

Chapter- I

INTRODUCTION

Background of the Study

Mathematics is the study of quantity, structure, space and change (Jems and Jems, 2006). It is the basic foundation of a scientific, technology in the world as we live in today. It is a discipline; we are familiar with lots of academic discipline such as archeology, biology, chemistry, economic, history, psychology and sociology so on. Empirical evidence also suggests that ethnicity, caste and gender inequalities are crucial aspect in social, political, cultural and economic structures with in Nepal (Geiser, 2005).

Mathematics has been developed along with the human civilization. During the ancient time and members of their community. But today as being foundation of all science and technological field, its remarkable role in every aspect has been inspirable part of human life. Person with the advanced mathematical knowledge and better mathematical literacy can have the better income in the development of countries. That's why mathematics has been given a much priority in school level curriculum especially in school level and as an optional subject until university level. Most of the girls students at university level do not like to select mathematics as major subject due to the possibility of failure in examination. Girls dislike to this subject has become a great problem to educationist and stake holders. There is now an equity theory that both the male and female should have chance of getting education as social importance. When girls are distracted from mathematics, it is certain that women could not get the position of scientist and the domain of the works which, by tradition is considered as male domain (Baniya, 2012). In the history of mathematics

we can find many mathematicians such as Euclid, Archimedes, Apollonius, Kepler, Pascal, Descartes, Bernoulli, Euler, Gauss, Thales, Pythagoras, Zeno of Elea, Hypatia etc. But among them we can find only one women mathematician Hypatia, other all are male mathematicians. We have to agree the fact that equate situation for the improvement of mathematicians is insufficient. This may be one of the causes to keep the girls to stay back in the history. Nowadays, girls have get equal opportunity for studying.

Leach (2003, p. 7) points out that even in the most industrialized countries women are paid less than men. Similarly the high ranking posts, even in the developed countries, are occupied by male. Women make only 26 percent of female legislators, senior officials and managers in Australia whereas in Italy 19 percent male and in Korea 5 percent female. Women have poor representation in politics globally; be it a Member of Parliament or in high ranking government positions. This is equally true for other developing countries as well.

In our Tribhuvan University, Department of mathematics Education; there are 18 teacher among them 3 are female teachers. Participation of total number of students is 450 which include 120 girls and 330 boys in 2069. According to the National population and Housing census 2011 published by the central Bureau of statistic (CBS), the female literacy rate is 57.4% which is low in comparison to the male literacy rate 75.1%. Though the female literacy rate increased from 42.8% (2001 census) to 57.4% still majority of girls are deprived from education.

In rural areas of Nepal, female have no access to education because of conservative social structure. For example, people still think that girls should not be educated and they should be kept only around in household activities. Moreover, some societies still wouldn't see positively if girls go to school. As a result, woman

has no accessibility to get any job such as government and private. As a consequence they should fully depend on their family and husband in terms of financial support.

As in my experience, there is always a low participation of female in mathematics classes. I think girls may view mathematics as a male domain that is difficult to reconcile with their sex-role identity. Girls may have internalized cultural ideals about who belongs in mathematics. Educators also noted that girls had low self-confidence regarding their performance with mathematics. Leach (2003, p. 7) points out that even in the most industrialized countries women are paid less than men. There is an obvious negative feedback loop between social and cultural pressures and girl's self-perceptions that they cannot do well in mathematics. Most of the teachers perceive that girls may feel embarrassed to show that they excel in mathematics. Many educators believe that girls may feel discouraged from proceeding in advanced mathematics classes when they are one of only a few female students in a class.

There are several reasons on chosen this topic for the study. The first reason for choosing this topic is being the 26% lady to study M.ED in Mathematics in my batch and my personal interest is that the numbers of females are not participating in mathematics classroom learning when I was studying in mathematics different level from +2. Other reasons, my school level learning journey began in Chitwan. My mathematics teacher, who ask the question and give us mathematical problem most of the time boys were quickly, solved but not girls. Although teacher had given emphasis to girls by saying girls you should first solve the problem but we are (girls) said that "Sir we can't do because boys are talented in mathematics, we are not". When I was in grade IX, our mathematics teacher said that only very talent pupil can take optional mathematics as an additional paper and rest can take Economics, so boys were take mathematics and girls were not because weak students can't succeed in S.L.C

examination. So I also ready to take economics as an additional paper without my interest. In our country gender inequity is one of the cause of the low participation of females in mathematics learning.

Statement of the Problem

Participation of girls at University level mathematics is not satisfactory. There are various factors in 'Girls Participation in Mathematics at University Level'. Factors like socio- cultural and economic condition, gender differences public image, parental belife system, girl's daily activities and early marriage etc. have adversities effect on the girl's participation in mathematics at university level.

If the participation of girls at University level mathematics can be increased then there will be availability of female teachers who would be able to teach mathematics in colleges and Universities. They could also be mathematicians who could contribute and present some findings in the field of mathematics. They would be able to join field like physics and engineering instead of the customary jobs status of girl's participation at University level mathematics is not pleasant. The factors influencing girl participation adversatively should be minimized with some appropriate solutions.

Hence, this study intends to answer the following research questions.

1. Why is female participation low in higher level mathematics education?
2. How do socio-cultural dimensions influence the participation of girls in higher level mathematics education?

Objective of the Study

The main objectives formulated for this study were as follows:

1. To explore the causes of girls low participation in mathematics at university level.

2. To find-out the socio-cultural dimension influence the participation of girls in higher level mathematics education.

Significance of the Study

Every research is important in itself because it give details of various unseen facts in any area of study. Most of the girls don't select mathematics in school and University level. The need of mathematics is apparent for everyday life as well as for higher studies in the field of science and technology. Mathematics achievement is a major factor for every student to his/her career. In our modern society all the scientific development depend on mathematical knowledge.

The significance of this study is, firstly to find out the manipulate factors that prohibit girls to contribute in mathematics then bring awareness among the teachers, parents and students themselves. As well as I think this research will be helpful for many female students, mathematics teachers and teacher educators to apply appropriate teaching strategy that can address the needs and interests of the learners and empower the girls to learn mathematics. On the other hand this research will bring some change in teaching and learning mathematics through different approach and create pedagogical thoughtfulness and wakefulness in others educative practices. Hence, this study has the following significance:

-) It would help teachers, curriculum developer, policy makers and related agencies to improve the participation of girls in mathematics.
-) It help would to encourage and motivate the girls towards mathematics education.
-) It gives to information about the participation of girls in mathematics.

Delimitation of the Study

Each study is not rigorous, perfect and free of limitation. Delimitation of the study concerns with the limitations of time, financial resources and material. . This study is focused on the exploring how the girls perceive the mathematics. This study does not study about the participation of girls in teaching and other fields like administration and management. In my research I would like to research on the participation of girls in the mathematics at university level education only. Thus, this study also has some limitation which is pointed as below:

-) This study was limited only in Kathmandu district.
-) The study was conducted B.Ed and M. Ed girls students in mathematics educations.
-) This study was based on the sample of Tribhuvan University.

Definition of Related Terms

Participation: In this study participation is defined as involvement of girls student of B.Ed and M.Ed (2069-070) years, who are academically regular in mathematics classes and participates in every classroom activities, does class works and shares mathematics problems with teachers.

T.U.: Abbreviation of “Tribhuvan University” which operates the education program for those who has pass B.Ed exam. There are two years under M.Ed, i. e. 1st and 2nd years and B.Ed also.

Peers influence: It is related to peers help in subject selection, motivation towards this subject and personal help to study mathematics.

Girls Interest: This refers interest of the girl’s student in selecting University level mathematic

Chapter- II

REVIEW OF RELATED LITERATURES

A review of related literature is source of further study of research task. It helps us to give the better idea at surveying in research. There are so many research studies about the 'Girl's Participation in Mathematics at University Level' under different variables such as teacher, students, family background, socio-economic factor, mentally and physically healthy person etc.

In this section, some related literature with this topic was reviewed as mentioned below:

Empirical Literature

CERID (2003) according to the Hindu Dharma Sastra "Be it a girl or a young women or women advanced in years, nothing must be done even in her own dwelling-place merely to please here. A female must be dependent on her father in her childhood, in youth on her husband and on her son later in life. A woman must never seek independence.

The society truly runs under these dictums as women are never ever allowed to seek freedom. Boys are sent to school early but while girls spent their time at home learning the household chores. So girls students are less participate in mathematics class even a whole class activities. The low participation of girl's students is due to greater involvement in the household work to take care of younger siblings, low motivation among parents about the facilities offered by the government to girl's students.

Devkota (2012); did a study on "Factor affecting girl's achievement in mathematics". For this the main objective of the study was: to analyze the factor that

affects the achievement of girls in mathematics. For this study 30 students from three government school of Kathmandu district were selected. The data of sampled students were obtained through the student interview. Interview was carried out with the mathematics teachers and principals of the selected sample school. The data obtained from interview were analyzed by descriptive method. After analysis and interpretation of the obtained data, the finding indicates that the mathematics achievement of girls student were affect by teaching learning process, teaching materials, home environment, gender bias, school environment, interest of learners, self-confident, practice of learners, social variables, poor etc. These variables influence the girl's achievement in mathematics.

Christian Ceetal (1997); did a study on gender difference in learning achievement and found that gender difference in ability and achievement are mainly due to social and cultural influences and not the biological causes. This indicates that the true intellectual potential of women would only revealed if women receive a similar education as men and have the opportunity to choose similar carriers to men.

UNESCO (2006) entitled 'The Impact of Women Teachers in Girls' Education' shows that there is a positive correlation between women teachers and girls education. A female role model can support and encourage girls to successfully complete their studies. But due to lack of role model, many girls are not allowed to go the universities and colleges, and even to schools especially in the rural areas.

U. S. Department of Education (USDE) (1997) entitled 'Women in Mathematics and Science' suggests that while women are just as likely as men to go to college immediately after high school, from the start they are less interested in majoring in mathematics and science. Although women tend to major in different subjects than men in college, some of these differences have narrowed over time. The

mathematics and science fields continue to be areas where the gender gap remains large. Women are far less likely than men to earn bachelor's degrees in computer science, engineering, physical sciences, or mathematics.

Pant (2009) shows that the girls scoreless in mathematics than the boys. The major reasons are less participation of girls in classroom, working more at home, difficulties in the process of socialization for girls and due to the physical problems of the girls during the adolescence period. There was a strong belief that mathematics cannot be learnt by girls. There are no more female mathematician and mathematics teachers. The psychological effect was also one of the causes that lead the girls towards the low achievement in mathematics.

Sharma (2000) also shows that socially and culturally, females are not given freedom of mobility. Boys are allowed to go outside the house any time, even away from home for their education, but most parents still do not allow females to go out of the home alone. The cultural rationalization is also supported also by religion, is that a son is required to perform the last rites of parents when they are dead, parents who do not get these ritual services for want of a son do not receive salvation (Shrestha et al. 1990). This shows that parents provide more preference economically and culturally to their male child than their female child. Such cultural beliefs create discrimination towards female education in the family.

Ernest (2002), empowerment is the gaining of power in particular domains of activity by individuals or groups and the processes of giving power to them, or processes that foster and facilitate their taking of power. Whereas, mathematical empowerment is concerned with the gaining of power over language, skills and practices of using and applying mathematics over a relatively narrow domain like school mathematics.

In term of school mathematics, Dweck (n.d.) had divided students into two categories: one who considers mathematics as gift and other who considers math as earned ability. Later, it was found that students who viewed their intellectual ability as something they could develop maintained their interest in learning and earned significantly higher grades than their peers who viewed intelligence as a gift. When he looked at those findings through gender story, there was a considerable gap between females and males in their math grades but only for those students who believed that intellectual skills are a gift. When he looked at students who believed that intellectual ability could be expanded, the gap is almost gone. So, empowerment of females in mathematics depends upon the attribution of students towards nature of mathematics. When discussion takes place about mathematics empowerment, females are considered to be mathematically disempowered in this patriarchal society.

Scotland Malawi Partnership (2011), girls are shown to be more likely to take up art, languages, biology and humanities subjects, while boys take up geography, physical education, and information technology. These sorts of scenario are also visible in the context of Nepal. In most of the colleges, we can notice maximum number of female students in biology and literature field whereas very less in mathematics and technology.

Theoretical Review

Theories provide an important base for understanding and interpreting the realities that come across the process of research. For this same purpose of understanding the realities, I discuss below the theories that I adopt in my study.

Feminism Theory

Feminist theory came into existence with the dissatisfaction towards sociological theories and subordination of women in various fields. As Abbott and Wallace (1997) mentions that "sociological knowledge portrayed women as men saw them, not as they saw themselves" (p. 5). Feminist argued that sociology is a male-

dominated subject that explained everything from the viewpoint of male leaving behind female. Feminist theory's main argument is that women are excluded from the domain of sociology, thus masculinity remains privileged. The women are oppressed and their freedom of action is limited by power of men, as men possess more economic, social and cultural resources than women do.

Male stream sociological theories, as claimed by feminist, support and justify sub-ordination and exploitation of women by men as natural phenomena. The Feminism argues those male stream theories serve as an ideological justification for subordination of women. They claim that feminism perspective is a must to understand the subordination and exploitation of women by men. Patriarchal or men's knowledge alone is not enough to explain such subordinations. "Feminists sociologists are interested to examine relationship between individuals and the social structure, between women's everyday experience and structure of the society in which they live, between men's power in interpersonal relationship and the ways in which that power is institutionalized" (Abbott & Wallace, 1997, p. 18).

Feminism argue that only including or adding women in the domain of sociology does not serve the purpose of understanding women or justify the absence of women's perspective in sociology. The need is to reformulate the sociological theories from the perspective of the women so that structured inequalities in the society, government policies from women's perspective and so on can be studied. Feminist approaches applauds the importance of men and women to social life, the connectedness of structures and processes found in macro and micro settings and the interdependence of one's personal orientation and professional concerns (Fox & Murry, 2000). Feminist scholars seek to identify critique and alter structures and practices that actively or passively hinder equality. "The axis of feminist enquiry is

Gender, which consists of deeply ensconced social meanings and their derivative power" (Wood, as cited in Fox & Murry, 2000). The Feminist approaches are critical to the social structure and the processes through which the subordinated patterns are generated, sustained over time, and reproduced. They emphasize that the knowledge gained from feminist research must be applied not social in the reshaping of theory but also in arenas of social change so as to reshape existing social conditions toward greater equality for men and women (Cohen, Manion & Morrison, 2000).

Feminists have challenged the notion of biology as the sole reason for differential treatment of girls and boys, women and men. They have argued that biological differences between men and women do not explain their social roles rather it needs to be understood as socially constructed (Adkins, 2005). They admit that there are anatomical differences between boys and girls but what is important are the ways in which girls and boys are socialized and brought up, how they are treated and interacted and the ways they are taught the appropriate behaviour. Feminist claim that television programs and text books also teach the appropriate role models for boys and girls; what is more striking is that the girls and boys who refuse to adhere to those expected roles and behaviours are ridiculed by their peers and adults.

Feminism Theory and Education

Since my study deals with the discrimination against the girls in school, I discuss feminist theory and education particularly. The Feminist argue that patriarchal society prepares the girls for the subordinated roles both in public and domestic life, with boys/men leading the upper posts and taking major decisions. In educational area, they have argued that girls are not only disadvantaged in the educational system but also learn to be subordinate and to accept dominant ideologies of femininity and

masculinity. They explain that subtle processes coupled with patriarchy make girls excel only in particular subjects, thus delimiting their opportunities in labour market.

Feminist research has shown that girls learn to create their identity as feminized, radicalized and located within a class system through schooling processes. They further claim that schooling depicts patriarchal nature through structural positioning of women in lower level of schooling system. "The axis of feminist enquiry is gender, which consists of deeply ensconced social meanings and their derivative power" (Wood, as cited in Fox & Murry, 2000). Female members of the school, both students and teachers, are disadvantaged irrespective of the attitudes and values of individual teachers or the policies of individual schools or local authorities (Myers, Anderson & Risman, 1998). Thus feminist sociology consists of theories that provide base for understanding and explaining actions of what is going on. As theories make sense of facts, similarly feminist's theories provide basis for explaining gender division in all spheres of society including education, about subordination and oppression of the women. Much of the feminist theory focuses on analyzing gender inequality and the promotion of women's rights, interests and issues. Among various feminist perspectives I have adopted radical and social feminism for my study. These feminists' theories address oppression of women, ways of overcoming them, power relations and expression of individual self. In the following section I discuss them briefly.

Structure and Agency

Structure is the medium and outcome of the individual actions. Structure consists of rules, norms and resources which the agent uses in the production and reproduction of social life (Kaspersen, 2000). Rules, norms and resources are the mode through which individuals act. Structure shapes individual resources, agency

and achievements. It also defines the parameters within which different categories of actors are able to pursue their interests, promoting the voice and agency of some and inhibiting that of others. It helps to shape individual interests that reflect how people define their goals and what they value further reflecting their social positioning as well as their individual histories, tastes and preferences (Kabeer, 1999).

Agency refers to an individual's capacity for action. Agency in the words of Mahmood (as cited in Winkelmann, 2005) is the capability of actors "to realize one's own interests against the weight of custom, tradition, transcendental will" (p.99).

Agency is thus the capacity of the actors "to process social experience and to devise ways of coping with life, even under the most extreme form of coercion" (Long, 2001, p. 16). Naila Kabeer (1999) points out that agency does not only have decision making capacity but also encompasses "bargaining and negotiation, deception and manipulation, subversion and resistance as well as more intangible, cognitive process of reflection and analysis" (p. 438).

The importance of this structure agency lies in the fact that the structure is reproduced by actions of the individuals through the mediation of rules, roles and other resources. Giddens (as cited in Kasperen, 2000) through his structure theory provides solution to the dualism of agency and structure that evolved with different sociological stands. He deconstructed the basic concepts of agents, action, power, structure and system as held by action theory, functionalism and structuralism so as to reconstruct them as basics of structure. Giddens reconstructed the traditional notions of dualism into duality meaning that the two opposed and separate tenets of agency and structure as one entity but with dual aspects. Hence, structure does not determine individual action and conversely, is not the sum total of individuals' action (Parajuli,

2002). According to Giddens, structure in a way enables and constrains actions of the individual.

Social practice is one of the important concepts in structure theory. As Kaspersen (2000, p.33) explains social practice constitutes the agents, their action and structure. It is the mediating concept between the agency and the structure, between the individual and the society. The social actors or the agents acknowledging the actions undertake the reutilised nature is referred as 'practical consciousness'. The 'discursive consciousness' is the knowledge that is achieved by reflecting upon one's action. Such discursive reflexivity accounts for the possibility of changing patterns of individual action. The third is the unconscious motives is the knowledge that is suppressed or in distorted form. Whatever is the form of knowledge, nonetheless, tacit knowledge of agent is important for the maintenance and reproduction of social life.

Everyday Life Theory

Everyday life, according to Madsen (2000), is what people do every day and what provides human beings with immediate meaning. Everyday life is the framework for people's current effort to create and maintain meaning in heterogeneous – diversified activities. Actions and practices in daily life are pre-reflective. Everyday life is something we do, something we manage without reflective why – as long as it seems meaningful. Everyday life is what we do and how we do (Madsen, 2000). Everyday life accounts for daily activities of people in their life. Besides the activities, it reflects actions, behaviours and the practices of people. It further exposes reasons behind the happening of certain events. Everyday life consists of heterogeneous activities that are taken-for-granted. Taken-for-grantedness is the significant feature of everyday life. Due to this activities are practiced daily and are shaped into routines,

rhythms, norms and rules. Those daily activities create immediate meanings in the everyday life. Similarly those activities are carried out regularly without any objection and asking 'why'. However, with structural changes such daily routine comes to break and again continues after reorganization of those activities as per the occurrence of the structural changes.

In educational context, according to Madsen (2000), everyday life is closely related to teaching, learning and schooling. The accounts of everyday life allow the capturing detail behaviours, practices and roles of teachers, students and other concerned people that would otherwise have been difficult to explore. Nonetheless, everyday life is also reflexive of socio-cultural prospect of particular place and people. Also everyday life in broader context gives continuity to the social order and culture.

Everyone learns from everyday life and school is one of the arenas where learning takes place. Madsen (2000) points out that educational everyday life research focuses on the ways children create meaning in their learning process inside and outside classroom; the changes in everyday life and children's strategies to establish a new order including learning new processes, similarly the school's impact on the questions children pose regarding the structure and organization of life and moreover, the school's ability to respond and answer the questions raised by children. Everyday life provides bits and pieces of activities of daily life that helps me to take account for such details in girl's everyday life at school and at home through which discriminations can be identified and so the behaviours, practices and roles can be studied. Not only will everyday life help to account for girl's activities and practices but also account of teachers and boys as well. This way micro perspective of girl's life can be understood.

Identities of Women

Identities of women has been adopted in this study from the article of Shweta Singh (2006) entitled "Deconstructing 'gender and development' for 'identities of women'". I found this concept appropriate for my study since it prioritizes the individuality – self of women and their agency. An identity of women is a framework that seeks to study women's experience through women themselves. It tries to understand women as a 'self' not as a member of a group or group as a whole. The three main principles that guide this framework are; women's self-conception, the multiple social environments that are relevant to individual women and women's relationship with those environments as perceived by women. This framework proposes to define women acknowledging and accepting the present identities of individual women and realizing their aspirations rather than defining them from external assessment of the reality. This framework has been developed specifically for understanding world and individual women of developing countries. Here, women are the primary source of information on their position and are recognized as agents who access and evaluate their own situation (Francis et. al., as cited in Singh, 2005).

Identity is an important element in identities of women. Identity differs in its meaning depending on the field it is studied. The study of identity in gender refers particularly to construction of gender identity in women. Similarly, gender identity has its meaning from biological based explanations including the psychology and sociology differentiating men from women. Nonetheless, 'identity' in 'identities of women' focuses on the uniqueness of individual women not on uniqueness of social category of gender. In short, 'identities of women framework are built on women's agency within their individual context'.

Identity of women framework, the interdisciplinary aspects: the post-structuralism critique of feminism, a cultural anthropology based on the understanding of social context and a socio-psychological understanding of the relationship between the context and the individual performance. This interdisciplinary approach is to study the identities of women based on three premises - rejecting generalization of women's identity, accepting women's uniqueness and acknowledging individual woman's ability to have multiple identities and negotiate new ones. The Post structuralism feminism puts forward the idea of the woman's identity as "a4 temporal duality of positions, that women carry within them, the positions of power and powerlessness at the same time, rather than the either/or position suggested by most of the discourses" (Francis et al., as cited in Singh, 2005). Cultural anthropology without proposing a macro, but encompassing representative reality associated with that cultural context (Holland et al., as cited in Singh, 2005). Whereas, identity in the socio-psychological approach reflects the formation of identity over the life cycle with reference to a single domain of life (Deaux& Stewart, as cited in Singh, 2005).

Identities of women framework also highlights on the narratives as an illustration of identities of women. According to this concept, personal narratives of women can also form a basis of their expressed identities. Each individual woman's narrative is different though they belong to the same social context considering different set of factors as salient to her identity. Hence, the personal narratives are the real voice of women themselves and thus reflect even subtle difference between individual women.

Thus, identities of women is adopted in my study since this voice for existing agency in the women, values identity of individual woman, accounting for women's

aspirations and abilities to determine pathways for their own well-being. Further I am interested in analyzing discrimination, prejudices against the girls and harassment experienced by them from the perspective of power. For this I discuss below Social Relations Approach as developed by NailaKabeer.

Social Relations Approach

The Social Relations Approach was developed by NailaKabeer during the early 1990s as a method of analyzing existing gender inequalities in the distribution of resources, responsibilities and power. According to Leach (2003), it is a powerful means of examining and explaining “gender relations” as constructed and maintained in institutions. It focuses on the relationships between the people and their relationship to resources and activities. So, examining a particular institution with this framework will help in exploring how gender inequality is formed and reproduced in particular institution (March, Smyth & Mukho upadhaya, 2000).

As mentioned in Leach (2003), Kabeer uses the term “social relations” to describe the structural relationships that create and reproduce systematic differences in the positioning of groups of people (p.87). According to her, such relationship determines our identity, roles and responsibilities. She claims that we can have rights and control over our own lives and those of others. So, social relations produce inequality that attributes certain position to each individual in the structure and hierarchy of their society.

There are five main concepts overarching the Social Relations Approach:- developments increase human well-being, social relations, institutional analysis, institutional gender policies and structural causes. Among these five concepts, I was discussed in brief only the institutional analysis and the institutional gender policies

that I used in my analysis. Kabeer (as cited in March et. al, 2000) defines institution as a framework of rules for achieving certain social or economic goals. She suggests four key institutions of society as the State, the market, the community and the family or kinship. The schools are the organizations- specific structural forms that institutions take as the part of educational system which is an important part of the State (an institution) (Leach, 2003). So education is one such means through which the state ideologies are perpetuated. But as Kabeer (as cited in Leach, 2003) argues that to see how social difference and inequalities are produced and reproduced through institutions, it is necessary to examine actual rules and practices of that institution. She identifies rules, resources, people, activities and power as five major components to understand existing inequality. The next concept used in my research is the institutional gender policies, where three policies are related to gender - the gender blind policies, the gender aware policies and the gender neutral policies. This provides a ground for analyzing how the policies of the school are responsive or non responsive to gender. Besides, institutional analysis is gender specific and it focuses on institution/organization that helps in examining their practices and addressing their weaknesses. So this has been adopted in my research for analysis of schools practices.

Constructivism

According to social constructivism of Vygotsky, mathematics is a social construction, a cultural product, fallible like any other branch of knowledge so constructivism believes that learners can construct their own understanding and knowledge of the world through experiencing the things and reflecting those experiences. "Constructivism emphasizes the aspect of learning which is about

understanding and, in doing so, takes us beyond any naive conception of learning as rote learning or as an unproblematic 'drinking in' of new information" (Fox, 2001).

Vygotsky's constructivism is proximate to my research issue since my focus is on socio-cultural dimensions having direct impact on participation of females in mathematics. Vygotsky emphasized on human sociability, social interaction and culture of society. Fallible nature of constructivism believes that there is not a single truth: rather all truth is constructed by individuals or societies so I will be engaged with participants to get insightful ideas on my research topic through the constructed meaning and understanding of participants about mathematics.

Filling the Gap

The study of human actions and behaviours is a complex phenomenon. As human behaviour, human actions vary across culture, time, place and the situation. Theories have been developed to understand and extract meaning out of these varied natures of human beings. In my study I have adopted various theories to back up my analysis and explanations of my research. As perception is abstract and discrimination is ambiguous concept, I have adopted the paradigm of Feminism and Social relations approach for detail understanding. Another important theme of my research is the response and to support this I have adopted agency and structure developed by Giddens. This is important domain in my study to explore the active participation of the girls to fight against discrimination and this does justice to my argument that the girls are not only the passive recipients of structural constraints but are the active agents with power to fight against the oppression and dissatisfaction. Next, Identities of women is crucial to my study as it focuses on the identity of individual rather than identity of group, supports the individual self consciousness for wellbeing of self which provides ground to understand individual girls' perception and reaction to

discrimination in my study. Further everyday life unfolds minute details in the everyday life of the girls that would count to explore discriminations practiced against them. The social relations approach differs in its focus on power in gender relations. This approach uses an institutional framework for the analysis of gender inequalities. The Social Relations approach seeks to expose the gendered power relations that perpetuate inequities. Thus in my study it helps to analyze school from the point of institution. Hence my theoretical construct inter links with one another to understand the issues I have raised in my study.

The above collection of literatures that are closely related to my study in one way or the other portrays the types of researches that had been carried out in relation to girls. Be it learning achievement or bullying or exclusion or a search for self identity, all are directed towards uplifting girl's life. The review of above mentioned literatures have provided me with important implications on the issues of girls. However, there have been very few researches on girls' perceptions and responses towards the discrimination in education and at home. Thus, my study aims to fill the knowledge gap by adding girls' participation low in mathematics at university level.

Conceptual Understanding of the Study

As the discussed above related literature, participation of girls' student in University level mathematics depends under different variables. Generally participation of girl's students is influenced from parent's attitude towards education, cultural behaviour, family background, physical facilities, interest of learner, motivational factors etc. Beside these influencing factors early marriage of girl's, gender difference, social environment, school environment, political and institutional policy etc. also may be the influencing factors of girl's participation in university

level mathematics. Under these factors I have conducted a research and had developed the following conceptual framework with the help of these variables.

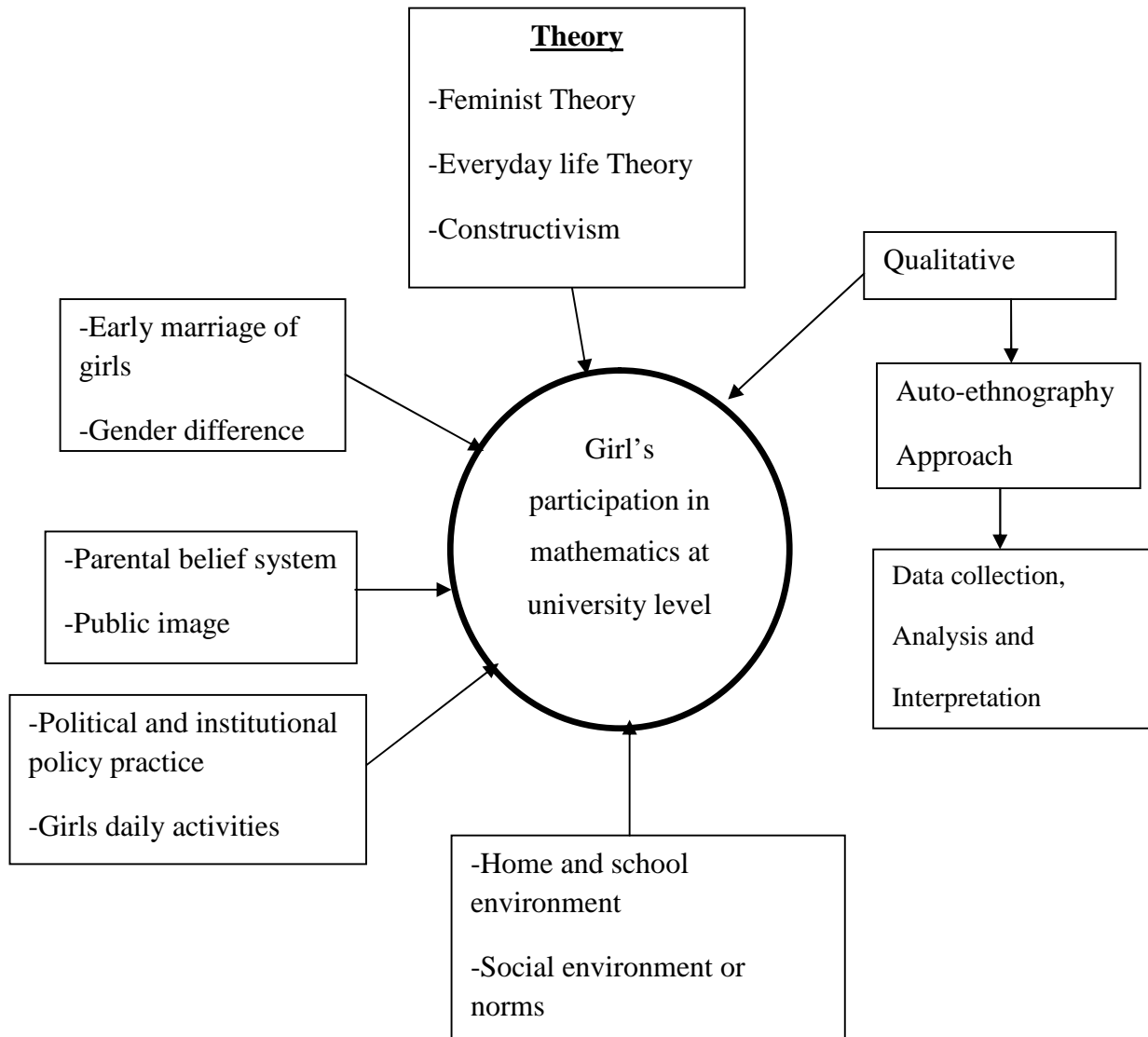


Figure: 2.1. Conceptual understanding of the study

I studied some of the research where I found that many of the researchers have shown similar type of problems concerning low participation of female students in mathematics learning. Those studies found that initially or in elementary school level girls have more positive attitudes towards mathematics than boys do, but as they continue in school, girls' attitudes become more negative or girls' positive attitudes

towards mathematics decline as they grow older. They have lower expectations for themselves in mathematics than boys, and that girls believe they do not have mathematical ability. In the view of girls, mathematics as a male domain that is difficult to settle with their sex-role identity. Girls may have internalized cultural ideals about who “belongs” in mathematics. Educators also noted that girls had low self-confidence regarding their performance with mathematics. There is an obvious negative feedback loop between social and cultural pressures and girls’ self-perceptions that they cannot do well in mathematics.

Chapter- III

METHODS AND PROCEDURES

This chapter lays out research methodology and design that I used in my study. Further it also describes how I selected my research field, introduction to research field and the selection of respondents. Likewise it also describes the data collection methods, tools and data analysis.

Research Design

Research design is a way through which the researchers to the collect data interpret and analyse. This was an auto-ethnography related to participation of girls in mathematics at university level. Thus, this study was qualitative design and auto-ethnography approach. Qualitative research is interpretive in nature and the theoretical base is subjective reality as truth, a real knowledge (Sharma, 2011). Qualitative research can be regarded as ‘Naturalistic inquiry’ in a sense that it is conducted in natural setting by trying to avoid any intentional manipulation and distortion of the environment of the information by the researcher (Tames W , Stigler and Michelly Perry, 1998; as cited in Creswell, 2007). Qualitative research being with assumption, a worldview, the possible use of a theoretical lens and the study of research problem inquiring into the meaning individual or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, data analysis that is inductive and establishes patterns or themes. The final written report or presentation includes the voice of participants, the reflexivity of the researcher, a complex description and interpretation

of the problem and it extends the literature or signals a call for action (Creswell, 2007).

One of the important things in qualitative research is that the researcher has to perform a role of human tool of data collection that needs relevant and appropriate knowledge and skill about it. Qualitative research emphasized on inductive analysis of data that proceeds to find theory to explain the data.

Auto-ethnography Approach

Auto-ethnography is a genre of writing and research that connects the personal to the cultural placing the self within a social contents (Acharya, 2072). Auto-ethnography is a form of qualitative research in which an author uses self-reflection and writing to explore their personal experience and connect this auto-ethnography story to wider cultural, political and social meanings and understandings. This qualitative dissertation uses auto-ethnography as the methodology. Auto-ethnography is research, writing and story where the researcher is the subject and the researcher's experiences are the data (Ellis and Bochner 2000). The theoretical frame for this auto-ethnography is identity theory as it relates to teacher identity construction. Memory, videotaped lessons, student commentary and a reflective journal serve as supporting data sources to render narratives detailing the finding. The research question guiding this dissertation is: In what ways does a teacher's reflection on mathematics practice facilitate teacher identity construction and change of practice? Auto-ethnography is a form of ethnography, which makes the researcher's life and experiences the focus of the research (Reed-Danahay 1997). Auto-ethnography is a research approach which focuses on learning about the social and cultural life of communities, institutions and other settings depends on own view. Auto-ethnography takes the position that human behaviour and the ways in which

people construct and make meaning of their worlds and their lives are highly variable and locally specific. The product of auto-ethnography is an interpretive story or narrative about a group of people (LeCompte, 1999). This research that auto-ethnography as tool in research provides the researchers to examine his or her pedagogical and research practices from his/her lived evocative experiences.

Selection of Field

It was the beginning of my research, when I have decided about my field of interest; I began to think about the research sites at Kathmandu valley.

Sample of the study

This is the qualitative inquiry, so the sample size in this study won't fix. According to Anderson, there won't rules for sample size in qualitative inquiry (Anderson 2001, p.123, cited in Adhakari 2007). Therefore, the sample size of this inquiry depends upon the researcher what s/he wants to know, what the purpose of inquiry was, what can be credibility of the study and what can be done with available time and resources. First, I had gone to collages and I met mathematics teacher. I told all about my study and I gave my research proposal. After that, the teacher agreed to give permission for me. She informed for all students about my study. I took permission to take interaction with selected mathematics students. Then after continue, I chose five students and two teachers from them.

Data Collection Tools

The study mainly focused on the exploratory qualitative aspects. As Creswell (2007) mentions qualitative research takes place in a natural setting and it uses multiple methods that are interactive and humanistic; the study is based on exploration of girl's experience of discrimination, their perception and responses

towards it. These are the data collection tools that were used in the study were discussed in below.

Class Observation form

Observation form is a kind of tool that helps to see the knowledge through use of sense that is eyes, ears, nose, tongue and skin. It has great importance in my research works. As a data gathering device, direct observation makes an important contribution to descriptive research. Observation means to watch over from every point of view. Especially the emphasis was given for the use of teaching methods, interest of the girls student, knowledge about the subject matter, girls student's participation, assignment, assessment system and overall management of the grade. Observation allows gathering data on the physical setting, human setting, interaction setting and programme setting.

Interview for Student

Information that attempts to measure the attitude or belief of an individual are known as opinion or attitude scale. One set of interview was developed as an instrument for the collection of needed information which was used for girl students. These are the girls participation in mathematics at university level:- early marriage of girls, parental belief system, public image, girls daily activities, gender difference, social environment or culture norms, school environment or school related condition, home environment and political and institution policy practices etc. It is assumed that these variables are already established and they could influence the girl participation in mathematics at university level.

Interview for teacher

Which is the process of communication or interaction in which subject or interview gives the needed information verbally in a face to face situation. There are

many types of interview; especially direct interview was conducted with respondents in this study. In this study, on the basis of the objectives I developed the interview guidelines about to find-out low participation of girls in mathematics at university level.

Quality Standard

Prolong engagement in the field; triangulation was use to maintain the quality standard. After completing the construction of the research tools, it is necessary to maintain quality standard. For the quality standard the reliability and validity of data were maintained by the following techniques:

Triangulation

Triangulation is a method to get an accurate and reliable picture of situation. The researcher was trying to understand by collecting different kinds of information from different perspective, from different sources and with different tools. Here I used data triangulation where the data were obtained from the class observation, interview with teacher, students and parents. This helped to mention reliability of the data interpretation.

Prolong Stays in the Field

For collecting the data I stay fifteen days in a field in which the mathematics classroom was observed. I took colleges from Kathmandu district where the different social background students can be found. Interview was taken for few days and school documents (teaching method and materials) were collected for few days. In the field which I saw and found were taken as the data for research. So I claim that the reliability and validity of the data.

Data Collection

The aim and purpose of data collection is to gather real descriptions of related field in order to produce clear and accurate descriptions of a particular aspect of human experiences (Creswell, 2003). The data collected through above mentioned tools from different respondents and sources was processed in different steps. Firstly the data from interview in the tape recorder was transcribed in Nepali in note book. Then after, it was translated in English in computer. Two different folders were created for each collage. Under each folder, separate files were created for each respondent. The writing and reading of transcripts allowed me to generate common codes, patterns and themes as well as the issues that have been anticipated. The text data - the sentences and paragraphs from transcripts of different respondents were then coded with the specific term or concept that it reflected. Further these coded sentences and paragraphs that expressed similar meaning were segmented into common categories. Finally after revising those categories, smaller specific themes in line with the research questions were generated.

Method of Data Analysis

Miles and Huber man suggest that good qualitative data analysis has to be systematic and intensely discipline. For the purpose of analysis, the themes were analysed for answering the research questions. The sentences under the themes were paraphrased or quoted as stated by individual participants. The important paraphrases with same meaning were brought together and summarized to support the argument whereas less relevant passages with same meaning were skipped for the case of analysis. Then after, with the help of theories the analyzed texts were interpreted and summarized. Thus, analysis of the statements from the specific themes were done and theories were used to interpret the meanings, values, experiences, opinions and

behaviour of respondents from the analyzed themes and answer the research questions. In a qualitative research the researcher was collect the data from the participants and display them for analyzing and interpreting. The data can be reduced during the interpreting and check their validity by using the different corresponding theories. Finally the data should be verified and conclude according to the data display sheets and chart.

To my interest, the experience and responses of the girls meant a major theme for my study. My inquiry based on the principles of auto-ethnographic research has helped me in developing research questions and then selecting the research fields and respective respondents for the study. This also helped me to come close to the subjective experiences of the girls directly through interaction with them as well as the attitudes, beliefs and judgment of the boys, teachers and parents towards girls. My observation also allowed me chart out networks between teachers, students (boys and girls) and their families, which allowed for relevant insights on the attitudes, organizational structure and social hierarchies in school. The interview and informal interactions with my respondents have helped me triangulate data. Then after, with the help of theories the analyzed texts were interpreted and summarized.

The data analysis and interpretation part has divided in two sections on the basis of research questions. The first section discusses about causes of girls low participation in mathematics at university level. And second section discusses about socio-cultural dimensions influence the participation of girls in higher level mathematics education.

Chapter- IV

ANALYSIS AND INTERPRETION

This chapter deals with various forms of social culture practise that create discrimination between men and women in higher education. Being a mathematics student, I have focused in this chapter on mathematics education. In this chapter, I have tried to address my research question in two sections. The first section discusses about causes of girls low participation in mathematics at university level. And second section discusses about socio-cultural dimensions influence the participation of girls in higher level mathematics education.

The culture of preference to son's is translated in thinking that son's remain in the family and are expected to support parent in their old age, where as daughters marry, normally in their mid to late teens and become members of another family. Social-cultural norms and practices have a huge impact on everyday forms of discriminations against women. UNESCO (2002) states, "cultural and social beliefs, attitudes and practices prevent girls from benefiting educational opportunities to the same extent as boys" (p.21). Brock and Cammish (1993) state "a major deterrent to family take up and follow through of educational opportunities to a near universal fundamental culture bias in favour of males". The patriarchal social structures girls' early marriage and early pregnancy or pregnancy, motherhood duties and household works affect the participation of girls and women in formal education. The purpose of my research is to find out the cause of low participation of female in highly level mathematics. Being a female have recently completed my master degree classes in mathematics education. I have a series of experiences of girls low participation in mathematics classroom from class nine to master's degree which I have mentioned in

the beginning paragraphs of chapter one. Here, I have included participant's views also on the concerning topics: Female participation in higher level mathematics education.

Section 1: Causes of Girls Low Participation in Mathematics at University Level

This section discusses about causes of girls low participation in mathematics at university level. The following are the causes of girls low participation in mathematics at university level.

Parental Belief System and Girls Higher Education

Parmar, Harkness and Super (2004) state parent's culture belief system influence on the organization of children's environment of learning and development. In the society with strong family values, parent are the key person's of a family, whatever they decide about their children becomes applicable to their children so, their understanding and education level is likely to influence their children's learning and development process .Unsurprisingly Nepali society is much more influenced by patriarchal system in which the men decide everything and the woman and rest of the family members listen or accept it as an order. Indira (translated by Buhler, 1886) states that woman must be honoured and adorned by their fathers, brothers, husbands and brother-in-law who desire their own welfare (p.41). Neither child's voices are heard nor are they allowed to parents opinions, especially if they are girls so, it can be said that daughters education is also guided by her father at home. Along this line, Teacher A said:

“When I completed grade ten my father said, As a daughter, you have taken basic education. It will help you for reading and writing letters in future. You will stay in this home one or two years, and then you will get married and have to go other home. If so, why to read more ?Now you stay at home looking home and support your mum as well Fortunately I am here in this level” (June 3rd, 2016).

As a female researcher these statements made me mad because I had not expected such experience from her and thought about the rest of the females, who couldn't get chance to complete even their school education. I can inform that many other females are likely to have the same experience like Ramila. Even if they got chance to study higher education, they would not be free to choose the subjects according to their interest. They were guided by their brother, father and husband if they are married. Of course, parents are becoming more conscious regarding daughter education but a huge mass has still negative impact towards daughter's education. In this regard, Student A said,

“Parent thinks that daughter is matter of sending to others home and daughter in law (Buhari in Neoli) is a person for household work but not for study. They have the concept that basic education is sufficient for them. For example, parents send their sons abroad for study but they do not want to send their daughter and daughter-in-laws to the colleges of Nepal for their higher study. They also send their sons to good private schools but sent their daughters in government or community schools” (Jun 4th, 2016).

The stories of the participants and my own experiences portray the same phenomenon that sons are more preferred to daughters. The Himalayan Times (July 25th, 2016) refers to a recently published Department of Education report showing the lower number of girls students in private schools than that of boys, while in community schools, girls number is more than the boys. Parents are guided by the beliefs that their sons should be admitted to private schools whereas girls place is public schools. Thus, it has deprived many girls of having quality education as generally held perception is that private schooling has been better than public schooling in terms of quality learning environment and prospects of further study. Unlike this Student B made me reflect on the nature of parental thinking prevailing in our society:

“Parents believe that basic education is sufficient for girls. They think that Marriage of daughter is their greater responsibility than their study. That’s why parents focused only on girl’s household work rather than study” (Jun 16th, 2016).

This statement indicates that parents do not give more priority to daughter’s higher study than their son’s. They think that basic education is sufficient for daughter and household works are more preferable. UNICEF (2001) shows that although attitudes towards the education of girls have begun to change even in traditional societies, many parents still believe that investment in a girl’s education is wasted when she is simply going to be married and work in another household. Own experience

“I am from western terai belt. Early marriage is the feature of western Terai. I was nearly married off when I was in after pass out SLC. Not only my parent but also lots of parent think that if money is invested on daughter’s education especially higher education then how to arrange dowry for her marriage? That’s why? Invest money on daughters education is unproductive and valueless” (Jun 3rd, 2016).

These statement help me to realize that parent have the fear of daughters dowry system for their marriage and they do not want to invest money to make their daughters educated, indeed this situation reminds me of Arundhati Ray’s 1997) writing which critique the commodification of women. Similarly, the parents think that investing money and daughters are the matter of sending others house.

In this regards, feminist argue that patriarchal society prepares the girls for the subordinated roles both in public and domestic life, with boys/men leading the upper posts and taking major decision. In educational area, they have argued that girls are not only disadvantaged in the educational system but also learn to be subordinate and to accept dominant ideologies of femininity and masculinity. Sharma (2000) also

shows that socially and culturally, females are not given freedom of mobility. Boys are allowed to go outside the house any time, even away from home for their education, but most parents still do not allow females to go out of the home alone. The cultural rationalization is also supported also by religion, is that a son is required to perform the last rites of parents when they are dead, parents who do not get these ritual services for want of a son do not receive salvation (shrestha et al. 1990). This shows that parents provide more preference economically and culturally to their male child than their female child. Such cultural beliefs create discrimination towards female education in the family. And Pant (2009) shows that the girls scoreless in mathematics than the boys. The major reasons are less participation of girls in classroom, working more at home, difficulties in the process of socialization for girls and due to the physical problems of the girls during the adolescence period. There was a strong belief that mathematics cannot be learnt by girls. There are no more female mathematician and mathematics teachers. The psychological effect was also one of the causes that lead the girls towards the low achievement in mathematics.

Female Teacher and Girls Higher Level Mathematics Education

In the context of Nepal, there are a few women teachers in educational institutions (school, colleges and university). The study shows that the presence of women teachers in school boosts the confidence of parents, encouraging them to send their daughters to school, especially in rural and conservative areas. These female teachers are likely to act as role models for girls students. They can also be supportive factors to create girl-friendly environment in schools. A research study by UNESCO (2006) shows the positive correlation between the number of women teachers and girls' enrolment in school. But due to lack of sufficient qualified women, there are very few female teachers in school and colleges.

In this topics, I discussed on the female role models and their influence on girl' higher education. In the same way, Teacher B Said:

“In school days, society blamed me unnecessarily. There were no any qualified females who could support me in learning. But now everybody gives me respect. Now I am a role model in my village. I do encourage my junior sisters to develop their confidence in higher study and often say, “I could, why can't you” (June 18th, 2016)?

Teacher B believes that social system and perception towards girls' education can be changed if there are female teachers in school and colleges. They are likely to feel secure and encouraged from the female teachers. I found similar opinion. In the same context, Anita said;

“Girls have to face family tension. They have family responsibilities and are bounded by the family rules and regulations. Nepalese women do not have freedom like women in develop countries. There is no place and no person to share their problems and difficulties regarding their study” (June 18th, 2016).

Anita perhaps thinks that due to lack of sharing and caring persons, they face different problems in the society and they do not get proper encouragement to go into the academic field. If there are more female role models in the society, the female participation may be more in higher study because female teachers understand female problems better than male teachers. UNESCO (2006) states that husband and family members feel comfortable to send their girls to school with women teachers.

Similarly, Own experience

“I found very few female lecturers or professors participating when there is mathematical training, programs and classes. There shouldn't be lots of female mathematics teachers and mathematician as role model in our society.

Due to lack of female role models, girls are discouraged to study mathematics in higher level” (Jun 19th 2016).

Consider that society is not interested in investing money on girl’s education as they have to be someone’s. Parents are unaware of the benefits of girl’s education. If the teacher is female, the society can realize the importance of girl’s education. There are very few women teachers in schools and colleges and they are few found in position of authority and leadership. Because of the low status or position in colleges, their voices are excluded of the female teacher. There need to be sufficient number of women teachers in the academic field. Hence, policies and program need to focus on recruitment of female teachers in the universities and colleges.

Early Marriage and Girls Higher Level Mathematics Education

In Nepal 40% of girls are married by the age of 15. Too often, marriage is seen as a high priority than education (UNESCO, 2002, P.21). Early marriage, early pregnancy and motherhood responsibility, household work and duties are other aspects for the girls with deprived them of getting the higher education. In this line, Student Anita said

“It’s difficult to manage career and household works for girl after marriage. It is difficult to manage the time for study and other responsibilities at the same too. Though there are sufficient voice of gender equality and equity, there are very few cases that husband helps his wife in household work. Now I am a jobholder. For me, it’s difficult to manage time for study, childcare and household work. It’s really challenging for girls to manage the time after marriage.” (Jun 16th, 2016).

From Anita’s opinion, it shows that marriage and time factor are directly related to each other. Due to lack of time and household work, females cannot

continue their study after marriage. It can be said that if girls did not get married till the completion of their higher study then it would be easy to develop their career and continue their study as well. Otherwise, they need to play double role as being student and housewife at the same time which is very difficult for the women. In this regards, Teacher B said;

“Early marriage is a problem for low participation of girls in higher level study. Though I got married in matured and capable age, I and my husband, are involved in job. Whenever my husband comes from the office, he says that he is tired and he sits on a chair. But I have to do all the household work and have to prepare the subject matter which I have to teach in class. So after marriage, it is difficult to manage time for study for a woman” (Jun16th, 2016).

Though both husband and wife are capable and educated, females are engaged themselves more in household work and child caring than their male counterpart. This could be a key reason why females cannot develop their career property and cannot continue their study. Because of environment at home after marriage, girls can not develop their personality and professional life. In this line, Student Kamala said:

“Daughter is taken as an object of sending other’s house. After marriage, girls have to face family domination and she cannot do anything without family permission. Next thing she has to play double role as a housewife and as a job holder. If she has a husband having good understanding regarding her study and career, then she can do further for her career. Also, after marriage, a girl has motherhood responsibility too. If her family is not supportive then female has difficulties to develop her career and give cares to her children at the same time” (Jun 16th, 2016).

It shows that the girls seem to follow the rules of their husband and other family

members after marriage. If she has a supportive husband on household work and career, it can be easier for her to continue her study and can develop her career too. But due to lack of time, it seems that to study mathematics is difficult for almost all the females till higher level. Student Yoshna shared her idea in such a way:

“When I was in grade seven, parents forced me a lot for marriage.

Fortunately, I got the chance to study till intermediate level. If I was married at grade seven, I would not get chance to study SLC level either. Mathematics is a time consuming subject. But after marriage it is difficult to manage time for study due to household responsibility. Next thing there is also child care responsibility. That’s why it is difficult to continue study after marriage” (Jun 20th, 2016).

This statement shows that when girls are in their school age, most of them have fear of marriage. Fortunately, some girls get chance to study till SLC. The tradition seems that parents start to search the candidate for her marriage. After marriage, girls seem to face many problems like, family preventions and restriction, pressure of the household works and so on. So, they are forced to drop out the study and have to prioritize the household work, husband care, child care rather than their own study. Own experience;

“People think that daughter in laws (Buhari in Nepali) should not go out from home for study and job. They should not talk with strangers especially males and they are just for household work. That’s why parents do not want to sent their daughter in laws to college and working place after marriage. So, early marriage is a problem for low participation of girls in higher level study.

Though I got married in matured and capable age, I could not support from my husband in my household work. We both, I and my husband are involved in job and students. Whenever my husband comes from the office, he say that he is tired and he sits on a chair. But I have to do all the household work and

have to prepare the subject matter which I have to teach in class. So after marriage, it is difficult to manage time for study a woman” (Jun 18th, 2016).

In this matter, a study by Brock and Cammish (1993) show that a major deterrent to female take up and follow through of educational opportunities is a near universal fundamental cultural bias in a favour of males. The widespread operation of patriarchal system of social organization; of customary early marriage; of the incidence of early pregnancy, of heavier domestic and subsistence duties of females; a generally lower regard for the value of female life that affect the participation of girls and women in formal education. Also a research carried out by U.S. Department of Education (USDE) (1997) suggest that while women are just as likely as men to go to college immediately after high school, from the start they are less interested in majoring in mathematics and science. Although women tend to major in different subjects than men in college, some of these differences have narrowed over time. Sharma (2000) also found that socially, culturally and religiously, females are pressured to take care of the husband and family. The parental house is a temporary home for females. Therefore, parents prefer to get their daughters married off rather than support her career. After marriage, performing the dual role of mother/wife and student it would be difficult for them to manage time.

Section 2: The Socio-cultural Dimensions

This section discusses about the socio-cultural dimensions influence the participation of girls in higher level mathematics education.

Public Image of Mathematics and Girl’s Higher Level Mathematics Education

The term of ‘image’ is defined as some kind of mental representation of something, organized from past experience as well as associated beliefs, attitudes and conceptions (Sam, 1999). In the context of my analysis images of mathematics can be

understood as mental representations or views mathematics constructed as a result of social experiences including school, parents, peers, textbooks and other resources. I come to know through Ernest (as cited in Sam, 1999) that many people's images of mathematics negatively via the metaphors of mathematics as cold, abstract, many cultures, largely masculine discipline. For my study, I talked to the participants. From their opinions I found there is the social image that mathematics is a difficult subject which is only for intelligent one. It is also male dominated subject. While talking about the female and higher level mathematics education with my participants, Student Ramila said;

“Till now, there are a very few ladies who have get higher education in mathematics. More teachers are male. When I got problem in mathematics, I used to go to the teacher. So, I faced many unnecessary blames due to bad social belief system. Whenever, I entered grade nine, even my teachers including head teacher also suggested me not to choose optional mathematics. They told me that as a girl, I could not study mathematics. There was no friendly culture for learning mathematics indeed in my days” (May 16th, 2016).

From this view, I can say that girl's face different social problems due to negative image of people regarding mathematics. There is boy's preferable culture and lack of sufficient women teachers in mathematics. As a result, boys are encouraged to choose optional mathematics but girls are discouraged. It also seems that teachers also have the perception that mathematics is just for male. So, there is no other way to expect the positive response from others and society. In this regard, Student Purnima said;

“There is a social belief system that girls cannot study mathematics properly. This influences on choosing mathematics subject for the girls. Still, if I talked with people, they asked about my professional subject. Then people are surprised and make their eyes big and say, “oh ho, maths”. Such belief system

is there in our society and girls could not develop their confidence in studying mathematics till higher level “(Jun 20th, 2016).

Mathematics and science have always been stereotyped as strongly ‘male’ or ‘masculine’ subject. Can it be due to the reason that most mathematics teachers in secondary school and a large majority of mathematicians were found to be men (Sam, 1999, p. 16)? Purnima’s opinion shows that our society does not believe that female also can do better at mathematics. If they hear about female mathematics teachers in higher level, they would be surprised. The main cause of is that every person is guided by social beliefs that mathematics is difficult subject and only male can do better at mathematics. Further, student Yoshna said;

“Girls are socially treated as an individual having low self esteem and confidence. Our society has the concept that they cannot study mathematics in higher level due to its complication. They also believed that girls cannot give sufficient time for mathematics which is required for it. Psychologically girls are treated weakly as mathematics is a male dominated subject. Though they want to study mathematics, they do not choose it due to such social and cultural belief systems” (Jun 20th, 2016).

Stereotypes threaten that mathematics is a hard subject. There is a belief system that girls need to learn more about the household work. Due to household work, they do not get sufficient time to practise mathematics. Thus, they cannot do better at mathematics. Own experience

“Negative impact of socially belief system of mathematics that mathematics is hard subject”. It also follows rote learning and memorizing the formulae which is decreasing the interest of female students towards mathematics. Next things, girls are not free to learn due to social and cultural barriers. For example, if a son returns home at 8pm then there is no issue of doubt, but if a daughter does the same then next time she does not get the chance to go out of

house for the study too because parents are also bounded by social boundaries”(Jun 22nd , 2016).

In this regards, Lim and Ernest (1998) argue that negative public images of mathematics might be one of the factors that has led to the decrease in student's enrollement in mathematics and science at instructions of higher education. Further they argue that mathematics is taken as a subject of male concern, a hard subject and just for a clever one. Sam (1999) also found that mathematics and science have always been stereotyped as strongly male or masculine subject. It can be due to reason that most mathematics teachers in secondary school and large majority of mathematics were found to be men.

Scholarship and Hostel Facilities for Girls in Higher Education

From the beginning stage of school, verities of program have been implemented for girl's education in nepal. Different government educational program have been targeted towards girls education. Likewise, many NGOs and INGOs individually and jointly with national advocacy and gender sensitization to uplift the position of girls and women. I have come to know that Ministry of Education has implemented various scholarships program to girls so that they could come forward in the education sector. Girls' basic scholarship scheme, each girls from class 1 to 8 to receive scholarship amount to Rs.400 for one academic session. Colleges and universities have a low number of girls in comparison to boys. There are very limited programs of scholarship for girls in higher education. In this regard, teacher A said:

“Low economic status of the family is a factor of low participation of girls in higher level mathematics education. If there would be scholarship and hostel facilities for the girls then they could easily get chance to study in city taking major subject of their choice. Government policies and visions are good regarding female education but implementation is poor. There should be

effective implementation regarding girls education. Girls education program are more focused on school level especially secondary education but higher education doesn't seem preferable" (Jun 3rd, 2016).

Referring my experience, girls need to go far from their village or hometown because of economic and cultural reasons. But due to residential and expenditure of the study problem parents cannot sent their daughters far from house for their higher education. If there would be some facilities for the girls regarding their higher mathematics then they could college in the city and could study of their choice. School education is more prioritized but higher education is not focused till present. Along this line, Student A said:

"To increase the number of female in higher level mathematics education, there should be scholarship and supportive environment for the female in colleges and universities. There are some policies and programs but not propel implemented" (Jun 4th , 2016).

Scholarship and other supportive environment for the female in colleges or universities can be a key to increase number of girls in higher education. Own experience

"33% reservation seats for girls are allocated for every sector but there is no effective implementation though population of female is more than 50%. Still I have not taken any benefit from this policy. Education plays the key role in quality of life for every person. Such reservation seats should be implemented properly in female higher education also. There should be scholarship program for female to increase the enrollment rate in higher education. Due to economic problem, many girls could not continue their study till higher level though they have an interest in study" (Jun 24th 2016).

Girls Daily Activities and Their Experiences

I had requested the girls, what work we do? Why need we do that work? Which work we liked and why? Which work we did not like? These activities were asked own self. The purpose of this activity was to understand detail forms of discrimination practiced against them, who were involved in such discrimination, their perception on doing certain tasks and how did we react towards discrimination. I understood that gendered role was dominant in everyday life of the students. Almost all of the girls we had to do the household chores. Our day would begin with getting up early in the morning at about 6, preparing tea, then meal, cleaning dishes, doing homework if I have some time, getting ready family food and husband for office and child. Then we went to college , attended classes, returned home, make Tiffin or lunch for family members after arriving home , if I have free time I wrote my homework and revision my course on text book, in evening time to take full responsibility of preparing dinner. After finishing dinner, I have to clean dishes and kitchen and then only I got time to do study if I were not tired. Finally I went to bed after finishing all those duties and responsibly. This was the general pattern of everyday life of majority of girls .Unless there was special occasion or ceremonies or festival in the house this was my usual routine. Moreover, the girls' part of work was loaded when we stay at home. Saturday also was usually spent cleaning room thoroughly washing clothes, cleaning around the house and bathing, child caring, sometimes shopping and visiting the park with family. Thus, only little time would be left for our study.

In this chapter, I introduce the socio-cultural dimension in my research study. They were `parental belief system, early marriage, public image towards mathematics and girls daily activities and experience. Then, I interpreted the information that I obtained from the participants.

Chapter-V

FINDINGS, CONCLUSIONS AND IMPLICATIONS

This chapter provides findings of the study, conclusions and implication in briefly..

Findings

When, I select my topic for my research study. I had no idea about the research and many questions arose in my mind. My supervisor suggested me to start writing in narrative depicting my experiences of the past days. I remembered those days of choosing optional mathematics in class nine and class eleven. I had seen the low participation of female students in mathematics up to the master's level. Observing such scenario of my life, many questions were raised in my mind and I started thinking a lot about the reason behind it. These questions were my research questions at that time. To get the answer to my questions I had gone through some reports, journals and articles from which I made some ideas which were helpful for my study. Further, I took some ideas from seniors who had completed their research works, teachers and friends.

Initially, I tried to look into existing perception on women's higher level mathematics. I visited three college of Kathmandu valleys to find out the exiting practice of women's enrolment in higher level mathematics. I also browsed websites of different Journals, books, articles, news flash and reports to find out the existing practices on girl's higher level mathematics. Reading different related materials, I realized that there is a need to study the participation of girl's in higher mathematics. So, I prepared some interview guidelines and went to the field. At that times, my mind was guided by a question how socio-cultural dimensions influence girl's higher

education. Keeping the relationship between socio-cultural dimension and girl's higher mathematics in my mind, I conducted interview with my participants on the basis of the guidelines. Following were the major findings of this study;

-) From the existing practices of the women's higher mathematics, disparity between men and women was found in the participation rate.
-) It found that socio-cultural dimensions like, parental belief system, early marriage, public image of mathematics and the stereotyped threats like mathematics is hard and only for man and lack of female role models was causing the low participation of girls in higher level mathematics education.
-) The patriarchal social structure and more preference given to boys are creating inequity and inequality in the case of girls' higher education.
-) The next influencing factor on girls' higher education is early marriage. Though marriage is taken as an essential aspect of life in Nepalese society, but early marriage itself is a barrier for the women's higher education.
-) Exploitation and oppression of women on grounds of tradition, superstition, and conservative beliefs are contributing to unequal treatment between sons and daughters.

Conclusions

From the existing practices of the women's higher mathematics, disparity between men and women was found in the participation rate. There were different factors creating such disparity in the participation of higher mathematics. Socio-cultural dimension is one of them. Every society has its own norms, values and rituals. I found that socio-cultural dimensions like, parental belief system, early marriage, public image of mathematics and the stereotyped threats like mathematics is

hard and only for man and lack of female role models was causing the low participation of girls in higher level mathematics education.

The patriarchal social structure and more preference given to boys are creating inequity and inequality in the case of girls' higher education. Exploitation and oppression of women on grounds of tradition, superstition, and conservative beliefs are contributing to unequal treatment between sons and daughters. Daughters also cannot decide themselves regarding their education either in higher or in school level. As the parents are the key persons of the family, each and every decision of them depends upon their parents. Thus, there are very few females in higher education, especially in mathematics education.

The next influencing factor on girls' higher education is early marriage. Though marriage is taken as an essential aspect of life in Nepalese society, but early marriage itself is a barrier for the women's higher education. Such social system makes the girls play dual role in her life being a caring person and a student and professional. But the social belief system does not favour daughters' or daughter-in-laws' education. So, women are discouraged to go to colleges or universities and cannot continue their study though they are enrolled in the academia.

Looking at different social practices, Nepalese society is male dominated society and there is the tradition that mathematics is just for males. There is an image in the society that mathematics is hard and time consuming subject, which a lady cannot study. From the interaction with my participants, I found that they were also discouraged to study mathematics from their secondary level. Due to lack of supportive environment of the society and the family members, girls lose their confidence to study mathematics in their higher study. If there were a few female role

models in the society, other girls could be motivated to study higher mathematics.

Thus, there is low participation of girls in higher mathematics.

Implications

Every study has implications in different sectors. This study also has its educational implications, which are as follows;

-) It is helpful to know that socio-cultural dimension has a huge influence on females' higher education.
-) Parents should invest and pay attention toward their daughters' higher education and make favourable home environment for learning mathematics.
-) Different kinds of awareness programs regarding girls' higher education need to be launched in the society. Parents and girls themselves need to be aware of the importance of education. Social representatives also need to give their concern on girls' higher education for social development and wellbeing.
-) Colleges and Universities need to focus on girls' hostel facilities, scholarship provision and other types of facilities to increase the number of girls in higher level mathematics.
-) There is also a need of female teachers' recruitment in colleges and universities. If female teachers are recruited, they can play as role models for girls. In this respect, gender sensitization program can also be launched in the society.
-) It is helpful for teachers, students, researchers, institutions, educationist, curriculum designer and policy makers.

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APPENDIX – A**Observation Area**

- Observation of classroom.
- Interaction between students- students, teacher- students.
- Learning environment in home especially of key respondents.
- Teachers behave toward student in teaching learning process.
- Teachers teaching style.
- Students and teacher social values.

APPENDIX-B

Interview Format

Name.....

Date.....

Qualification.....

Gender.....

Experience as a Teacher.....

Cast/Ethnicity.....

-Interview Guidelines:

-Teaching methods

-Use of assignment

-Impact of girls in learning mathematics

-Learning opportunities

-Languages problem in instruction process

-Special treatment provided to girls students

-Role of female teacher in increasing the good learning for girls in classroom.

-Student attraction

-Relation between girls and learning mathematics.

-Effective teaching methods.

-Classroom discrimination

-Factors that influemethe learning mathematics.

Interviewer.....

Date.....