The profession by the intrinsic theory of motivation implies inner desire in case of becoming professional teachers. Sense of respect and devotion prevails dedication, direction determination, discipline and commitment.

) Academic Qualification

Academic qualification, adequate training experience, mission and vision in mathematics teaching and learning make teacher really professional, effective and commanding.

) Punctuality

A professional mathematics teacher is full of mixture of so many qualities. A quality punctuality gives an idea to the teacher of positive attitude, planning managing teaching skill and make teacher up to date creative, productive, reflective and constructive.

) Teachers as learner

It derives the sense of no limitation perfection and learning as a lifelong process.

) Teacher as a problem solver

) If a teacher takes problem actually he can teach better and he can solve the problem raised by the students and it increases the skill and ability of the teacher.

The motivating factors for the professional development of mathematics teacher

-) Promotion
-) Grade and incentive salary
-) Avoid the political influence
-) Reward and appreciation
-) Appropriate methods, materials and technology

Conclusion

Professional Development develops the teacher as a learner. Problem solver, punctual, academically qualified, and respectful and devotee and the profession, pertaining to the qualities given as above, those qualities presents the problems teachers face while doing is classroom practices. We can get it through discussion, interaction and theory using inductive deduction questioning and answering, problem solving, logically thinking, rationing etc.

Professional development gives a sense of no limitation of perfection and learning is a lifelong process. It makes teachers curious, serious and sensitive. It believes that adequate qualifications are achieved through training, experience, mission and vision to develop the profession. Teacher is creative, punctual, dedicated, self-confident, continuous learner, laborious and up to dated. Professional development is motivated from the factors promotion, grade, incentive salary, self-respect, political influences, methods, materials and technology etc, which helps for professional development of the teachers.

These motivating factors should be managed properly. Professional development of secondary mathematics teachers will show reflection in quality of mathematics and securing high percentage in SLC exam of mathematics. These motivating factor make teacher laborious, creative, productive, regular practitioner, up to dated, innovative,

investigator, research, respectful and devotes to the profession, analyzed logical, deep thinker and feel self-respect and happy in their professional life.

Implications

We do some things so that it could help others to know some ideas and apply them in the time they need in a particular kind of situation. This research helps to improve pedagogy of the teachers. Ultimately it helps the students and teachers improve their field. Teachers have a special position, power, prestige, value and ethic in the society because of enhancing the knowledge. To keep these all things in balanced form, such as power, prestige, value and ethics in society teacher have to be more professional skill and making mathematics education interesting, in this direction this research will be applicable.

It is my hope that this research study contributes to the larger literature on professional development among teachers and encourages teacher education programs to be more responsive to the mathematics and consider this as a critical aspect in the progress of prospective teachers and students. Similarly, this study has pedagogical implications, psychological implications, training implications, organizational implications and personal implications for myself to improve my professional development.

Appendix 1

Interview Guideline For Teachers Supervisors and Resources Person

-) Would you tell me about qualities of professional development of mathematics teacher?
-) Could you tell me about respect and devotion?
-) Could you tell me about teacher as learner?
-) Could you tell me about teacher as problem solver?
-) Could you tell me about punctuality of teacher?
-) Could you tell me about academic qualification of teacher?
-) Could you tell me motivating factor of professional development of mathematics teacher?
-) Could you tell me about promotion?
-) Could you tell me about grades and incentive salary?
-) Could you tell me about political influence?
-) Could you tell me about reward and appreciation?
-) Could you tell me about teaching materials and technology?

REFERENCES

- Acharya, B.R. (2015), *Foundations of Mathematics Education*. Kathmandu: DikshantPrakashan.
- Acharya, B.R. (2011). A critical inquiry of culturally relevance of primary level school mathematics education of Nepal. An unpublished mini research division, T.U., Kathmandu.
- Attreya, B. (2006). A study of problems faced by mathematics teachers to maintain positive discipline in secondary level classroom. A thesis submitted to the central department of mathematics education, T.U., Kirtipur.
- Basnet, D.B. (2003). Teaching problems faced by mathematics teacher in existing curriculum of grade VIII. A thesis submitted to the Central Department of Mathematics.
- Denzin, N. K. & Lincoln, Y. S. (2005). Introduction: The discipline and practices of qualitative research. In N. K. Denzin and Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd edition). New Delhi: Sage Publications.
- Ghimire, S.(2013).Promoting and Demoting Factors for Professional Development of Mathematics Teachers in Nepal.(Unpublished M. Phill, Dissertation), TU, Kathmandu.
- Hornby, A.S. (1995). *Oxford advanced learner's dictionary of current English* (6thed.). Delhi, Oxford University Press, P. 874
- Mohanty, J. (2003). *Teacher education*. New Delhi: Deep& Deep Publications Pvt.Ltd.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.

Pandey,S..R. (2011) Professional Development of Teachers through Reflective practice. (Unpublished PhD, Dissertation), K. U. , Kathmandu.

Paudel (2063). "Understanding Teachers' Professionalism".

Timilasina (2061 B.S.).Teachers' professional development. Teacher education.NCED.

Wagley (2007). "Viewing Nepal from the current Trend in Teacher Education".

Wagley and Panta (2003).Teacher development of secondary education in Nepal.