Chapter I

INTRODUCTION

Background of the Study

Mathematics plays an important role in the development of science and technology as well as every human discipline. It helps people to understand and interpret very important quantitative and qualitative aspects of living and natural phenomena. In this modern age, understanding, and interpreting every discipline, the stage of mathematics is essential. The importance of mathematics is related from primitive age people to the modern age. Mathematics has been utilized to solve the difficulties arisen from natural calamities, political purpose, economic planning and other social events. In the ancient period, most of the mathematical structures, rules, formulae, etc. were the outcomes of empirical mathematics. But now, empirical (practical) mathematics has been developed into abstract mathematics theory. "Oriental literature reveals that mathematics was originated from practical experiences (Eves, 1982: p. 22). Without knowing mathematics now, it is very difficult to understand other disciplines such as chemistry, physics, social sciences, economics, etc. Thus, mathematics is intimately involved in every movement of everyone's life and every discipline of human civilization. It is accepted as the heritage of human civilization.

Nepal is a multiethnic, multilingual and multi-religious country. The Central Bureau of Statistics has identified 126 caste and ethnic groups in Nepal, 12.18% of whole population as Dalit (CBS, 2011). Secondary level is foundation of mathematics; it creates premise for higher study. In the context of Nepal, Dalit is generally known for poor and uneducated background people. Dalit students are identified as having specific learning difficulties especially in mathematics but there is a divergence of views about causes and identification. The affluent high caste the same word Karma now imply socially and religiously unacceptable actions translates into fat echoing poverty, negativity, passivity and eventually untouchability" (Koirala, 1996). Also, Dalit girls faced many problems during secondary level school period. Dalit girls they suffer from triple discrimination as oppressed by the so-called high caste people which equally affects both male and female Dalit, oppressed by the

design of the Hindu patriarchal system and oppressed by Dalit males. So, their learning ability is poor and achievement is lower in mathematics (Sob, 2005).

Table-1: Achievement of SEE Result

year	Total no. of students		Obtained grade								
			A+	A	B+	B	C+	C	D+	D	E
2072	Boys	51	1	3	5	7	10	12	7	4	2
	Girls	62	1	1	3	9	7	6	15	9	10
	Dalit girls	9	-	-	-	-	-	-	1	3	5
2073	Boys	50	-	2	2	5	9	8	9	10	5
	Girls	55	-	1	1	2	-	8	16	17	10
	Dalit girls	7	-	-	-	-	1	-	1	1	4
2074	Boys	39	-	3	1	8	-	11	4	7	4
	Girls	57	-	2	2	6	3	18	13	8	5
	Dalit girls	5	-	-	-	1	-	1	-	1	2
2075	Boys	34	-	2	1	6	11	4	3	4	3
	Girls	41	-	-	2	3	8	13	7	4	4
	Dalit girls	4	-	-	-	-	1	-	-	1	2

(Source: SEE Examination Statistics (B.S. 2072-075), Shree Achane Secondary School, Tripurasundari-07, Khahare, Dhading.)

From this table, SEE result of Achane Secondary School, Dhading was satisfactory and result of girl students was quite satisfactory. But the SEE result of Dalit girls was very poor which affects the whole results of SEE.

Statement of the Problem

This study was concerned with the study of difficulties in mathematics at secondary level of Dalit girl students. So, it is appropriate to discuss about the learning difficulties faced by Dalit girl students to improve in learning mathematics. For learning mathematics, various factors like previous knowledge, home environment, school environment, physical facilities, attitude towards mathematics, classroom interaction, and discrimination affects girls as well as being Dalit communities. (Yadav 2017)

In 2019 August 7, on the occasion of distribution of permanent appointment to the secondary level school teachers, the Head of Education Development and Coordination Unit(EDCU), Dhading said, "total sixteen hundred students fill up the form to participate the supplementary examination of SEE. Among them fourteen hundred students are going to attend the mathematics subjects''. Then in 2019 August 8, I met officer of education section of Tripuarasundari Rural municipality, Dhading and the head teacher of Achane Secondary School Tripurasundari -07, Khahare. The head teacher said, "mathematics results of SEE Examination for several year is not satisfactory, among them every year about 10% Dalit girl students participate to SEE but hardly 10-15% passed the examination".

I also found that Dalit girl students were weak in subject matter while evaluating myself. They were not interested to interact with their classmate and with me. They were not punctual in school, there seemed to be irregularity. So I was interested to study difficulties of Dalit girl students in learning mathematics.

Objectives of the Study

The objectives of this study are as follows:

- To find the areas of difficulties in learning mathematics of Dalit girl students.
- To find the causes of difficulties faced by Dalit girl students in learning mathematics at secondary level.

Research Questions

To address the objectives of this study, following research questions are formulated:

- What are the area of difficulties in learning mathematics of Dalit girl students?
- What are the difficulties faced by Dalit girl students in learning mathematics at secondary level?

Rational of the Study

Every research is important in itself because it give details of various unseen facts in any area of study. Most of Dalit girl students are poor in mathematics. The present research is significant as it explores the factors, which contribute to the difficulties faced by Dalit girl students in learning mathematics. This helps to improve the mathematics teaching status to reduce failure in mathematics among Dalit girl students. Following are the justification of the study:

- This study would help teachers, educators, local activist, curriculum planner, and related agencies to improve in learning mathematics.
- This study would help to encourage and motivate the participation of Dalit girl students in learning mathematics.
- It provides the appropriate information about difficulty in learning mathematics.
- This study would help further research in the areas of difficulties in learning mathematics faced by Dalit girl students.
- This study would be helpful for students to be aware of the main problems of the mathematics to adopt necessary strategies to reduce difficulties.

Delimitation of the Study

Delimitation of the study was concerned with the limitation of time, financial resources and material. Following were the delimitation of the study:

- The study was delimited in Tripurasundari Rural Municipality, Dhading only.
- This study was conducted to only government school.
- This study included the Dalit girl students of grade X only.
- This study was based on one secondary level school of Dhading district.
- This study was conducted only for the subject of compulsory mathematics.

Definition of Related Terms

Difficulties

In this study, difficulty is defined as the status or situation that causes problems for Dalit girl students in learning mathematics because of previous knowledge, home environment, interaction etc.

Dalit

According to Nepali dictionary, "Caste or group of people who are unable to get equal rights prestige, proud in the society, exploited and disadvantage caste or group of people due to unequal social system. Person or group of people who are socially, economically, culturally and politically disadvantaged (i.e. Paninachalnejaat) is known as Dalit. Here, the term Dalit refers to the students who are religiously, culturally, socially, economically and historically oppressed, excluded and treated as untouchable communities who have to face discrimination in different forms whether be it in school or society.

Government School

In this study, government school means which is fully funded by the government of Nepal.

Students

In this study, the term students stands for those Dalit girls students who were studying in grade X of Achane Secondary School, Tripureswor, Dhading.

Parents

In this study, the 'parents' means father, mother, brother, sister and other guardians of Dalit girl students studying in Achane Secondary School, Tripureswor, Dhading.

Secondary level

In this study, Class IX to XII in the school system of Nepal is considered as secondary level.

Causes

Causes mean those problems, which affect mathematics learning of Dalit girl students in secondary level.

Chapter II

REVIEW OF RELATED LITERATURES

In this section, I describe the literature to related to this are classified two types Empirical and theoretical. A literature review is an important source of the further research study. It helps to researcher better perspective and essential for guidance for the research plan. I have reviewed some kinds of literature, which are related to my study.

Review of Empirical Literature

A brief summary of previous researches and writing of recognized exports provide evidence that the researcher is familiar with what is already known and with what is still unknown and untested. The review of related literature should conclude with the summary of area agreement and disagreement in findings.

Sharki(2019) conducted a study on “Causes of difficulties in learning mathematics of Dalit girl students at basic level” among 5 Dalit girls at Bhanu Higher Secondary School, Paharilotar, Bharatpur Chitwan. The study was qualitative in nature. The objectives of the study were to find the causes of difficulties faced by Dalit girl students in learning mathematics at basic level and to explore the mathematics learning environment of Dalit girl students at home and school. Semi-structured interview and observation were used as a tool. The main findings of this study were Dalit financial condition is not strong enough to send their children at school and afford them in their future education. Most of the parents of Dalit girl students are illiterate and their children are usually used as means of earning money for their simple livelihood and being uneducated family caused their children can't get good guidance and motivation in the home to do homework and practice of mathematics subject.

Sunar (2017) did research entitled "Mathematical disposition of basic level students" in which the researcher explored the contextual effects associated with classroom and school that may be related to self-concept and achievement. Current literature suggests that educators try to enhance self-concept and skill development simultaneously. The researcher used mixed method (qualitative and quantitative). In this study, the researcher took 8 schools as samples among different schools of Kathmandu district. The mean and median score were used to investigate the mathematical disposition. According to the analysis of the difficulties in mathematics of this thesis, problem is higher when based on the test instead of grades. Grades in

turn have a stronger impact on self-concept. Implications of literature suggest the separation and focus on the specific domain that is known to directly affect because the correlation between the self-concept and students problem is higher for nonrelated subject.

Yadav (2017) conducted a study on "Difficulties faced by Dalit students in learning mathematics" among grade-X students in Shree Adarsha Secondary School of Nawalparasi district. The research was qualitative in nature. The objective of the study was to explore the difficulties faced by the Dalit students in learning mathematics. For this research, researcher has selected 65 students. Observation and interview were used as a tool to identifying the learning difficulties in mathematics. The study found that the learning environment plays vital role in better performance in learning mathematics. The lack of proper environment at school has created the difficulties in learning mathematics.

Ghimire (2013) conducted a study on "Difficulties of student in learning mathematics". This study based on descriptive survey design. The objective of this study was to find the difficulties of Bote students in learning mathematics at lower secondary level. This research was qualitative in nature. The study was conducted with sample size of four Bote students of grade VII of Tanahu district. Face to face interview with students, parents, mathematical teacher, head teacher and the observation was taken. Such collected data were analyzed by using thematic categorization and interpreted. According to cultural difference and discontinuity, theory finding of the study show that, there is cultural difference and discontinuity at school and home. There is discontinuity in language, poor relationship with entire teacher's low participation in classroom discussion and poor interaction with the teachers. Bote socio-economic and financial condition is not enough to send their children at school and afford them in further education.

Lamichhane (2012) studied on the topic "Causes of girl's difficulties in mathematics learning at secondary level". The objective of the study was to find the causes of difficulties faced by girl students in learning mathematics at secondary level. This study was conducted with the sample size of five girl students. The research was qualitative in nature. The researcher adopted the case study method. Different tools such as semi-structured interview and observation form were applied to identify the learning difficulties of girl student. The conclusion of this research was in home environment parent's education, poverty, gender bias, lacks of study hour,

behavior of the parents were the causes of girl's student difficulties. The motivational factor is poor. The mathematics teacher does not motivate the girl students rather they discourage them. Moreover, their own passivity while studying and low confidence also hampers the learning. So, at last but not least we can claim that so many factors like socio-economic factors, environment teacher's ill treatment students' own faults have affected the learning mathematics regarding the girl students.

Chanda (2009) did a study on "Factor affecting the achievement of secondary girl students in mathematics at Baitadi district." The main objectives of this study were to determine the personal factor and physical factors that affects the girl's mathematics achievement and to measure the correlation between affecting factors and mathematics achievement. For this purpose researcher has selected 40 students by random sampling method of the academic year of 2008. The data of sample student were obtained through the student questionnaire form. A study found that mathematics achievement of girl students are found to be strongly as associated with the peer behaviors, self-confidence and practice of learner. The teacher's behavior, home environment, interest of learner and motivation has low positive correlation with mathematics achievement of girl student. But school environment, classroom environment and motivation have negative effect in mathematics achievement of girl students.

Rijal (2008) conducted a study on “Difficulties in learning mathematics.” A case study of Rana Tharu in Kanchanpur district. The objectives of this study were to identify the difficulties in learning mathematics of Rana Tharu students at lower secondary level and to identify the causes of difficulties. This study was based on qualitative in nature. The study was conducted with the sample size of five Rana Tharu students of Grade-VI. Face to face interview with students, parents, mathematics teachers, head teacher and the observation was taken. The collected data were analyzed by using mathematics categorization and interpreted according to the cultural difference and discontinuity at school and home.

Luitel (2005) did a study on "A study of learning difficulties area in mathematics of grade VIII for deaf students." The objective of the study was to identify the difficulty in arithmetic and to locate areas as to relate them to their cases. The students were chosen sample random process; observation and interview were used to identify the learning difficulties in mathematics. The study concluded that deaf student had the fundamental knowledge of mathematics but in academic course

they were feeling difficulties in learning mathematics (arithmetic) because of various reasons such as to develop clear concept on verbal problems, to generalize the learners concept, to understand the language association, limited vocabulary in mathematical words, fast forgetting to discriminate the condition of the situation. These difficulties are not only due to their problems but due to lack of supportive environments such as teaching methods instructional materials, social interaction and their place in the family and the society.

Mathematics is a complex subject including different domains such as arithmetic, arithmetic problem solving, geometry, algebra, probability, statistics, calculus, … that implies mobilizing a variety of basic abilities associated with the sense of quantity, symbols decoding, memory, visuospatial capacity, logics, to name a few. Students with difficulties in any of these abilities or in their co-ordination, may experience mathematical learning difficulties. Understanding the cognitive nature of the various mathematical domains, as well as the mechanisms mediating cognitive development, has fascinated researchers from different fields: from mathematics education to developmental and cognitive psychology and neuroscience.

The field of cognitive psychology has a long history in the studies of cognitive difficulties involved in developing the representation and learning general use of numbers in mathematics (e.g., Campbell, 2005). However, as Fletcher et al. (2007) note, there are “no consistent standards by which to judge the presence or absence of LDs [learning difficulties] in math” (p. 207), and there is still disagreement concerning the question of a definition, operational criteria, and prevalence (Lanfranchi et al., 2008; Mazzocco, 2008). In general, the term Mathematical Learning Difficulty (MLD) is used broadly to describe a wide variety of deficits in math skills, typically pertaining the domains of arithmetic and arithmetic problem solving. We will use MLDs to refer to learning difficulties in these domains as well as other mathematical domains like the ones mentioned above.

Within the field of mathematics education, many frameworks and theories have been developed to analyze teaching and learning processes and difficulties involved with these and other mathematical tasks (e.g., Freudenthal, 1991; Schoenfeld, 1992, 2011; Bharath and English, 2010). Recently, the field has shown interest in perspectives from cognitive neuroscience (e.g., Grabner and Ansari, 2010).

Although developmental and classification models in these fields have been developed (for example, Geary and Hoard, 2005; Desoete, 2007; von Aster and Shalev, 2007), to our knowledge, no single framework or model can be used for a comprehensive and fine interpretation of students' mathematical difficulties, not only for scientific purposes, but also for informing mathematics educators. As mathematics educators1, we believe that reaching a model that combines existing hypotheses on MLD, based on known cognitive processes and mechanisms, could be used to provide a mathematical profile for every student.

Our aims with this contribution are to: (1) provide an overview of the most relevant hypotheses in the present day's literature regarding possible deficits that lead to MLD and of possible classifications of MLD subtypes; (2) and to build on such literature, using a multi-deficit neurocognitive approach, to propose a classification model for MLD describing four basic cognitive domains within which specific deficits may reside.

In order to reach our first objectives we will describe the current hypotheses on neurocognitive deficits that may lead to MLD specifically related to numbers, and then we will provide examples of the most relevant classifications of MLD, based on a possible deficit in basic cognitive functions. (Karagiannakis et al.,2014)

Review of Theoretical Literature

The theoretical discussion is needed for the interaction of the findings of the study. There are many theories about the learning and development of children such as cognitive, behaviorist, humanist, and social constructivism and so on. In this chapter, the researcher discusses the theoretical framework for the studies what would support the significant of causes of difficulties in learning mathematics of Dalit girl students. Low intelligence, teaching material, different class size, activities of teacher and students in the class, home environment were more causes of difficulties in learning mathematics. As a consequence, students learn poorly in class and ultimately they have no option except dropping out from their schools.

Social Constructivism Theory

Vygotsky has developed socio-cultural theory and he believed that children are active seeker of knowledge. This study is mainly related with Vygotsky's theory of constructivist approach to learning mathematics. 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. It helps to find out difficulties in learning mathematics. Vygotsky (1978) states every function in the child's cultural development appears twice: first on the social level and later on the individual level; first between people(inter-psychological) and then inside the child (intra-psychological).An accessible, introductory volume that provides a good summary of Vygotskian core concepts, including the sociocultural genesis of human thinking, a developmental approach to studying human thinking, and the power of cultural mediation in understanding and transforming educational practices. Well written and worth a look (Moll, 2014). The objectives of Vygotsky's theory are:

- To motivate the learner for learning.
- To emphasize on previous knowledge, previous experience and students' capacity for learning.
- To emphasize on both personal and grouping teaching method.
- To teach mathematics effective by interaction method.
- To emphasize on cooperative learning (scaffolding method).

While studying causes of difficulties in learning mathematics of Dalit girl students, Vygotsky’s social constructivism theory mainly guide previous knowledge of Dalit girl students for mathematics learning, teacher’s teaching strategy in classroom, student’s interaction in teaching learning activities and how we can motivate the students in learning mathematics.

Critical Race Theory

Critical race theory (CRT) is a school of thought meant to emphasize the effects of race on one's social standing. Critical race theory refers to a broad social scientific approach to the study of race, racism, and society. Kimberlé Crenshaw and Derrick Bell popularized the notion of critical race theory within the subfield of critical legal studies in the 1980s.Critical race theory (CRT) is a theoretical

framework in the social sciences that uses critical theory to examine society and culture as they relate to categorizations of race, law, and power. A collection of critical stances against the existing legal order from a race-based point of view (Brooks, 1994).

The notion that race is a social construct essentially means that race has no scientific basis or biological reality. Instead, race as a way to differentiate human beings is a social concept, a product of human thought that is innately hierarchical. Of course, this does not mean that there are no physical or phenotypical differences between people from different regions of the world (Bodenheimer, 2019). Race has historically been, and continues to be, a significant issue in all aspects of American society. In the field of education, racial inequality is prominent in the areas of access, opportunity, and outcomes. CRT is a framework that offers researchers, practitioners, and policy-makers a race-conscious approach to understanding educational inequality and structural racism to find solutions that lead to greater justice. Placing race at the center of analysis, Critical Race Theory scholars interrogate policies and practices that are taken for granted to uncover the overt and covert ways that racist ideologies, structures, and institutions create and maintain racial inequality.(Paula G, 2001)

Central to critical race theory is that racism is much more than individual prejudice and bigotry; rather, racism is a systemic feature of social structure. Given that racism is so deeply embedded in social structure, Bonilla-Silva argues that racial inequality often gets misrecognized as a natural process rather than a by-product of a system of racial domination (Bonilla-Silva, 2015). Also, he has redeveloped the tenets of CRT to the following:

- Racism is ‘embedded in the structure of society’.
- Racism has a ‘material foundation’.
- Racism changes and develops over different times.
- Racism is often ascribed a degree of rationality.
- Racism has a contemporary basis.

Dalit students are religiously, culturally, socially, economically and historically oppressed in the context of Nepal. Participation of Dalit people on policy making level is very low. So the policy of our country couldn’t address their needs and voice. Most of Dalit students are economically poor. They can’t buy educational material properly, so it directly affects to their learning mathematics.

Feminist Theory

Feminism is theory that men and women should be equal politically, economically and socially. Feminist theory is a major branch of theory within sociology that shifts its assumptions, analytic lens, and topical focus away from the male viewpoint and experience and toward that of women. In doing so, feminist theory shines a light on social problems, trends, and issues that are otherwise overlooked or misidentified by the historically dominant male perspective within social theory (Crossman, 2018). Feminist theory is one of the major contemporary sociological theories, which analyzes the status of women and men in society with the purpose of using that knowledge to better women's lives. Feminist theories have also started to question the differences between women, including how race, class, ethnicity and age intersect with gender. Feminist theory is most concerned with giving voice to women and highlighting the various ways women have contributed to society.

There are four main types of feminist theory that attempt to explain the social differences between men and women. They are described below:

Gender Differences: Some feminist theory provides an analytic framework for understanding how women's location in, and experience of, social situations differ from men's. For example, cultural feminists look at the different values associated with womanhood and femininity as a reason why men and women experience the social world differently. Other feminist theorists believe that the different roles assigned to women and men within institutions better explain gender difference, including the sexual division of labor in the household. Existential and phenomenological feminists focus on how women have been marginalized and defined as “other” in patriarchal societies. Some feminist theorists focus specifically on how masculinity is developed through socialization, and how its development interacts with the process of developing feminity in girls (Crossman, 2018).

Gender Inequality: Feminist theories that focus on gender inequality recognize that women's location in, and experience of, social situations are not only different but also unequal to men's. Liberal feminists argue that women have the same capacity as men for moral reasoning and agency, but that patriarchy, particularly the sexist division of labor, has historically denied women the opportunity to express and practice this reasoning. These dynamics serve to shove women into the private sphere of the household and to exclude them from full participation in public life. Liberal

feminists point out that gender inequality exists for women in a heterosexual marriage and that women do not benefit from being married. Therefore, the sexual division of labor in both the public and private spheres needs to be altered in order for women to achieve equality in marriage (Crossman, 2018).

Gender Oppression: Theories of gender oppression go further than theories of gender difference and gender inequality by arguing that not only are women different from or unequal to men, but that they are actively oppressed, subordinated, and even abused by men. Power is the key variable in the two main theories of gender oppression: psychoanalytic feminism and radical feminism. Psychoanalytic feminists attempt to explain power relations between men and women by reformulating Freud's theories of human emotions, childhood development, and the workings of the subconscious and unconscious. They believe that conscious calculation cannot fully explain the production and reproduction of patriarchy. Radical feminists argue that being a woman is a positive thing in and of itself, but that this is not acknowledged in patriarchal societies where women are oppressed. They identify physical violence as being at the base of patriarchy, but they think that patriarchy can be defeated if women recognize their own value and strength, establish a sisterhood of trust with other women, confront oppression critically, and form female-based separatist networks in the private and public spheres (Crossman, 2018).

Structural Oppression: Structural oppression theories posit that women's oppression and inequality are a result of capitalism, patriarchy, and racism. Socialist feminists agree with Karl Marx and Freidrich Engels that the working class is exploited as a consequence of capitalism, but they seek to extend this exploitation not just to class but also to gender. Intersectionality theorists seek to explain oppression and inequality across a variety of variables, including class, gender, race, ethnicity, and age. They offer the important insight that not all women experience oppression in the same way, and that the same forces that work to oppress women and girls also oppress people of color and other marginalized groups. One way in which structural oppression of women, specifically the economic kind, manifests in society is in the gender wage gap, which shows that men routinely earn more for the same work than women. An intersectional view of this situation shows us that women of color, and men of color, too, are even further penalized relative to the earnings of white men.

In the late 20th century, this strain of feminist theory was extended to account for the globalization of capitalism and how its methods of production and of

accumulating wealth center on the exploitation of women workers around the world (Crossman, 2018).

Nepal is male dominated country. Female are oppressed by male historically. Female are limited only in kitchen and house work for a long time. Almost Dalit students are facing so many problems such as workload, gender inequality and parents also discriminate to their daughter than son. Historically and structurally Dalit girl students are oppressed by their society as well as parents.

Conceptual Framework

This was a case study, tried to identify causes of difficulties in learning mathematics of Dalit girl students at secondary level. The following framework in difficulties in learning mathematics was purposed for this case study.

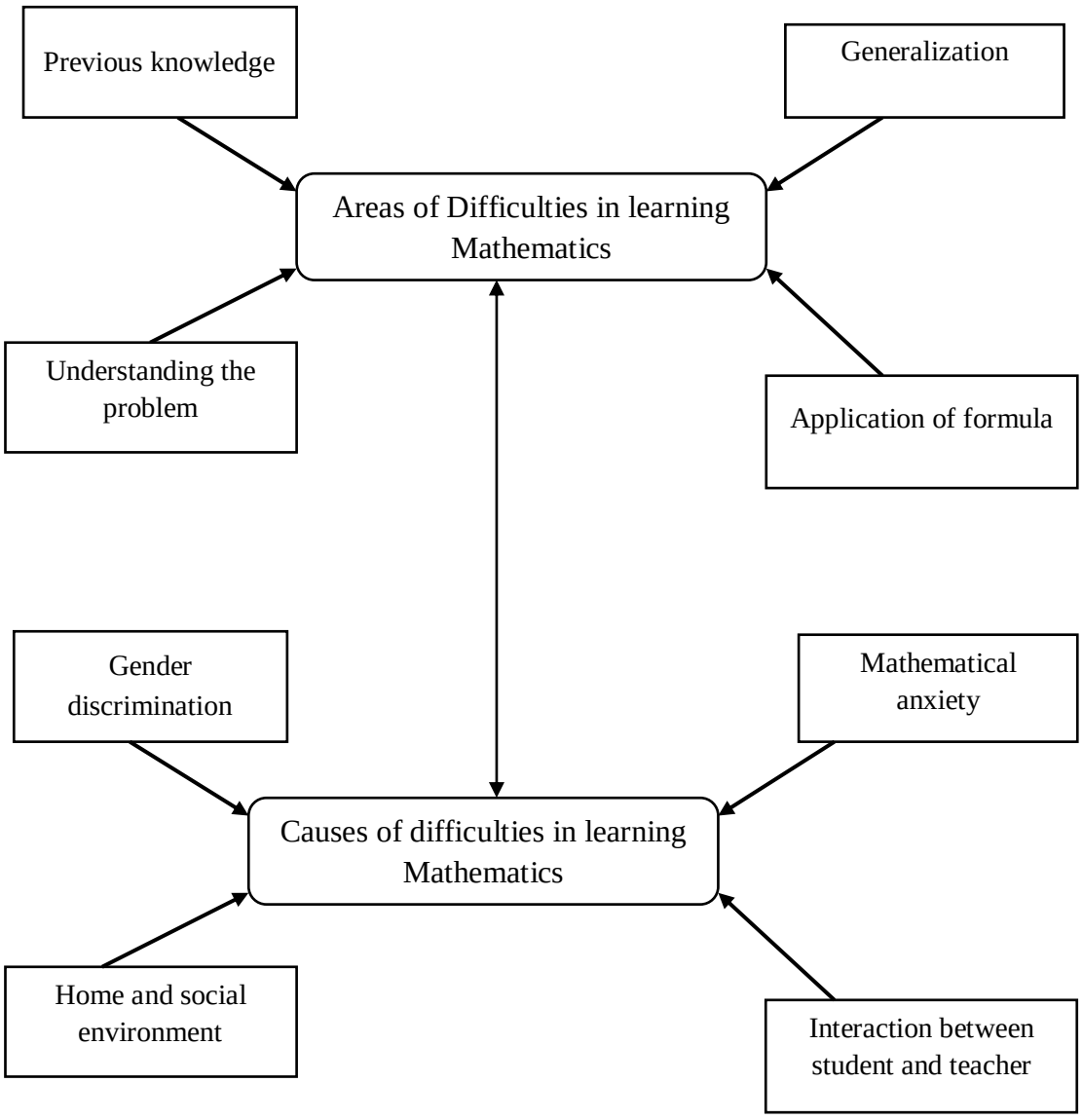


Fig.1.1 Conceptual framework of difficulties in learning Mathematics

Source: A model for "Causes of difficulties in learning mathematics of Dalit girls students at basic level" by unpublished master's thesis of Sharki;(2019).

In the context of Nepal, most of the girls have to prepare the meal, look after sibling, cleaning and sweeping and all the household activities. As result, they don't have much time to study and sometimes they are unable to attend the class because of heavy workload in house. Social and cultural believes, practice and attitudes of often do not favor girls in their pursuit of education to the same extent as a boy. Traditions of early marriage, discrimination, social norms are social factors which affect in learning. Social environment reflects belief and tradition of the social communities and delighting the relation among the parents, student and teacher. Generally, in our schools all the students kept in single class or group and taught whether they are very talented and weak. The teacher use lecture method rather than interaction method. So that, those students are weak in the mathematics and unable to learn mathematics properly (Lammichhane, 2012).

School is the second home of the child. The teachers, students and parents are the components of the school. School environment reflects belief and tradition of the school community delineating the relation among parents, students and teacher. Scholarship to the teacher, extra class provided, appropriate teaching method and equal chance for boys and girls in all activities are the major aspect of school environment (KC,2009).

Home environment reflects the parent's education, economic status and learning opportunity at home. Culture and Customs reflects home culture and culture of society. Teaching learning process reflects teaching method, learning opportunity at school and interest of learner (Yadav, 2017).

The above review of the literatures concluded that achievement in mathematics learning of the student was weak belongs that community who are backwards in socio-economic condition. Also, they recommended for further study in same context and less study are doing in related to Dalit community. Especially, Dalit girls have more problems in learning mathematics. So, it would be required to research the causes of difficulties in learning mathematics and to identify reality of the situation of Dalit girls in learning mathematics, this study had carried.

CHAPTER - III

METHODS AND PROCEDURES

To carry out the research work, methodology plays the central role because without methodology the researcher cannot fulfill the objectives. I had followed the methodology to fulfill the objectives of the research topic.

Design of the Study

This is a qualitative research. This is case study related to the difficulties of Dalit girl students in learning mathematics at secondary level. This study has adopted case study. Dalit girl students were case of this study.

Site Selection

This study was related to learning difficulties in mathematics of Dalit girl students located at Tripurasundari-07, Dhading because of poor educational condition and backwardness in every aspect of their life. Some of their children do not attend any educational institution yet. Therefore, this research has focused on identifying the cause of difficulties learning mathematics of Dalit girl students. I selected site purposively, selected only one school of Dhading district. It was Achane Secondary school. Since I teach in this school, I had decided to do the research work because I know the school environment, student behavior and social environment nicely.

Selection of Case Respondents

The respondents of the case study were Dalit girl students. The sample units were selected purposively. There are no rules for sample size in qualitative researcher (Anderson et.al 2001, p. 123). So, the sample size of the inquiry depends up on the researcher. What he/she wants to know, what is the purpose of the inquiry, what is the credibility of the study and what will be done with available time and resources. Since this study is qualitative research. From the school only four Dalit girl students who are weak in mathematics were selected for this study.

Data Collection Tools

Data collection is the most important part of the study. For the study, I used following tools to collect the necessary information.

Mathematics Achievement Test

I had conducted a mathematics achievement test to all students of grade X with including questions related to different areas of mathematics and related to previous knowledge. The mathematics achievement test was used to find out the causes of difficulties and areas of difficulties in learning mathematics.

Class Observation Form

The class observation form made by researcher on the basis of requirement/necessity of research was used to observe the difficulties in mathematics learning in classroom practices. The researcher observed the activities of the key respondents in their class, school using the pre-established observation form.

Semi-structured Interview

Interview is the process of data collection from face to face with interaction. Interview is a two-way interaction between interviewer and interviewee. In interview, interviewer creates situations that can attract the attention of respondents for enough period of time in asking questions and answering the questions which interviewee put his/her understanding and meaning.

I took the semi-structured interview on the basis of the second objective i.e. to find out the causes of difficulties in learning mathematics, which was related on the topic; girl's workload, learning environment of school and home, teacher and students activities in the classroom, interpersonal relation and mathematical content. I had taken interview with case students, parents of those case students and mathematics teachers on their experiences, opinions, feelings and knowledge. And the interview guidelines are given in appendix.

Data Collection Procedure

The data collection is the most important part of the study on the basis of the data we can study and analyze every aspect from the good techniques. For this study the data and information were collected by using tools as mathematical achievement test, direct observation and interview. I had adopted the case study of children with interview and direct observation to get the data for the research study. Personal case study, their experience, feeling works, study time, family background, education condition etc. in the study and held interview with their parents and mathematics teacher for the collection data.

Procedure of Data Analysis

The areas of difficulties were analyzed on the basis of previous knowledge, skill of generalization, understanding level of problem and application of formula. Areas of difficulties were categorized into conceptual difficulties and procedural difficulties as explained in conceptual framework.

The analysis of class observation and interview was thematic in nature. The collected data was categorized according to the category of the respondent. The

categories are key students, mathematics teacher, head teacher and parents of the key students. After those different themes such as: prior knowledge, application of formula, mathematics anxiety, interpersonal relation, home and social environment, interaction between teacher and Dalit girl students at classroom was given in the text of interview and observation. Then I began with the detail analysis of the data and equally analysis and triangulation form. The data was interpreted by using the conceptual understanding of the study developed in literature review and Vygotsky's social constructivism theory, critical race theory and feminist theory.

Chapter - IV
ANALYSIS AND INTERPRETATION OF DATA

Introduction

Qualitative research is multi-method in focus, involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts – that describe routine and problematic moments and meanings in individuals' lives. (Denzin and Lincoln 2005)

This chapter included the analysis and interpretation of the study. The collected data were analyzed in terms of previous knowledge, understanding the problems, application of formulas and generalization of knowledge on the basis of mathematics achievement test and gender discrimination, home environment, interaction between student and teacher and mathematics anxiety on the basis of class observation and semi-structured interview to the case students, their parents, mathematics teacher and head teacher. The mathematics achievement test was taken to find the areas of difficulties of mathematics. There were some pre-structured questions asked in the interview and observed the classroom activities for data collection. The descriptive method is mainly used in this research. The researcher has attempted to calculate the study by describing and analyzing the information acquired in the research process.

The researcher minutely studied the school documents such as; mark ledger, attendance as well as the other activities of Dalit girl students. Also, the researcher had observed mathematics classroom, behavior, activities and interaction with mathematics teacher in this research. Each activity and behaviors of the Dalitgirl students and teacher were carefully observed and noted. The semi-structured interview was taken to the focused Dalit girl students, their parents, mathematics teacher and head teacher and noted carefully.

Introduction of case students

The respondent students were Dalit girl students of grade X. They were from Dhading district. Those students were low achiever in mathematics. The brief description of case students is given below:

Respondent-A

Respondent-A was of fifteen years old girl studying in class X. She lived in Tripurasundari -07, khahare. It takes about 15 minutes to reach her house from school. There were five members in her family. Her father was in the traditional profession of making iron utensils and mother was housewife. The economic condition of her family was weak. Since her family was uneducated and poor so she had done hard work in the house and field. Before the school time, she was busy in cooking foods and caring small brothers. Due to this reason she was not able to finish her homework properly. When the researchers was in his house, she said " I felt difficulties in learning mathematics because there is not enough time to practice and there is no seniors in our family to guide me to teach mathematics ."

Respondent-B

She was a sixteen years old girl studying in class X, was born in Tripurasundari-07, Masar, Dhading . She was younger sister in her family. Her family's economic condition was quite good but her parents were uneducated and her elder sister and brother were literate only. Her father was ambulance driver. Her sister was married. Her brother and sister-in-law live apart from her parents. Mother was sick so all the housework was in her head.

She was average in study. She was poor in mathematics. She didn't like mathematics subject. She didn't have proper time to practice and repeat. Cooking in the morning and evening and cutting grass for cattle was her daily routine. She studied at night by arranging time. She wanted to try to do mathematics homework but rarely completed because of lack of time. She thought mathematics is the very difficult subject comparison with other subjects.

Respondent- C

Respondent- C, one of the Dalit girl students, studying in class X and was seventeen years old. There were four members in her family. His brother also read in class X in same school.

Her father used to drink alcohol daily. The father abused and beaten the mother. She said that "due to such reason I feel deep pain in my mind. There is such a situation at home, I like to read but what to do?" She has raised broiler to earn money. She should give water and grains three times in a day. She was so interested in singing. She had amazing voice. She had a big dream to become a singer. All the responsibilities of the house were on her shoulders. Her brother didn't pay attention to household works, so she didn't have enough time to do homework and to practice mathematics. She couldn't go to school regularly. Upper caste classmates do not respect her in the school and society. According to her mother, they were more worried about her marriage rather than continuing her study.

Respondent- D

She was fifteen years old girl studying in grade X. She became scared as soon as she listen the word mathematics. She couldn't get good marks in mathematics in any previous classes. Her brother had passed +2 level. He encouraged to attend good marks in mathematics. She used to try to solve mathematical numerical but didn't get successes. There was problem of mathematics anxiety in her mind. She was very brilliant in other language subjects. She was just became passed in mathematics subjects in previous examination. She obtained fifth position in class.

She had enough time to practice and to recall the mathematics concept and numerical but she was not able to obtain good marks in mathematics. She listened carefully to her teacher but she was afraid to raise a question whatever she didn't told that it was very scary to get up and ask questions to the teacher in classroom.

From the above introduction of case students it could be summarize that students were felt mathematics as difficult subject for themselves. There was mathematics anxiety in their mind they had no proper time to recall the mathematical concepts. They were not interested to interact with teacher and their classmates. Because of unsupportive home environment, they couldn't finished the homework

properly. They have poor previous knowledge of mathematics. So they couldn't learn mathematics properly.

Areas of Difficulties in Learning Mathematics

Mathematics achievement test and semi-structured interview were used to explore the area of difficulties of Dalit students in learning mathematics. There were so many causes of difficulties faced by Dalit girl students in learning mathematics. These difficulties have been collected with the help of related literature, theory, mathematics achievement test, class observation, semi-structured interview with case students, mathematics teacher, head teacher, their parents and related documents from school. Such variables are described as follows:

Mathematics Achievement Test

I had taken mathematics achievement test to find out the cases of difficulties and areas of difficulties of Dalit girl students. The test had fifty full marks from different domains of objectives. After taking the mathematics achievement test, it was indicated that there was scope of difficulties such as mensuration, algebra, trigonometry and geometry.

I had explored the areas of difficulties in dealing with major two themes, i.e. conceptual difficulties and procedural difficulties. Conceptual difficulties mean problems in understanding the principles and interrelation between pieces of knowledge. Procedural difficulties means problem in action sequences for solving problems. Conceptual understanding plays an important role in procedural adoption.(Bethany et al., 2003, Conceptual and Procedural Knowledge of Mathematics). Lack of prior knowledge, lack of mathematical contents like: definitions, theorems, operations, symbols, formulas and principles are dealing with conceptual difficulties and understanding the problems, connecting the definitions on solving problems, process of writing, applications of formula and generalization dealing procedural difficulties in this study. From the mathematical achievement test and semi-structured interview, I had declared areas of difficulties.

From the mathematics achievement test it was found that there was lack of prior knowledge of mathematics of Dalit girl students. They didn't have proper knowledge of mathematics content. Dalit girl students didn't understand the mathematics problems properly. They knew some formula but couldn't use those formulas when required. They felt uneasy to transform the knowledge one situation from another situation. There seemed problem to generalize the mathematics knowledge and content. They didn't have proper knowledge of mathematics content, like: fundamental definitions, theorems, operations, symbols, formulas and principles. So researcher concluded that respondent student had conceptual difficulties in mathematical learning.

There seemed procedural difficulties also. Respondent students were confused to apply the formula whatever they knew. They felt uneasy to transform the knowledge from one situation to another situation. There was also problem to understand the mathematics problems and to generalize the mathematical knowledge and content.

From semi-structured interview, the researcher found that respondent students felt mathematics as difficult subject. One of the respondent said, *"There is no use of own creativity, mathematics demand exact formula and exact method. Geometry, mensuration and LCM, HCF is very hard for me. There are many formulas in mensuration. I felt confusion where and how to apply appropriate formula to solve the problem."* Respondent views indicates that she felt formula related to mensuration is very confusing and difficult. She didn't know how to apply the formula properly in solving problems.

"I felt confuse in LCM and HCF. In algebra it is use in everywhere. So, I felt very hard to solve algebraic problems. Formula related to algebra also very difficult to remember. So, it would not have been chapter algebra in mathematics."

Student view

After collected the data and information from mathematics achievement test and semi-structured interview with Dalit girl students, the following areas were identified on difficulties in learning mathematics:

- Previous knowledge

- Understanding the problem
- Application of formula
- Generalization

Previous Knowledge

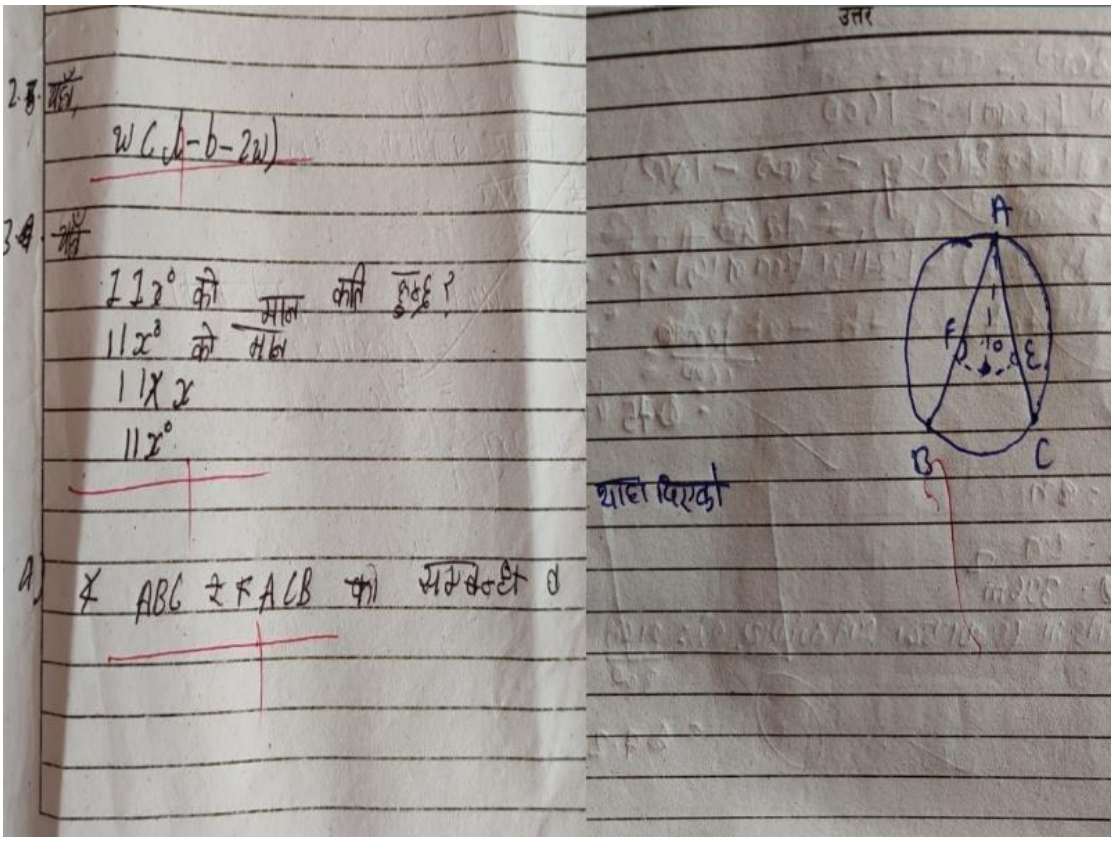
Previous Knowledge in mathematics was measured in terms of skills in equation solving, term identification, next step, equivalent expression and error identification. From the mathematics achievement test, the researcher identified that the prior knowledge of Dalit girl student was seemed to very poor. Students became confuse to general rules of mathematics like multiplication, divide, fraction, simplification, taking LCM and general concept of geometry. Students had written wrong answer almost of question because of lack of previous knowledge. The relation ofbase angles of isosceles triangle was studied in class eight but Dalit girl student's answer was not correct. Due to this reason they could not solve very short question and they were unable to prove theorem also. The researcher found that Dalit girl students had lack of prior knowledge which is necessary to solve mathematics problems properly.

In the interview one of the respondent girl students said, *"My sister also never passed the mathematics subject and my brother also suffered a lot from the mathematics in the SEE examination. I am also worried about not being able to pass mathematics for several years. I never understood until today such contents like fraction, rationalization, lowest common multiple and geometric theorem."*

Her views reflected that she had lack of prior knowledge of mathematics. She was not able to know the concepts that she had to learn in the previous classes which directly affect her today's mathematics learning. Basic concepts like multiplication, divisions, rule of fraction, lowest common multiple, theory and definition related to geometry are also very difficult concept to her. So it was seemed that case student had lack of previous knowledge.

In classroom observation, I found that respondent students were passive and silent. They only wrote what the teacher writes in white board. They couldn't give

right answer while teacher asked very easy question to them. They were also unable to solve problem given by teacher. They were confused in basic concept of mathematics while solving the problem. So it was concluded they had not proper prior knowledge of mathematics. According to mathematics teacher, respondent girl students had not good history of result in mathematics. It was due to lack of proper prior knowledge.



Understanding The Problems

There are two types of understanding, relational and instrumental. Relational understanding as knowing both what to do and why to do and the process of learning relational mathematics as building up a conceptual structure. On the other hand instrumental understanding is simply described as rules without reasons (Skemp, 1976).

To solve the mathematics problems correctly, understanding the problems play the vital role. The researcher found that case students were unable to understand the mathematics problems related to mensuration, algebra, geometry and trigonometry.

They had seemed to poor to create idea of method of solving the mathematics problems. One of the case students was written a formula correctly but she didn't write other given information from question because she didn't understand the problem properly. There was a question related to profit and loss, students were unable to solve but they had known the relation between cost price, selling price, profit and loss. Teacher should be careful to the students to increase the power of organizing the information according to mathematical concepts and identifying the relevant solution properly.

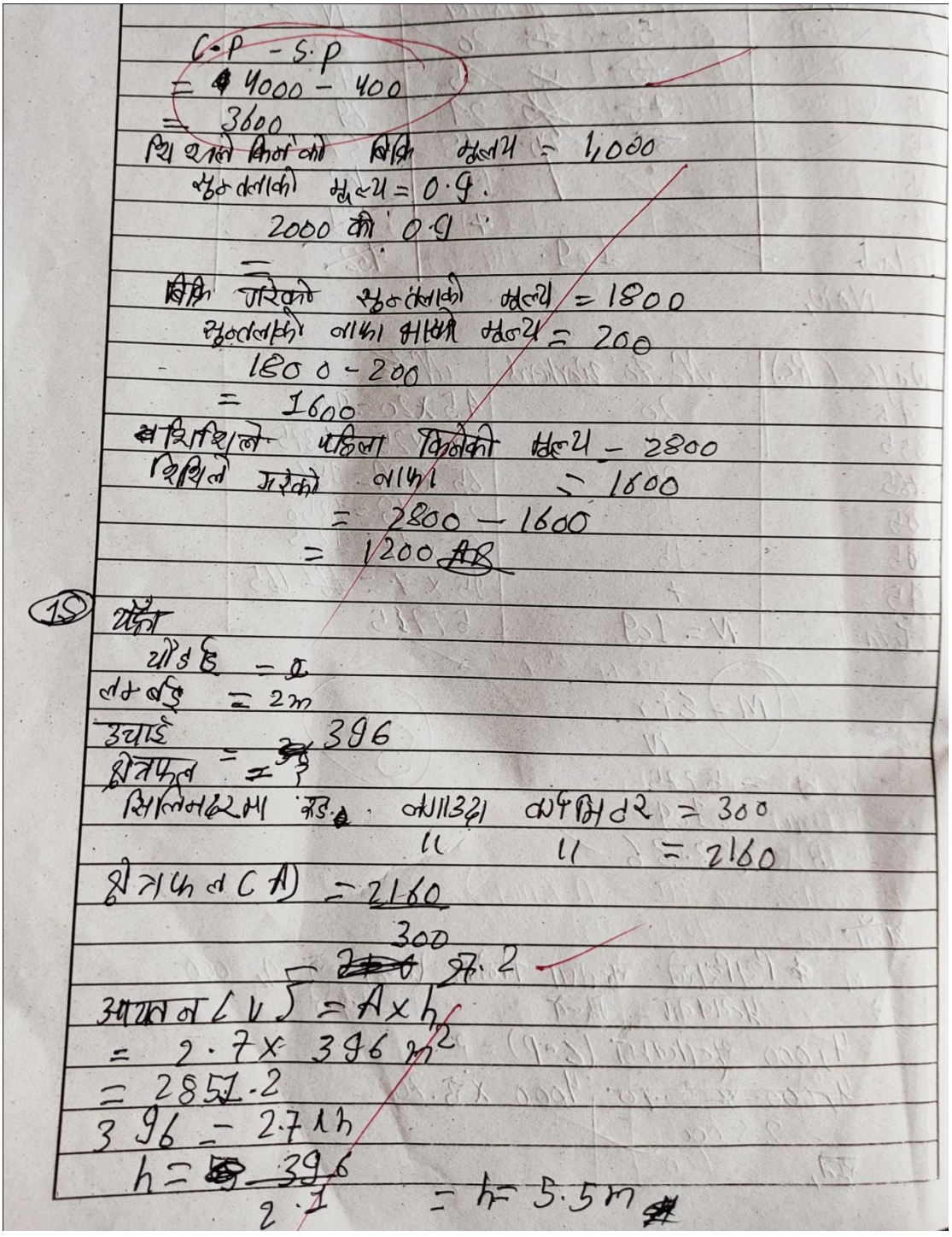
"I wish I could get good marks in mathematics but I didn't understand why and how to solve mathematics problems. In every mathematical problem, there is different way in order to solve the problems, it made me confused. On other hand I couldn't understand the questions also."

Students view

"The respondent didn't pay much attention to understand the concept and numerical problems. There was problem yesterday and there is problem today also."

Teacher view

From above view it could be conclude that respondent girl students had not learnt concept of mathematics in which class they was supposed to learn. So it made them very difficult to understand the concept and to solve the problem with respect to questions. In the classroom students seemed very passive. They didn't try to understand the concept of mathematics. Due to this, they were not able to solve and to understand the mathematics problem. The teacher also used old teaching method. Teacher didn't use concrete educational materials to clear the concept of mathematics to the students. It was also another reason for weak understanding level of students.



Application of formula

The formula is a fact or rule written with mathematical symbols. It usually connects two or more quantities an equal to sign. We use them to help us to solve the problem easier and faster. Application of formula is another important fact to solve the problems. Respondent students had little knowledge of formulas but there was lack of knowledge to apply those formulas properly. After mathematics achievement

test, the researcher noticed that respondent students had written some formula correctly but they couldn't able to solve problems. They were confused about what was given information in question and how to use the formula on given condition according to question. A Dalit girl student written correct formula of finding median and she also arranged the data in frequency table but she couldn't found the correct value of median. It shows that there was problem to apply the formula properly. Student had to do more practice and teacher should teach them by using concrete materials and from problems related to our daily life.

The respondent girl students had not sufficient previous knowledge of mathematics and they were unable to understand the concept and mathematical problems. They knew some formula but they were confused how to apply and where to apply such mathematical formula.

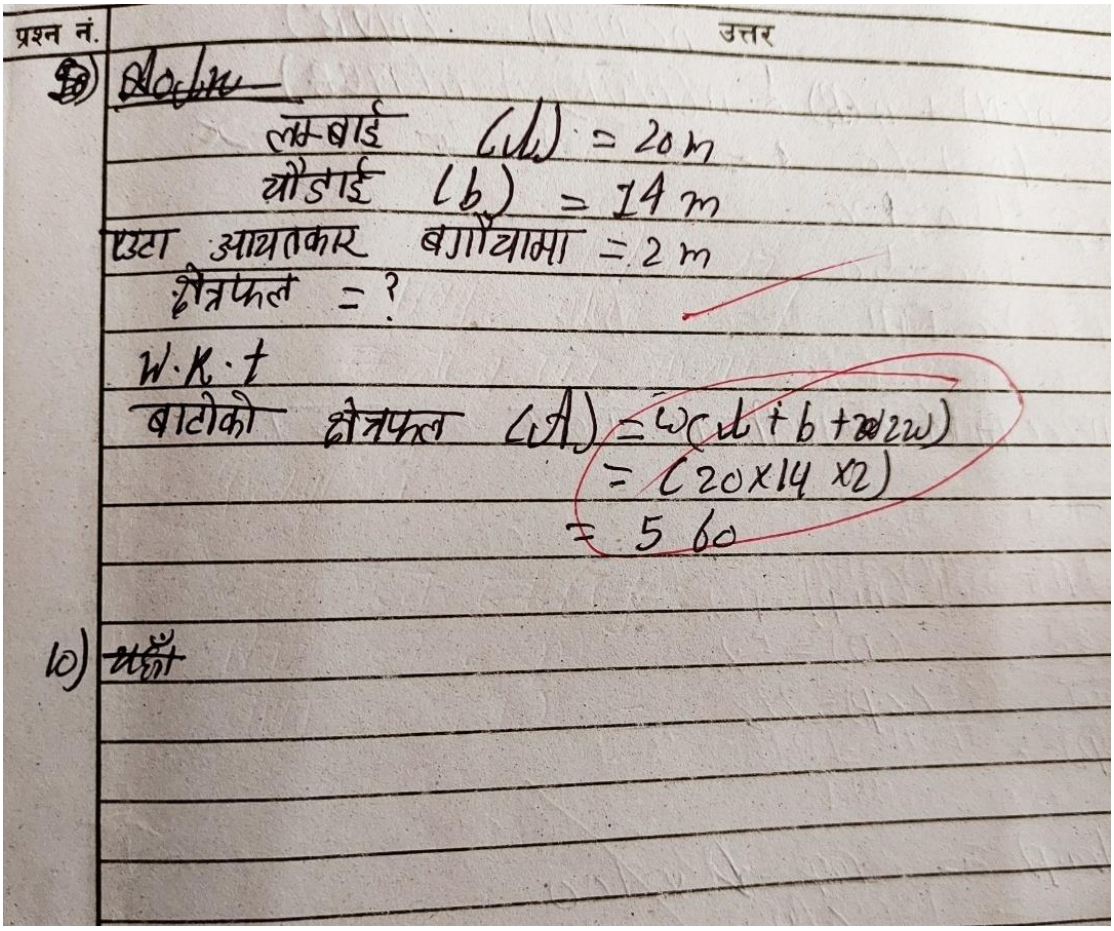
"I know some formula but i don't know how to use it and where to use it."

Student view

"Dalit girl students don't know required formula and they are totally unknown how to use it. They were not interested to learn mathematics."

Teacher view

Respondent girl students were annoying how to apply the known formula in numerical properly. Somewhere "h" indicate length, somewhere another terms. Similarly somewhere "l" indicate length and somewhere another. So it made her confused that which formula is needed to apply. In the classroom Dalit girl students weren't able to choose right formula. Girl students didn't able to put the value in the formula according to question. So researcher was found that there was a problem in application of the formula.



Generalization

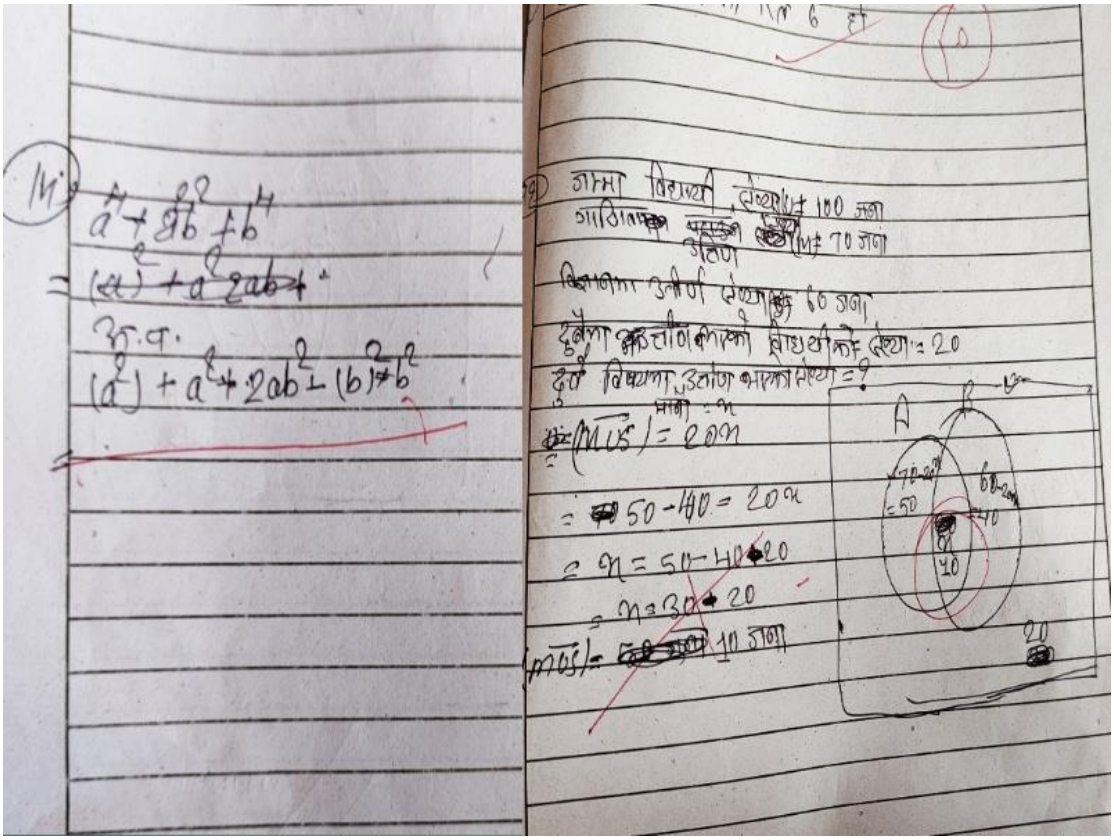
Generalization is the life hood of mathematics. In mathematics, Generalization can be both a process and product. When one looks at specific instances, notices a pattern and inductive reasoning to conjecture a statement about all such patterns one is generalizing. The symbolic, verbal or visual representation of the pattern in conjecture might be called Generalization (Mason, 2011).

Dalit girl students were not able to generalize the mathematical concept and problems. They answered correctly the problems of profit and loss related to knowledge level but they were not able to solve the problems of same chapter related to application and higher ability level. Girl students were not able to transform the mathematics knowledge from one situation to another situation. For the generalization, concept teaching best method and needed more practice in home.

Generalization is a form of abstraction which plays very important role to improve achievement of mathematics learning. From the mathematics achievement test it can be conclude that they were unable to generalize the concept of mathematics.

One of the respondent girl said that she couldn't knew where to use known concept and formula properly. Dalit girl students could not manage time to study and to solve the mathematics problems. In home they had not proper time to study and to generalize the mathematical concept. They didn't practice mathematics properly so there generalization capacity became weak.

In the classroom, teacher didn't pay much attention to Dalit girl students. Dalit girl students were seated in the last bench. They were passive learner. They didn't try to understand and to generalize the mathematics concept. Students didn't get chance to use educational materials. So it also affects them directly. Due to this they had weak perfermance in mathematics learning.



Causes of difficulties in learning mathematics of Dalit girl students

Gender Discrimination

Nepal is a highly patriarchal society and on almost every measure. Women are worse off than men. In 2016, the global gender index ranked Nepal 110th out of 144

countries for gender parity. In the context of Dalit women the socio-cultural, political, economic and educational status is at the bottom in all indicators. For example, the literacy rate of Dalit women is 17.4% when others have 57.4%. Dalit girl student are living in a precarious condition for long and still face discrimination. Another problem of Dalit girl is early pregnancy and child marriage. According to Dalit NGO federation Dalit girls who get married before reaching 15 years of age range up to 62% among Dalit girls. Dalit girls are being faces multiple forms of abuses such as untouchability and tortured with different types of violence. So, the girl student faced several types of problems at home, society and school as well. They must have been focused on work rather than boys. So, they didn't get enough time to do homework and to practice mathematics.

> *There is no meaning of education specially in daughters life because they would be limited in housework after get marriage.* (Parent's view)

From the mother's above view, it indicates that the girls are only born for housework. The opinion was also supported to them who felt that girl's education would bring no fruitful results as they had to do the same house hold chores after married.

> *I want to provide quality education to daughter but we haven't basic things to survive, there are too many difficulties to live. How can we invest time and money for her?* (Parents view)

Parent's view shows that girl students had no sufficient time for practice. They engaged with different types of works. They have to support solving the economic problems of parents. So Dalit girl student had not get sufficient time for practice however mathematics needs more and more practice to achieve good marks.

> *Our parents forced us to do the housework and other work for earning. So we can't go to school regularly and we can't have enough time to practice mathematics but our brother didn't do more housework comparing with me. My brother had gone to extra class of mathematics but I had not enough time to copy his note.* (Student's view)

From the above view, we can conclude that mathematics need more times for practice and repetition but Dalit girl students have felt lack of time for practice and to

do homework. They felt gender discrimination at home and they hadn't get equal opportunity to learn and to practice mathematics.

> *Dalit community is very near from the school but their parents hadn't came to the school. They weren't worried about their daughter's education but they used to come to school sometimes while their son was studied here.*
>
> *Teacher's view*

Teacher's view indicates that parents are not sincere to their daughter's education. They took more care for their son's study than daughters.

The main aims of feminist theory are to eliminate inequalities of rights between men and women to promote a culture of equity and to deal with the different of violence and discrimination. Feminism seeks to promote girls right to equal education. So to reduce difficulties in learning mathematics, provide equal opportunity to take extra class and equal time to do practice and to do homework in home.

Finally, researcher found that the gender discrimination in home and society directly affects the Dalit girls learning environment. Due to discrimination between son and daughter in home and society, Dalit girl students were depressed and could not motivated to mathematics learning.

Home Environment

There is psychological factor which has greatly contributed to the learning difficulties of Dalit girl students. The social practices encourage people to send their daughter to household work and sons to playground. Due to those reasons, Dalit parents were seems to fail to motivate and encourage their daughter in learning process.

> *We were hardly fulfilling our hand to mouth problem due to poverty. Our income was not enough for fooding and clothing. We are not able to buy even copies and books properly. We can't help our children to complete their work at home. It is our obligation.* (Parent's view)

Above views indicates that the economic status of parents influence to the achievement of the students. The students from higher classes can get better chances to buy copies, books, pens and to get other extra classes. Mathematics needs more practice and effort with comparison to other subjects. Dalit girl students had not get such basic facility at home.

> *We, Dalit people having very poor economic status. We have no source of regular income. So our parents forced us in farming and reconciliation. We had to do hard work for few money. Parents encourage us to earn money rather than going to school. So we are unable to go school regularly. Student's view*

Above student's view noticed that the Dalit girl had no sufficient time for learning mathematics and to do homework as well. They were obligated to engage on their main occupation i.e. farming, reconciliation and labor due to poor economic condition and unawareness of education of their parents. Above view also indicates that they were feeling oppressed by so called upper caste people. It is also the cause of poverty. This is related to critical race theory.

> *I used student centered learning strategy as much as possible. I explained the mathematical concept and problems step by step until they understand. But their home environment didn't support to their study. Because of illiteracy of parents, students didn't have proper guidance to learn mathematics. So they became very weak in mathematics. Most of the parents feel that only the school is responsible to their daughter's study.*
>
> *Teacher's view*

From the above views it was seemed that even when the teacher was trying to do better but achievement of Dalit girl students was not satisfactory. The parents didn't guide their daughters in home. They were not able to fulfill their responsibility to their daughter's education. Dalit girl students were not even able to get basic necessities like copies, books, extra classes, computer, internet and etc. The critical race theory argued that racism and power affect in learning. Since Poverty, social discrimination, unawareness directly affects learning mathematics of Dalit girl students.

Finally, the researcher found that home environment of Dalit girl students was not favor of learning mathematics. They didn't have proper time to practice. There was discrimination between son and daughter. Another important cause was parent´s negligence to their daughter's education.

Social Environment

The social environment, social context, socio-cultural context refers to the immediate physical and social setting in which people live or in which something happens or develops. It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact. The interaction may be in person or through communication media, even anonymous or one-way, and may not imply equality of social status. As we are the social being and social environment affects all our activities; the teaching and learning too has no exception of it. In general, while learning, family background, friends and other so, many factors affect it. And so is the case of learning mathematics to the Dalit girl students.

Forty-one percent of Nepali women between ages 20 and 24 are married before the age of 18. Child marriage is most prevalent among less educated, poor women. Improving female education may improve the childhood marriage rate (Borgen project, 2018).

In our society after 16/17 year, parents force to marriage to their daughter that's why to read such type of difficult subject as mathematics.

Student's view

So they could not get chance to further study. It arose "why to read if you couldn't get chance to use it. So, it discourages to learn mathematics.

Dalit are always kept far from opportunity by the state. Most of the Dalit people of parental generation are uneducated and their economic condition is poor. They couldn't fulfill the needs of their family. Dalit are uneducated person due to the lack of knowledge. They do not know about the importance of education. So they are trail in social condition. Family background plays the vital role in their children education and their success. Due to lack of knowledge and poverty, they could not able to send their children at school. Moreover the Dalit girl becomes the victim of such consequences that generally happen in poor, rural and uneducated societies.

Education is not for us. We are the people who believed in work. It helps to survive us. It is enough if they know their simple calculation and simple reading and writing skill.

Parent's view

From the above view, they are not psychologically aware for education. So they were backward of mainstream education.

Nepal has patriarchal structure. It seems that women are not given equal position in the society by males and they are continuous issues for the equal right. In Nepalese society, there is believed that son will look after in their old age. Due to these beliefs, sons are given more priority than girls. Especially, Dalit face discrimination although son and daughter are uneducated (Yadav, 2017).

Education has no proper use in daughter's life since they have to do the household works after get marriage.

Parent's view

The researcher found that in Dalit society there are great differences existing between son and daughter. Dalit girls are forced to accept discrimination and differences. Dalit girls were forced to household work, take care of small sister and brother because of their mother has been doing it, so they have to do it.

A tradition is a belief or behavior passed down within a group or society with symbolic meaning or special significance with origins in the past. There are many cultural issues in teaching and learning mathematics in the context of Nepal. Dalit girls are deprived of listening radio, watching T.V., playing games and other activities which broaden their mind. Another to do outdoor activities which increases confidence in them. There is an inborn concept about the girls that they shouldn’t be sent in outdoor activities because they can't do.

I think, to study and to have job far from home is not good for daughter. It is unsecure for them.

Parent's view

The above view indicated that parents and students were influenced by their society and tradition. It lost confidence of girls and at last they were weak in mathematics. Critical race theory argued that equal opportunity in education would ensure that students from marginalized groups would have access to the same curriculum, instruction, funding and facilities as other community's students.

It concluded that students who come from marginalized groups based on race, sexuality, social and economic factors, have more negative experiences than higher caste's students. It showed that, society and their parents were not aware to teach their daughter and teaching was necessities.

Interaction between student and teacher

Interaction is a social activity. It may be within person or a group. Interaction brings the maturity in learning. Teacher-students interaction refers to the discussing activity in classroom that impact productively on a students learning. The relationship between student and teacher plays a large role to the children's academic success and social development. Establishing a positive relationship with their teacher helps the student to feel comfortable and safe in their classroom activity.

In this case study, interaction between student and teacher means the relation of Dalit girl students with mathematics teacher, head teacher other students of their class. The researcher observed a class in the school. It was based on teacher activities and student activities in their class. The researcher found that the key respondents were silent in the class. They felt uneasy to ask the questions to the teacher. In the community as well as school, it seemed that they were not allowed to speak because they felt oppressed. Social constructivism theory states that knowledge is social situation of discussion rather than being the reflection of objective reality. From this theory Dalit girl students seemed to have fallen behind in constructing knowledge.

> *The main purpose of coming to school is to learn whether it is from a book or from a teacher or from the school environment. Students should try to learn new knowledge from wherever they are. But ironically, our students do not even try to learn. Even in class, they do not discuss about study, they do not ask the questions. Dalit girl students sits on the back bench, they do not pay much attention while teaching.*
>
> *Head teacher's view*

Head teacher´s view noticed that the respondent students did not pay much attention while teaching. They kept silent in classroom whereas discussion and interaction are essential for learning. Dalit girl students had no curiosity about mathematics learning. Due to this, their achievement in mathematics had not been good.

Research in education and psychology has demonstrated that teacher and students often understand shared experiences through learning by doing. This topic focuses on the interplay between teacher and girl students understanding through student-teacher interaction in learning mathematics class. Dalit girls were afraid to interact with teacher, this also causes of difficulty in mathematics learning.

Episode I

The teacher had just entered in the class with daily uses teaching materials. Researcher also entered in the class with mathematics teacher. Teacher had started to teach. He wrote the topic cylinder and sphere. The teacher drew some solid figures on the white board and asked if you knew the names of these objects. The respondent student slowly said something to her friend but the teacher didn't listen. The teacher picked up some students and asked the name of the picture. Teacher focused more on the students who were sitting in the front. Dalit girl students were seated on the back bench of the class. The teacher didn't pay much attention to them. Some correct answer also came from some students. The teacher again drew a picture of net of cylinder and asked how many surfaces are there and what these are. Correcting the answers from the students, teacher proceeded for formula to find curved surface area and total surface area. Dalit girl students were silently copying what the teacher had written. They were not excited to interact with teacher and other students. After writing the formula, the teacher had solved a problem related to area of cylinder and asked the other same question to solve themselves. Dalit girl students only wrote the question but didn't try to solve this. The teacher looked at everyone´s copy and went back. Dalit girl looked scared when asked by teacher how to solve it. She didn't answer. The teacher didn't give any feedback to her. He checked a copy from front bench and said it was very easy problem. Teacher was escaped out from the class while remaining five minutes for bell ring.

From the above classroom activities it was indicated that there was no proper interaction between teacher and Dalit girl students in mathematics classroom. The co-operation between teacher and students couldn't be established properly. The teacher didn't checked homework regularly and he thought that it was not possible to do regularly. Interaction brings the maturity in learning. But the interaction between Dalit girl students and teacher couldn't be seen properly in the mathematics class. The main objectives of Vygotsky´s theory is to teach mathematics effective by interaction method and to emphasize on grouping teaching method. Hence it could be concluded that interaction is another main factor which creates the creative environment in mathematics classroom to the Dalit girl students.

Episode-II

Another episode of mathematics class is given here. It was observed when researcher went to the class with mathematics teacher.

This was second class observation of the mathematics class. There were 23 students in the class. There were about 2 Dalit girl students among them. The class was well-managed. The white board was kept in the right place. The teacher started to teach the HCF. He started the class connecting with previous lesson. Then he wrote a problem on the white board and solved it with explaining. Then he gave a same kind of problem to the student to do without guiding. In the board, he solved himself explaining with step by step and he told them to do the exercise of the text book which was too much difficult for the students.

In the episode, I found that the teaching method used by the teacher was lecture and problem-solve method. The class was well-managed. Only the little number of students was seen to be participated in the classroom. Most of the Dalit girl students has seated in the last bench. They were none well motivated and responded by the teacher.

Episode-III

“The mathematics teacher was just entered in the class together with researcher by carrying daily use teaching materials. He had started to teach. He wrote the topic indices. He did not review the previous lesson. The teacher wrote the question on blackboard and solved a problem by himself. Then, one of the researcher's respondent asked the question about factorization with the teacher, but he became angry and said that did you present yesterday? The student was quite serious

and told “No sir.” Again, teacher solved another question by himself. Teacher asked some question with other students but Dalit student did not get such opportunity at class. They were sitting at last benches and seemed to be a silent. The teacher gave homework form exercise and the class was over.”

From above classroom activities it indicated that there was no proper interaction between teacher and Dalit girl students in mathematics. Teacher didn't response to the Dalit girl students. Teacher did not check mathematics homework regularly and they mostly became absent in school. Interaction brings the motivation in learning. But the interaction between Dalit girl students and teachers could not be seen in the class nicely. It is due to their socio-cultural situation. At last it can be conclude that the interaction is another factor which creates the participation in mathematics for Dalit girl students.

Mathematics Anxiety

Mathematics anxiety is negative emotional reaction to mathematics. It has been defined as a feeling of tension and anxiety that interfere with the solving mathematics problems. Mathematics anxiety negatively affects an individual physiological and employment which results in the individual obtaining lower achievement in mathematics.

Mathematics has being viewed as an inherently difficult subject. Many students are unable to see it’s practically and teachers seldom attempt to make the connections. Due to its cumulative and sequential nature, when students missed out something along the way, it is likely that they may never fully comprehend it (Foong, 1987).

The causes of mathematics anxiety were assessments, personal factors, nature and perception of mathematics, negative experiences, learning environment and patent´s effects (Lay, 2011).

Math anxiety does not appear to have a single cause. It is associated both with internal and external factors. Some of the most common factors related to math

anxiety are: insufficient working memory, inability to handle frustration derived from low math skills, poor self-concept regarding ability in mathematics, inadequate motivation and lack of confidence when working in mathematical situations, which, in turn, are often related to internalized negative parental and teacher attitudes towards mathematics or inappropriate methods of teaching mathematical skills.

> *I get scared when i hear the word mathematics. I always get good mark in other language subjects, but it is always difficult how to pass the mathematics subject.*
>
> *Student´s view*
>
> *Probably, because of the difficult subject, our daughter can never get high marks in mathematics. On other hand, since her brother dropped out of school after failure to pass the mathematics, she was daughter, how it was possible to pass mathematics by her.*
>
> *Parent´s view*
>
> *Subjects like mathematics, english and science are difficult subjects. So there is more practice and labor required than other subjects.*
>
> *Head teacher view*
>
> *Even though it is not difficult itself, everyone is already saying mathematics is a difficult subject, which brings psychological effect to the students.*
>
> *Teacher's view*

The above view noticed that mathematics anxiety is one of the important causes of difficulties in learning mathematics. Because of anxiety, Dalit girl students didn't practice mathematics at home and didn't interact with friends and teacher at classroom. One of the respondent said that very talented boys didn't solved mathematics numerical correctly then how to solve by me? Social constructivism believes that interaction is more powerful things for mathematics learning. Mathematics needs more and more practice in home but Dalit girl students had anxiety of mathematics and lack of proper mentality to learn mathematics in home. Due to this their achievement of mathematics was not satisfactory.

Vygotsky's social constructivism theory focuses that we should teach mathematics effective by interaction method. It also indicates that it is very necessary to motivate the learner for mathematics learning. But researcher found that respondent girl students were not interested to interact with teacher and their friends. Home environment was also opposite to Vygotsky's theory in learning mathematics. Feminism states that men and women should be equal socially and educationally and economically. Dalit girl students were backward from main stream of society and education. They didn't get equal opportunity to learn mathematics because of gender discrimination. Other main cause was traditional race system of our country. The mentality that Dalit should not study, left them behind. So their achievement in mathematics learning became low. Workload in home was another cause of difficulties of mathematics learning.

Chapter V

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATION

This chapter presents the summary of the research work undertaken, the conclusions drawn and the recommendations made as on outgrowth of this study.

Summary of the study

This is a qualitative research related to difficulties in learning mathematics of Dalit girl students at secondary level in Dhading district. The main objectives of the study were to find the areas of difficulties and to find the causes of difficulties faced by Dalit girl students in learning mathematics. The major tools used for this study were mathematics achievement test, semi-structured interview and class observation. The respondents of this study were Dalit girl students of class -X, mathematics teacher, head teacher and parents. The researcher found that there were many factors affecting the Dalit girl students in learning mathematics such as previous knowledge, understanding the problems, application of formula, generalization, gender discrimination, home environment, interaction between student and teacher and mathematics anxiety.

Findings

The researcher found that following are the difficulties in learning mathematics of Dalit girl students:

- There is lack of prior knowledge to Dalit girl students.
- Dalit girl students don’t seem to understand mathematics problems properly.
- Dalit girl students are not able to use the mathematics formulas what they knew.
- There are difficulties in generalizing mathematics concepts and formulas.
- They felt mensuration, geometry, trigonometry and indices are difficult content in mathematics.
- There is discriminatory behavior between son and daughter.
- Educational and economical status of Dalit family is poor. So they used to their's children as means of earning money for their simple livelihood.

- Dalit girl students are irregular in school because of work load and lack of education of their parents.
- There is lack of interaction between Dalit girl students and teacher and other students in the classroom.
- The mathematics teachers do not use concrete instructional materials in teaching learning activities.
- There is mathematics anxiety already in student's mind.
- There is no use of ICT in learning mathematics in classroom.

Conclusions

From this study, the researcher draws the following conclusions:

The prior knowledge, skill of application of formula, teaching strategy, home environment, gender discrimination, and mathematics anxiety affects to learn mathematics. Dalit girl students haven't enough time to do homework and to do more practice due to workload in home. These responsible factors should be manage properly. Student centered teaching strategy should be used in teaching learning activities. Individual teaching should be needed to special students for fulfilling the prior knowledge to them. It was seemed to lift up the level of awareness of parents. Parents should provide extra classes to their daughters to improve their mathematics. School and local government should be launched various scholarship programmed discount in tuition fee of Dalit girl students. Parents also had to manage enough time to study at home without any discrimination between son and daughter. The teacher, head teacher and parents all have to play positive role to minimize the anxiety of mathematics.

Recommendations

According to the finding and conclusion providing by the story, the recommendations for further study can be presented as:

- This study was done only in Achane Secondary School, Dhading. A similar study could be done in large sample for the generalization.
- Similar study can be carried out in private schools also.
- Similar study can be carried out in basic level and other subject as well.

- Similar study can be done on the causes of difficulties of other indigenous caste group such as magar, tamang, tharu and other girl students.
- School might be applied practical and project-based activities to increase the learning achievement of students.
- Awareness programme could be could be by school and local government to parents on their children's learning and to reduce the discrimination between son and daughter.

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Appendix-A

Mathematics Achievement Test for Secondary Level students

Student's Name: ……

School's Name: ……

Class: …….

Roll No: ……

Group "A"

1. qmod'No -qm= d'=_, laqmod'No -la= d'=_ / gfkmfnfO{ ;dLs/0fdf n]Vg'xf];\ .

Write cost price (CP), selling price (SP) and loss (L) in the form of equation.

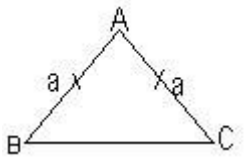
2. cfotsf/ rf}/sf] aflx/ jl/kl/ m ld6/ km/flsnf] af6f] 5 eg] pQm af6f]sf] lf]qkmn slt x'G5<

What is the area of rectangular ground with width m meter?

3. $_{11x}{}^{0}$ sf] dfg slt x'G5<

What is the value of $_{11x}{}^{0}$<

4. lbOPsf] lrqdf $\measuredangle ABC$ / $\measuredangle ACB$ sf] ;DaGw n]Vg'xf];\.



Write the relation between $\measuredangle ABC$ and $\measuredangle ACB$ in figure.

5. vl08t >]0fLdf dWos kQf nufpg] ;"q n]Vg'xf];\.

Write the formulae to find median in discrete series.

Group "B"

6. Pp6f ;f/L ? 800 df lsg]/ ? 1000 df a]lrg . gfkmf jf gf]S;fg kQf nufpg'xf];\ .

7. Deepa bought a sari for Rs 800 and sold it for Rs 1000. Calculate profit or loss percentage.

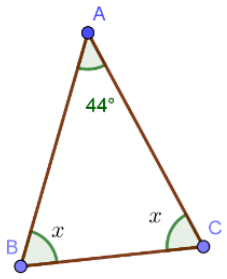
8. nDjfO{ 2 ld= rf}8fO{ 14 ld= ePsf] Pp6f cfotsf/ ju}rfdf 2 ld6/ km/flsnf b'O{ j6f af6f] Pscfk;df sf6L uPsf 5g eg] jf6f]sf] lf]qkmn kQf nufpg'xf];\.

Inside arectangular ground 20 m long and 14 m broad runs two crossing paths each of 2 m width to each other, find the area of path.

9. vl08s/0f ug{'xf];\. Factorise: $x^2+y^2-z^2-2xy$

10. lbOPsf] lrqaf6 x sf] dfg kQf nufpg'xf];\.

From the given Figure, find the value of *x*.



11. lbO{Psf] cfFs8fsf] cfwf/df /Lt kQfnufpg'xf];\ .

Find the mode from the following data.

X	*2*	*3*	*4*	*5*	*6*	*7*
F	*3*	*8*	*10*	*12*	*16*	*14*

Group "C"

12. Pp6f k/LIffdf ;fd]n ePsf100 hgfljBfyL{x?dWo] 70 hgful0ftdfpQL0f{ eP 60 hgf

lj1fgdf pQL{0f{ eP / 20 hgf b'a} ljifodf cg'QL0f{ eP eg] e]glrq k|of]u u/L b'a} ljifodf pQL0f {ljBfyL{x?sf] ;+Vof kQfufpg'xf];\ .

Out of 100 students, 70 passed in mathematics, 60 passed in science, 20 failed in both subjects. Find the number of students who passed in both subjects.

13. s'g} a:t'sf] c+lstd'Nodf 15% 5'6 lbFbf 5% gfkmf x'G5 . ;f] a:t'sf] qmod"No ? 272 eP pQm a:t'sf] c+lst d"No kQf nufpg'xf];\ .

After allowing 15% discount on the marked price of an article, the profit will be 5%. If the cost price of the article is Rs 272, find the marked price of the article.

14. vl08s/0f ug{'xf];\ . Factorise:$x^4-18x^2-21-24x-3x^2$

15. ;dfgfGt/ rt{'e'hsf ;Dd'v e'hfx? a/fa/ x'G5g\ elg k|dfl0ft ug{'xf];\ .

Proved that opposite sides of parallelogram are equal.

16. lbO{Psf] cfFs8fsf] cfwf/df dlWosf kQf nufpg'xf];\ .

Find the median from the following data.

Wages(Rs.)	*45*	*55*	*65*	*75*	*85*	*95*
No. of workers	*20*	*25*	*24*	*18*	*15*	*7*

Group "D"

17. lzlz/n] 4,000 ;'Gtnfx? k|To]ssf] 70 k};fdf lsGof] . t/ ltgLx¿ dWo] 400 ;'Gtnfx? s'lxP5g . p;n] 2,000 j6f ;'Gtnfx? k|To]ssf] 90 k};fsf] b/n] laqmL uof]{ . olb p;n] ? 200 gfkmf ug]{ of]hgf agfof] eg] afFsL ;'Gtnfx? p;n] s'g b/df laqmL ug{'k5{ <

    Shishir bought 4,000 oranges at 70 paisa. But 400 of them were rotten. He sold 2,000 oranges at 90 paisa each. If he plans to make a profit of Rs 200, at what rate must he sell the rest of the oranges?

18. nDafO rf}8fOsf] bf]Aa/ ePsf] Pp6f sf]7fdf 396 m^3 xfjf c6fpF5 . To;sf] l;lnªdf /ª nufpFbf k|ltju{ ld6/sf] ?300 sf] b/n] ?2160 nfU5 . To; sf]7fsf] rf/ leQfx?df /ª nufpFbf k|ltju{ ld6/sf] ?60 sf] b/n] hDdf slt vr{ nfU5 < lgsfNg'xf];\ .

The length of room is 2 times its breath and it contains 396$m^3$of air. The cost of paintingits ceiling atRs. 300 per squqre meter be Rs.2160. Find the total cost of colouring its four walls at Rs. 60 per square meter.

19. lbOPsf] lrqdf O j[Qsf] s]Gb|laGb' xf] . lhjfx? olb AB / AC 5g\ . olb ∠BAO = ∠CAO eP k|dfl0ft ug'{xf];\ : AB = AC.

In given figure O is centre of circle. AB and AC are chords. If ∠BAO =∠CAO, Proved that: AB = AC.

The End

Appendix - B

Semi-structured interview guidelines with parents

Parents Name: ……..…….

Students Name: …….

Date: ……..

Qualification: ……

Address: ……

The following interview with the parents will take on the following questions:

- What's your family education background?
- What is your concept about daughter's education?
- What is your economic conditions?
- How much time do you provide to study your daughter?
- Do you visit the school properly to interact with teacher?
- Do you check homework, they complete or not?
- Do you help to learning in mathematics?
- Do you send your children regularly in school?
- How to reduce the difficulties of your children in learning mathematics? What are the ways to address the difficulties?

Appendix - C

Semi-structured interview guidelines with students

Name of the students: …….. Age: …….

Class: …… Address: ……..

Roll No.: …….. Date: ……

School: ……

The interview with Dalit girls students will take on the basis of the following questions:

- What's your family education background?
- What types of task do you at home? And how long?
- How long time do you spend to read? Do you get enough opportunity to read?
- Do you read in the separate room?
- What is the relation between your friends while learning in classroom?
- How does the teacher respond in case you ask a question?
- Which are the most difficulties topic?
- Do you complete your all Homework and assignment? Does the teacher check homework or not?
- What are the difficulties in class room?
- Do you feel any discrimination in classroom?
- What problem do you fell frequently experience in mathematics class?
- Do you satisfied or not with the mathematics teacher?
- What are the facilities provided to improve mathematics achievement?
- Do you get any encouragement form teacher and parents?
- What's your expectation about mathematics learning?

Appendix - D

Semi-structured interview guidelines with math teacher

Name: ……. Sex: ……..

Date: ……... Qualification: ……..

The interview head teacher will take on the basis of the following questions:

- Do the Dalit girl students follow your instruction in the class hour?
- Which method do you apply in your teaching learning activities?
- Do you use teaching materials or not? And why?
- What is the condition of Dalit girl students in the classroom?
- How do you behave Dalit girl students in the classroom?
- How do you provide opportunity to learning in classroom?
- Does interaction takes place in the classroom?
- How much they are interested in mathematics learning?
- Do you provide homework or not? Do they do or not the class work and homework?
- Do they participate in extra curriculum activities?
- Do you use ICT in teaching mathematics teaching?
- How to reduce the difficulties in learning mathematics?

Appendix - E

Semi-structured interview guidelines with head teacher

Name: ……. Sex: ……..

Date: ……... Qualification: ……..

The interview with head teacher will take on the basis of the following questions:

- Do the Dalit girl students follow your instruction in the school?
- Do the teachers use teaching materials or not? And why?
- What is the educational condition of Dalit girl students?
- How do teachers behave Dalit girl students?
- Does interaction takes place in the classroom and school?
- How much they are interested in extra curricular activity?
- Does your school administration conduct extra classes?
- Do your school uses ICT in teaching learning activities?
- Do you provide equal opportunity in every activity conducted by school?
- Do the parents of Dalit girl students come to school in time to time?

Appendix - F

Class Observations Form

Name of School: …… Date: ……

Class: …….. Period: ……..

Total No. of students: …… Subject: ……

Students name	Student's activities	Teacher's activities	Homework	Class work	Interaction between respondents and teacher	Interaction between respondents and other students	Observation comments

Researcher will conduct observation of Dalit girl students on the basis of following main topics and details.

- Main aspect of interesting in learning.
- Friend's behavior towards respondents.
- Teacher's behavior towards the case students.
- Major interesting things in learning mathematics.
- Participation in teaching learning activities.
- Educational materials in learning mathematics.
- Difficult area in learning mathematics.