

Chapter-I

INTRODUCTION

Background of the Study

Mathematics is directly concern with human life. It is believed that development and civilization and the development of mathematics appeared mutually. Mathematics was created to fulfill the human requirements. Although mathematics was introduced as a formal education system latter days, it was used tremendously from the past in the informal way. It had been introduced and developed outright with the formation of society. Mathematics is not thought and practiced through the formal system in school, college and university only but also informally it is entertained in a large deal even today.

Although mathematics is an essential part of life, no we can say when it was started and developed. In the past primitive men used to count their cattle and members by sticks or stones. Gradually different measures and unit of mathematical concepts were developed and followed as well as established rules and methods to apply it in daily life. It was thought a compulsory matter to get different information. Therefore, as if Necessity is the mother of invention, mathematics become of compulsory part for human. Besides different concepts and principles aroused and developed in the field of mathematics. Mathematics was developed through the ancient civilization like Egyptian, Greek, Roman and Babylon. Archimedes, Pythagoras, Euclid, Plato, Descartes, Newton, Cantor etc were contributed to develop the mathematical concepts.

In the ancient period mathematics was used by different civilization like Tigris and Euphrates, Mahenzedaro Harappa. Hwang Ho and Yang Si Kang were another subject of civilization, where the mathematic was used gradually first and rigorously today. So it is not

new subject for the different ethno groups. But only the difference is the way of getting mathematics knowledge the formally and informally, how the different ethno groups are using mathematical activities.

Early mathematics arose with the evolution of advance form of society in that civilization because life was easier in the plain area and river side. There used to be convenience of transportation and irrigation where survival was possible. These regions, aborigines became rich and prosperous so that it was possible them to think mathematically or technologically. Gradually in the field of agriculture, the manufacture simple tools to cultivate the length which was the human pioneer engineering. Later on the knitted their acquired skills and used it to disseminate to the next and new generation too. Even they used their innovation for administration and financial management. Eves(1983,p.22).

Regarding the evolution of mathematics D'Ambrosia has defined the ethno mathematics- "Ethno mathematics is the math practices among cultural groups such national tribal societies, labor groups, children as certain age, professional class and so on." It means mathematical concept is acquired at home by every day activities around their surrounds. H. Preston (cited in Adhikari- 2002,p 3) has expressed his view that mathematics was developed from the need of organized society of people, for example the primitive tribes used to survive by hunting and collecting flesh from the forest. It was emerged rudimentary knowledge of counting to communicate the number of the tribes. This may be number of animals in a herd or the number of people in hostile tribes. D'Ambrosia (1985) defines the ethno mathematics as "A relation between anthropological, cultural, historical and mathematical phenomenon is an important step towards the reorganization of different ways of thinking which direct differential from that we called ethno mathematics. It refers the cultural activities embedded with the concept of mathematics." Gautam (1997) Defines "mathematics used by a define a cultural group in proceeding is the relation with the problem and activities according to the

context.” Certain permitted awareness about shape, size, distance etc grew larger and long lasted. Bandura(1977) difference “learning takes place through the observation and imitation it usually involve the change in cognition that may or may not be expressed as behavior neither reinforced.”

A child can learn to survive from his own environment and learns to keep mutual understanding with parents. In the form of eye contact he can fulfill his needs where it is called learning or not. Whether it is the intension of the learner towards learning or if he wants to learn or acquires automatically it is the genuine question. If learner tries his action towards the new goal, it is learning (Upadhyay, 2001,p.12,) Effects on constructivism a mathematical achievements of grade V students of Nepal.

Nepal is a country having different caste and cultures. The main four castes were in Nepal viz. Brahmin, Chhetri, Baesya and Sudra. Among them Dalit also called Sudra community is a backwards community as it has been made backward from political, social and economic perspective. There are different objective of education in national and international agenda as it is the national objective to include the backward community in the national mainstream (Vishwakarma, august, 2012).

Badi is a Dalit community in Nepal, Badi means vadyabadak, or who plays musical instruments. The Badi remain the lowest ranking untouchable caste in western Nepal. The rules of orthodox Hinduism dictate that members of the higher castes (Brahaman, chhetri, Thakuri) cannot allow the Badi enter to even brush against them; although higher caste men are allowed to have sex with Badi prostitutes (www. Wikipedia. Com, 2 March, 2014).

The term Badi is derived from the Sanskrit word vadybadak that means one who plays musical instruments referring to the period when they were a cast nomadic entertains in the neighboring Indian states of Bihar and Uttarpradesh, India. The majority of the Badi were

in the med and far western regions. The Badi are ranked at the bottom of Nepal cast system even within the Dalit intra- cast hierarchy. Which has given them the infamous label of untouchable of the untouchable (Chaudhary, 2014).

Most children have been Badi community marginalized and vulnerable due to unidentified fathers. Not knowing a father in it put these children in listed of social outcasts even before they are born. Poor nurturing, social insecurity, poor school environment and violation were child rights. Make life of Badi children much worse. This community is not only deprived economically but also socially, culturally and legally. The legal rights, which are provided by the constitution of Nepal 1990, are not properly implemented by the concerning agencies. Therefore, for the protection of their right guaranteed by the constitution, there is a need of strong thrust within the community (ActionAid Nepal, 2001),(cited by Pant D.N.2015).

Learning can be defined as the change of behavior through experience on training although it is not measurable for the sudden change but useful for gradual change which is life long process. Everyone acquire and learns from his family and social environments. Badies are one of the marginalized ethno groups in Nepalese society whose children are deprived from the formal education in public school. But somewhere they have been performing their skill to survive which they acquired and learned.

The present study mathematical activities used by out of school children of Badi is concerned to focus on the Badi children in Bajhang district how they are using mathematical activities to solve their day to day problem. The study only tries to find how the mathematical activities are applied informally and how are the concepts developed to solve their daily life problem. Though, it may not be specific fact to mathematical field. This study seeks how

Badi children use mathematics what is its origin, developmental process and present cultural value.

Statement of the Problems

Nepalese history is unique in the world because it has a multi ethnic, multi lingual and multi-cultural society which has larger classification of caste and creed and even deep discrimination among the caste. Although every caste, culture and religion has its own value and significance, some tribes are under estimated either. It is said mathematics is the social creation on which culture has been contributing for the development of mathematical concept to all civilization. Cultural diversity is one of the characteristics of Nepalese society which is not taken seriously to find and search their innovative mathematical attributes that provides an opportunity to solve the problem. Without mathematical concept one cannot structure or restructure of minimal events of life. Therefore it is the elementary root of education.

Without education one cannot perform his full academic energy during his life. But in the context of Nepal, some of the tribes who are economically, culturally and socially under estimated, have not got the opportunity to get formal education in public school. They acquire knowledge from their hereditary art, sculpture and their transmission system of knowledge which they build scheme by their own ethno mathematical process. This study is intended to study 'The Badi childrens' activities' who are out of school and learning process they have used in Bajhang district.

This study is based on the children of Badi at Kotbhairab V.D.C. in Bajhang district. It intends to answer the following questions.

-) What are the basic mathematical activities of out of school of Badi children?
-) How do Badi children use mathematical concept?
-) How do out of school Badi children use mathematics in their activities?

Objectives of the Study

The main objective of this study was to find out the mathematical activities and skills practices by out of school children of Badi community. Therefore the following objectives are formulated.

) To find out basic mathematical concept practiced by out of school children of Badi community.

) To analyze the basic mathematical activities of out of school Children of Badi Community.

Significance of the Study

In the context of Badi family the mathematics knowledge cannot be develop as other educated family. Maximum number of Badi children were in school had low achievement and failed in mathematics. This shows that they have not shown good mathematics knowledge and how they were use the daily activity related to mathematics knowledge and out of children known something about the mathematics by their family environment and society.

Mathematics is the discipline which knowingly or unknowingly every human individually or socially acknowledge for creation, pleasure and survive. The development of mathematical concepts and activities depend on the different opportunity and activities which are operated in the environment. Numerical and process of mathematics have been developing from consistence introduction in the society andthe use of object in the environment. Although it is thought a difficult subject to group knowledge, it plays a significant role to mould the society through the basic mathematical activities. The significance of this study was as follows:

-) It helps to find out the basic mathematical activities of Badi children who are out of school. To support to bring the Badi children into main stream of the education provided by Government.
-) The study provides the data relating to school children's current skills of mathematical activities.
-) It helps to explore the ethno mathematical knowledge of Badi children who are out of school.
-) It supports to bring new education policies.

Therefore it is necessary to find out the basic mathematical activities done by different cultural group from their own way. The study would be useful to provide the data relating out of school children present skills of mathematical activities. It helps to explore ethno mathematical knowledge of Badi children who are out of school.

Delimitation of the Study

The study was focused on the activities of Badi community children who were out of school of Kotbhairab V.D.C. inBajhang district.

-) Badi community Kotbhairab,Thalara was selected for the study.
-) The study would be of (7-14) age group children only.
-) The study would depend upon the 2 children who were economically down trodden.
-) The tools of this study were observation and interview.
-) The mathematical concept of Badi child was analyzed by their response towards the interview question.

Definition of the operational terms:

Basis mathematical concepts and activities: The concept of four mathematical operations (addition, subtraction, multiplication and division) and geometrical concept of shape and size (triangle, rectangle, square, circle etc.). Also, basic mathematical activities refer to the basic concept of counting, measuring and calculating.

Out-of-school children: The school age children to whom formal education must be given are not being able to be included in this system are known as the out of school children.

Literate: According to NESP (1971), literate means being to at least read and write general Nepali and perform fundamental mathematical operations in daily life.

Illiterate: Illiterate are those people who cannot read, write and solve their general mathematical problems of daily life.

Baditribe: A tribes, who sing and dance even play bands to survive, live in Nepal as a minority caste and marginalized group.

Marginalized group: To place in a position of marginal importance influence or power, to put out of the main stream.

ZPD Theory: The theory which supports to develop the individual capacity in highest point.

Chapter-II

REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

The literature review helps the researcher to know the works carried out in the area of this research project. The related studies construct the knowledge of further study. There were different research studies about out of school children, how they use mathematics. That helps researcher to forward the research and draw necessary conclusion. The chapter deals the review of related imperial and the critical literature.

Empirical literature

CERID(1990), Studies that the elementary process of learning mathematical concept and process of Rasuwa Tamang. The purpose of the study was to study the basic mathematical concept would be used by Tamang adult and non-formal mathematics education to identify traditional Tamang method of mathematics operation and to find out the implication of Tamang process and tone up the present learning situation. This project work has shown that Tamang have their own systems of measurement, counting and their own mathematics process and geometrical concepts are based on the shape and structure patterns on objects existing around. This study has also showed the situation of children into the formal system, but it didn't study the effect of ethno-mathematical practices on the classroom settings.

K.C. (2001), "How do street children learn in relation to survival?" Bal Ram K.C. has done this research on the street children of Kathmandu valley focusing on learning for their survival. The finding of the investigation suggest that the street children love learned many things to live in the street which are learnt mostly from experience, situation also some incidents, since they landed in street. Their actual method of learning included trial and error observation advice from adults and imitation.

Thapa(2001), Studied the learning strategy for out of school children of Dalit community. This research deals how the children of age group (10-14) of out of school program classroom learn?

The objectives of research would be to find out the learning skills and way of learning in daily life of uncountable children. Interview in an informal setting and careful observation of the participants would be the main tools and data collection. In out of school class more emphasis would have place on theoretical aspects and less stress on practical matters. Even in the training materials biological approaches we not include. This study drew some implication for the improvement of teaching and learning methods of the out of school program, material must be related to everyday life of the children and their ways of the learning.

Mandal (2003), Studied in the field of learning of Mushar children who belong to disadvantage as well as oppress group. This study seeks to explore how the Mushar children learn and what their parents and teacher approaches to them. Information for the research would have collect through tools such as interview, observation and literature review. Vygotsky's constructivism theory and Bandura's social learning theory would have to conceptual content child learns through observation, imitation practices trial and error method. But in school these children would have found learning through rote memorization.

Kandel(2005), Carried out a study entitled "The basic mathematical concepts and process explore the counting system of Chepang community, to find out the ways of the four basic mathematical operations practiced by Chepang people and to identity the measurement used in Chepang community. His research tools were observation and interview.His findings were:

-) The numeration system of chepang is a system of base 20. Except 20 other grouping system (like 2, 5, 10, 50 etc.) were found in practice. They have not developed their own scripts for numerals. Everything is in oral forms of mathematic.
-) Chepang children have their own mathematical processes that are as simple accumulation process. Numbers are decomposed in different groups of number for carrying out subtraction done by circulation additive process.
-) They have their own conventional system of measurement. Length is measured with hand and finger, area is measured with seed of grain, volume is measured with ManaKuruwa etc. and weight is measured with Dharni, Bisakli etc.
-) The conventional practices of measurement of Chepang community use physical objects of the environment in the practical solutions

So the review of the above literature have helped the researcher concerning, basic mathematical concepts used by out of school children as a case study of Gadari children and the review of literature has helped in adopting theoretical framework of constructivism and constructivist approach.

Poudel (2005), Did a research on “Learning strategies of mathematical concept of out-of –school children” a case study of Dalit community. The objectives of the research were to fine out the learning strategies of basic mathematical concepts by them, to identify how they acquire the mathematical concepts. This research tools were participant observation, interview and photographs. He used Vygotsky’s theory in constructivism. His finding were, despite the huge investment of government NGO’s in education, about 32 percent of children of school going age still remained out of school. Among those who were enrolled, 41 percent become dropouts. The reason are different for being school dropouts given by the study reports, like the burden of households work, lack of meaningful

connection of their education and daily life, poverty etc. (Human Resource Development Report,1998).

His findings were:

-) Base 20 have been practiced in Dalit community for counting process.
-) They have not their own symbols for native name of numbers.
-) They solve multiplication problems by repetitive addition technique, so they take long time to solve multiplication problems.
-) Length/ distance are measured on 'Angul' 'Bitta' and 'Haat'.

Chhetri(2007), Did the researcher on mathematics idea of group of Sawyers. This was qualitative type of study. The objective of the study was to identify the mathematical skills used by sawyer. The research area of this study was Bagulang District. He found that Swayers used mathematical skills in their works heavily. They used the concepts of number, measuring scale, some geometrical idea in their work,they gained mathematical idea through learning experience and from adult.

Subedi(2009), Did the research on “mathematics concepts used by wicker worker.” This was qualitative type study. The main objective of this study was to find the mathematics concepts and idea of wicker worker. He found that wicker worker used different mathematical concept in their work and they get mathematical concept and ideas from practice and from their culture.

Rokaya (2011), Conducted a study on mathematical concepts and process used by Jumli shepherd. The main objectives of this study was to find out mathematics concepts and used by Jumli shepherd. The nature of the study was descriptive qualitative type. The study was conducted in remote area of Jumla district. He concluded in remote different

mathematical concept were constructed in different situation as they were engaged in household works, farm works, abort works and the interaction among the family and society.

Dhakal (2014), The main objectives of the study was to identify and explore the basic mathematical concepts and processes used by Out of School Children of Tamang Community in Ramechhap. In this study, counting system and four fundamental processes of addition, subtraction, multiplication and division were examined for Out of School children of Tamang Community.

In order to fulfill the objectives of the study the researcher selected Doramba VDC of Ramechhap district by purposive sampling method for the study area and only 17 respondents were taken for interview. The data collection was mainly based on interview and observation.

The Tamang ethnic group uses their own language to count the number. They have developed their one specific script for numerals based on grouping of twenty. They used not place value system. In courses of the study it is found that their own mathematical process and numbers are decomposed into different groups of numbers for performing operations. Addition and multiplication are down by repeated processes. Observation and interview conducted for the study reflect that illiterate people of Tamang Community acquire the knowledge of counting operations and measurements through the process of social interactions.

Pant (2015), This is a case study related to cause of low achievement in mathematics of Badi students of Gokuleshwor higher secondary school Gokule. The objectives of the study were to find the achievement in mathematics of Badi students, to identify the factor these affects the mathematics achievement of Badi students and to analysis these factors affecting the achievements in mathematics of Badi students.sAlso the problem of this study

was how are the achievement in mathematics of Badi students ? what are factors that affect the achievement in mathematics of Badi students? How are these factors affecting achievement in mathematics of Badi students?

Theoretical Literature

The researcher introduces the theoretical discussion which is relevant for the interpretation of the finding of the study. There are many learning theories related to children cognitive aspects. They are various theories related to Children's learning and development; they are classical conditioning, operant conditioning, Gestalt theory, Trial and error social leaning theory and social constructivism and so on.

Constructivism

Simply constructivism means a kind of consideration about themes and built up a strong mental plan, so different individuals have their own construction about existing object. Learning mathematics requires construction requires construction not passive reception and to know mathematics requires constructive work with mathematical community.

Constructivism is basically a theory based on observation and scientific study about how people learn. It says that people construct their own understanding and knowledge of world, thought experiencing things and reflecting on those experiences. When we encounter same things new, we have to reconcile it without previous ideals and experience may be changing what we believe or may be discarding the new information as irrelevant. In any case, we are active creators of our own knowledge. To do this, we must ask questions, explore and assess what we know.

Constructivism transforms the student from a passive receipting of information to active participant in the learning process. Always guided by teachers, students construct their

knowledge actively rather than just mechanically ingesting knowledge from the teacher or the text book. In fact, constructivism taps into and triggers the students become experience, learning to hypothesize, testing their theories and ultimately drawing conclusion from their finding. Constructivism stands on its three axioms that are as follows:

Constructivism is basically theory based on observation and scientific study about how people learning. Its epistemology education is that constructivism is a philosophy of learning and teaching of an objects existing in the world. We can construct many kind of knowledge our assuming of instruction which we use to make a sense of our experiences. Therefore it is simply the process of adjusting our mental models to accommodate new experience.

-) Constructivism stands on its these axiom that are as follow:
-) Learners learn knowledge from their active participation.
-) Learners gain knowledge when they try to convey their solution to others(Upadhyay 2001)
-) Learners gain knowledge while reflecting on their own action.

Lev Vygotsky

Lev Vygotsky (1896-1934) was famous scholar who emphasized on social constructivism. The most significant basic of a social constructivism theory is zone of proximal development (ZPD) is observed then when children were tested on task on their own they did as well as when there working is collaboration with on adult. The child needs some mediator like parents or peers to uplift his/her knowledge that existed with his/her. This assuming process is known as ZPD. Vygotsky's theory is one of them that regards social

interaction between peers and adult as important aspects in creating meaning making sense and covering culture within the shared context (wood et.al 1986 cited in Balayar 2000).

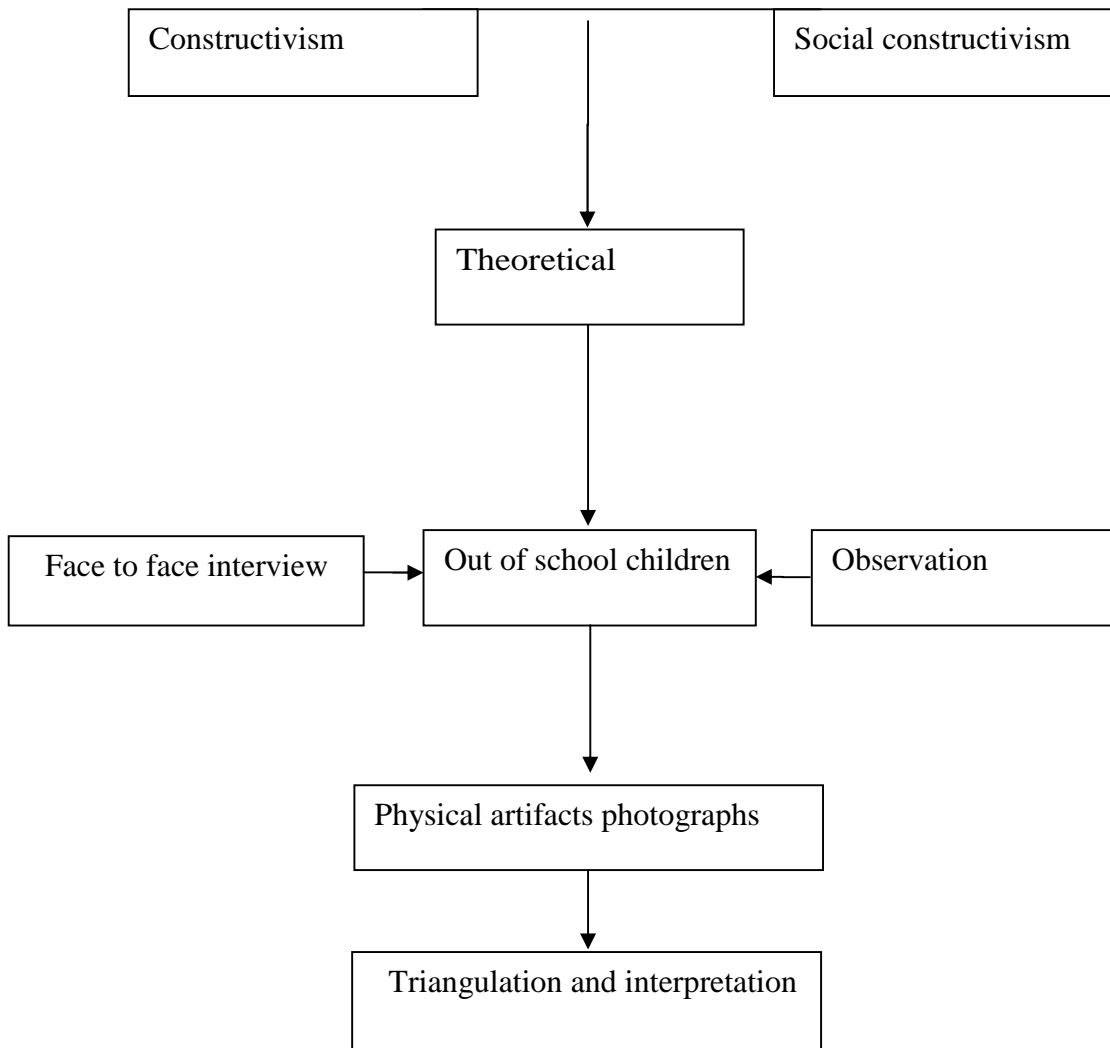
According to Vygotsky(1978) child development in organic growth and maturation is known as natural line. Psychological function is known as cultural improvement both of these process of development meets at certain point mediated by speech and cultural forces of development are equally important. He believes on the role of the culture in development of children, which is transmitted to them by their parents, adults or peers. Vygotskystresses that children learn some things first on the social levels, then at the individual levels. It means children develop these skills through playing or interesting with peers. This implies that social level takes first for initiation of the learning then every individual internalized the skills.

Social constructivism

Knowledge is being construct is social situation of negotiation rather than the reflection of the objectives reality which is term as social constructivism. Vygotsky argue that the child development cannot be understood by studying the individual that needs to examine the external world. In the similar manner the other concept from Vygotsky are useful to generalize the human behavior about the information of mathematics concepts. The researcher would draw the idea from Vygotsky's social constructivism to support understanding about Badi children and learning mathematical concepts.

Conceptual Framework

The researcher would have conducted the research on the basicof following framework:



Source: Vygotsky, L.S.(1978),(Cited by BirendraYadav, 2009)

In this study social constructivism theory would be used to get main idea that how socio-culture helps children /people to perform mathematical activities and how mathematical knowledge is closely related to culture and society. The main tools for collecting of data would be interview observation and photographs of sample population in out of school children of Badi community in Bajhang District.By the helps of the theory, researcher made his conceptual framework. The conceptual frame work helps to forward the research and provide the clear concept of future plan. The researcher first selected the Badi child by purposive sampling and take interview with child and their children. The interview questions were from four basic mathematical operation and shape and size. For their physical artifacts children’s photographs were also taken.By taking the response of the child, the results were analyzed by triangulation.

Chapter-III

RESEARCH METHOD AND PROCEDURES

The design of the study was qualitative and descriptive case study. Qualitative research is about person's life stories and behavior. It is a non-mathematical analytic procedure. The basic meaning of gathering data would be design of the study. Site selection, Procedure Selection, Selection of the case respondents tools for research use of to collect the data. It also explains the method of analyzing the collect data.

Design of the Study

Case study is the in-depth study of any social unit to find out reality. Its main purpose is to understand the importance aspects of life cycle of any social unit. This is an explanatory study which is carried out of a Kotbhairab V.D.C. of Bajhang district. It is the study to find out the mathematical concepts practiced by out of school children from Badi community and for this , observation and interview were used to research the process of the learning mathematics for the purpose. The investigation of individual mathematics skills and the way of acquiring this knowledge the qualitative from has been selected.

Site selection and Sample of the Study

Badi are spread different parts of Nepal. They have also been residing different parts of Bajhang district. The researcher has chosen this place because of own residential district. The researcher has his experience that so many school age children in Badi community are deprived of getting formal education of basic mathematics. They are applying the mathematical activities in their daily life situation unknowingly. The researcher would have carried out in a small Badi community but of Kotbhairab V.D.C. of Thalara Bajhang and their occupational like singing, dancing and playing. Because of the poor socio-culture,

economic condition low literacy rate most of the Badi children aren't joined any educational institution of this community. In the qualitative research, there is no rule for sampling and sample sizes. The sample would be selected purposively. The selected data according to census 2068 B.S is presented as required for this research. The population of Kotbhairab V.D.C. is 3495. Specially, the population of Badi community is 138 and 21 houses. For this research the age group is 7-14. The researcher has selected two boys/ girls for their case study.

Tools and Data Collection Procedure

There are many approaches for the qualitative research to get the primary information from the people about their experience, idea, believes, documents, case, histories, personal diary are also evidential substances. For example Upadhyay (2001) citing Marshal and Russman (1995) describe four ways for data collection. There would be participation in setting direct observation, in depth interviewing and photographs. Case study, observation and interview are used to investigate research question.

At first, Badi communities were visited and two children one male (a boy) and female (a girl) were selected for question and interview. The questions were considered in order to ascertain whether the out of school children of Badi in Kotbhairab V.D.C. had the following skilled or not. Researcher spends three weeks for his observation period. How they gained the knowledge of basic mathematics as follows:

) Counting numbers

) Adding number

) Subtracting numbers

-) Multiplications numbers
-) Dividing numbers
-) Measuring shape and size

The researcher had taken these six mathematical skills because they play significant role in daily life activities of the children. Likewise their parents and neighboring parents and children were also asked.

Observation

There are many numbers of techniques to get information. Observation is one of them. Observation is most useful tool for data collection in any kind of research studies. There is a good way to get closure to children by observing them. So the researcher would go to the related area to meet the Badi children of that place and tell them about the purpose of visiting the village. With the help of social worker, the researcher would select a group of children without introducing the purpose of the study.

Through observation the researcher would establish interaction with them which helped the researcher to understand their emotion etc. The researcher used daily note book to save record for their daily activity, while observing the daily life of Badi children.

Interview

After observation the researcher took field notes about the events and then interviewed the participant children, their peers, parents and neighbors. K.C.(2001, P28) cite, Keilinger (1986) described that interview as phase to phase interpersonal role situation in which one person, the interviewer asks a person being interviewer and the respondent questions design to obtain answer pertinent to the purpose of the research problem. The interview with children main focus on what and how they learn different mathematical

activities related to everyday works. What suggestion they get from their parents how they exchange their knowledge and concept with their peers etc. Researchers apply a schedule of semi structure interview.

Reliability and Validity of Data Collection

A case study is an empirical inquiry that investigate a contemporary phenomenon on which its real life context especially which are not evident. For Anderson (1998) case study research is highly data base and striven for the same degree of reliability and validity as any good research. This study also demands high degree of reliability and validity because it is one of the imperial studies of the phenomena. For this the researcher used the method of triangulation. So, in general case study would be concerned. Similarly, it helps the researcher to understanding individual to develop insight into the basic aspect of human behavior. For the validity of the result, the researcher would attempt to analyze finding on the basic of interview, observation and photographs.

Data Analysis

The study would be depended open the construction of mathematics activities on out of school children from Badi community. First, the ways of learning mathematics would be find out to investigate the acquired mathematical skills from Badi children who are out of school. The researcher has focused on two selected Badi children who were out of school in this case study to find mathematical reception in which the information have been collected from observation, interview and positional photographs. For the purpose of the study, Vygotskian theory of social constructivism is used and the findings are interpreted. In this case study, basic operation of mathematics counting, measuring and calculating (addition, subtraction, multiplication and division) are taken into account while research was conducted. How out of school Badi children learn the above mathematical activities is the main query of this study. Regarding this study, parents were asked individually to find concepts related with basic mathematics. Children selected for case study, their parents and neighbors and neighboring children were asked questions for triangulation.

Chapter- IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter deals with the analysis and interpretation of collected data. This study deals with mathematical concept practiced by out of school children in Badi community of the remote area of Bajhang District. The analysis depends upon the following headings:

-) Analysis of concepts of numbers,
-) How they use the adding numbers,
-) Analysis of subtraction operation in their daily life,
-) How parents and child use multiplication problem,
-) How they use division problem in their activities in the real field,
-) How they decide the real the shape and size of the things,

Under these 6 characteristics mathematical skills of Badi were described in their real field. The question of the related topic was asked to the parents, neighboring and children.

Analysis of the Counting Number (based on interview)

Some of the Badi Children are uneducated and out of school but some Children go to school. Researcher selected the children PuskarBadi aged 13 and SamjhanaBadi aged 12 were taken the interview who do not go to school. For the convenience of the analysis, similar types of the response were grouped as to give the categories of the numbers concepts. When the following questions were asked to the Children different types of the response were found which are as follow. The following conversations show the student, counting system and their concept. Where R means researcher himself and R1 and R2 were PuskarBadi and SamjhanaBadi.

R : How many family members do you have? Can you count?

R1 : *Five/Six*

R2 : *Seven/Eight*

R : How old are you?

R1 : *Twelve/ Thirteen*

R2 : *Eleven/Twelve*

R : Exactly

R1 : *You ask my mother, I don't know exactly.*

R2 : *You ask my parents, they tell you.*

Another Conversation

R : Do you have any cow/buffalo/ pig/hen.

R1 : *Two pig, piglets*

R2 : *Two pig, two piglets, two hen*

R : How many are altogether?

R1 : *May be 6,7*

R2 : *(hesitating) all? How many one, I don't know*

R : Do you know your birth date? When were you born?

R1 : *No, ask my mother.*

R2 : *No, what's that, ask my parents.*

Description of the Respondents

Respondent (R1): Respondent one (R1) Was Puskar Badi who was thirteen years old. He asked the different questions to know whether he can count the numbers and how he does three counting activities. He told his name easily but he could not say his family member number so easily. He tried to count his family numbers on the finger and finally he responded he had five/six family members. He was asked if he had any pet or domestic animals. He couldn't say so easily. He tried to count if gesturing. Likewise Respondent two (R2) was Samjhana Badi who was twelve years old and asked same question to know whether she can count and how she count she couldn't say clearly. She was asked about the pets and domestic animals would as birds. She couldn't say easily and couldn't count the total number of pets and birds.

It means although mathematics is compulsory discipline to all human beings, everyone learn it from their society informally. These Badi families are backward socially, economically, politically and educationally as well. The government hasn't taken any attention about Badi. Today, some NGOs, INGOs helped them to uplift their economics condition. Therefore, they have got pigs, chicken for smaller scale business to survive. Their parents were asked the following questions about how they count the numbers and how their children count the numbers.

Interview with Parents and their Responses

R : Why didn't you send your children at school?

R1's Parents replied that they were poor, they hadn't got school dress, books, bags, exercise books, sometimes they had to go to village to beg for morning food. Puskar is our senior son and he does our household work which are necessary for our everyday living. We don't have any land to cultivate, to grow corn. We are six in numbers. We don't have any source of income we always have the problem of the hands for months. One Bajhangee king bought us here for recreation. We are Chhetri from Chhatter in India. Later on, we were victimized by the king and became economically weak and our family status descended. If we send our children to school it is not possible to survive. Instead, they learn to sing, dance and play. They go to village to beg and have our meal. It is an easy job.

R2's Parents replied that Samjhana was their daughter and they had eight family members. Daughters don't need to learn and go to school when they grow, they go to village in wedding and other ceremony and earn money easily. If they go to school, how do they earn to survive? Therefore we don't send them to school. Today she looks after pigs and sometimes brother and sister. If we send them to school, now we pay for their education school dress, bags, books and pen etc is needed to them. We don't have money in time. Therefore we don't send them to school.

R : How do your children learn the idea of counting?

R1 and R2's Parents replied that they sometimes told them one, two in the previous days and little by little they can count numbers but they cannot count like school children one to hundred. They learn automatically through looking at us and listening.

Most of the parents replied that they were poor and cannot survive without had work. If their children goes to school cannot provide dress, bags, books and pen etc. Their children also help their parents by looking after animals. By this case they do not want to send their children school. By low economic condition they were also backward in the 21st century. Then asking question, how their children learn the idea of counting, they said that their children count slowly and cannot count as school children. The counting knowledge of children was developed by looking their parents and listening to the others.

Interview with Puskar and Samjhana Badi

R : Can you count one to twenty on your finger?

R1 and R2 were asked the above question. They both practices to count on the finger but they couldn't do it easily. They were asked to count three digits but they couldn't. They could say amount how much it was. It means how many hundred makes a thousand. They only pronounced different figure.

Analysis of Basic Mathematical Operation (Based on Observation)

From the field study, the research found some specific use of mathematics in Badi Children. It was found that every child requires mathematics to work at house hold activities. Out of school Badi children use mathematics materials like waving mat, measuring length, area, weight and value but use of mathematics in other activities is limited. Some of the measure activities observed by the researcher in Badi Community are mentioned below. The process of basis operation used by out of school is Badi children were oral and their mental process is discussed below.

Addition and Subtraction

Addition and subtraction are the basic mathematical operations in extended from of counting. Addition of numbers does not mean to increase but to group, join or rename a pair of numbers as a single number. After the concept about the number and counting, addition is the basic stage for learning mathematics. Subtraction determines an amount equal to the difference between two quantities rather than which is equal to the combined amounts. (Dhydegaard and Spencer 1966).

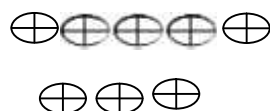
In making the concepts of mathematics or learning mathematics, the skill of addition and the reverse of addition provide the requisites for further operations. The way of making concept, this process is another important thing.

There is no specific way of doing mathematical activity it is also like as schools mathematical operation but their activity are not clear how is it possible to do easily. Though the out of school children learn addition and subtraction by teachers, they can use those concepts. The learning process may be different. In course of doing this research, it was examined that weather there is concept of addition and subtraction to out of school children of Badi community or not.

Once the researcher met Puskar and SamjhanaBadi while they were playing marble with his friend while researcher was watching, he/ she were more skillful to play as compared to his peers. Sometimes he/she had to calculate the number of marbles of game won and other calculation that required these. It was found that he/ she knows some addition application which can be justified by the observation and conversation below.

R : **How many marbles did you have beginning?**

R1 : *I had 6 marbles.*



R2 : *I had 5 marbles.*

R : How many did you win?

R1 : *I won 3 marbles. These 5 are mine.*

(It means that he has already three marbles and after plying he own other five marble)

R2 : *I won 4 marbles. These 4 are mine.*

(It means that after plying marble he win other four marble and say that this win marbles are his)

R : How many do you have now?

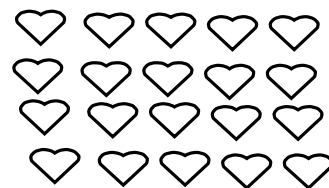
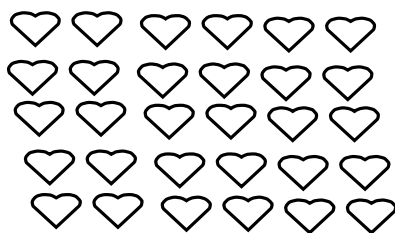
R1 : *I have 8 marbles all together.*

(His own marble + win marble)

R2 : *I have 8 altogether(by counting one by one)*

(By the response of respondent researcher try to checked their response himself. For this researcher make discussion in a group of marble player and find the correct response or wrong response or their counting ability.)

R : How many apples are there if 30 apples are added to 20 apples?



R1 : *It is 2 bisha 10 because 30 consist of one bisha and ten. (As he used his fingers)"*

20 mean 2 Das and 30 means 3 Das and it is 5 Das as 2 Das and 3 Das are added."

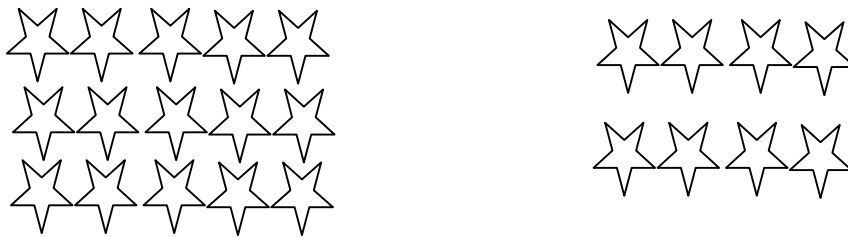
R2 : It is 50. (Drawing lines on the ground)

R : What is the sum of 65 and 43?

R1 : The numbers 65 and 43 were expressed into three twenties and 5 and two twenties and 3 respectively. The added verbally three twenties and two twenties making five one and three one make eight ones.

R2 : Counting the one to hundred numbers and adding the 65 and 43.

R : There are 15 stars, if you remove 8 stars, how many stars are remaining?



R1 : There is remaining 7 (By using fingers of hand and legs.)

R2 : There is remaining 7.

From above conversation the researcher came to know that Puskar and SamjhanaBadi had simple concept about addition. By the response of respondent researcher try to checked their response himself. For this researcher make discussion in a group of marble player and find the correct response or wrong response or their counting ability. The next day, the researcher met him when he/she were at the field. The researcher asked him to count the total no of plots in the field and the no of plots that had finished. And he/she were turn over to another side and asked for remaining field as:

R : How many plots are these?

R1 : *These are 15.*

R2 : *These are 14*

R : How many had been planted?

R1 : *10*

R2 : *8*

They replied less confidently. When the researcher said yes, they were quite happy by the same moment their father came there and asked them to go the shopbuy some cigarette for grocers by giving Rs.20. Cigarette cost Rs.15 and 5 are here. Similarly it was lunch time. The researcher asked him to count the numbers workers who were eating and remaining he/she replied correctly.

Next time the researcher visited him while playing with his friend and observed his activities. In all observation the researcher came to know that he/she had simple concepts of subtraction of small quantities.

R: How did he/ she make the concepts of addition and subtraction?

Such types of his activities were observed frequently. Once he/ she were asked to count and add some amount of money provided by the researcher. On observing these activities it was found that he /she were able to count and add. He/she added using one to one correspondence and prolonged activity of counting. All these activities the researcher found

that he/ she had the concept and ideas of simple and shorter addition. But he /she did not know to add larger number. The researcher desired to know that how he /she were able to add simple addition. While responding one of the questions of the researcher he /she said, *"In the beginning while on playing of marbles. While on counting to play they did too many mistakes on adding. Now I can add myself and they cannot lie me. I add myself my hisabkitab."*

Although, the researcher knew about his simple skill and concept of subtraction but he /she did not know what is subtraction. The researcher intended to know how he / she knew simple practical problems on subtraction. For this researcher had asked how he /she learned. The researcher asked R1's father some questions and he /she responded as:

"In the beginning (age of 12/13 years)he did not know. They had sent many times to the help and gradually he started to ask with shopkeeper and recall the calculation to me. Now a day he describes every hisapkitab of shopping is the amount is less than 20 to me."

When the researcher was asked with R2's father about question on calculation he replied that:

"Once my daughter come to me and asked whether nine and five combined together will be fourteen. My friend said that my nine pigs and five pigs altogether were fourteen pigs."

By the observation on different situation the researcher concluded that he/ she know this process with the interaction of his friend, the help of his parents in different content e.g. shopping, playing games and the activities involved to conduct different tasks.

Again, the researcher asked R1 and R2

R : How much the cost of one Hen?

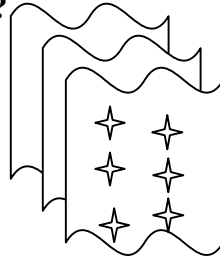
R1 : *Three hundred Rupees.*

R2 : *Three hundred fifty Rupees.*

R : How many books did you seen?

R1 : *Three.*

R2 : *Four.*



R : What is the addition of 10 and 15?

The respondents could not answer of it. The researcher asked such question in different condition like playing Gotta, Chungi, Singing, dancing etc. He /she were able to add small number but were able for larger numbers more than 60. This assessing process is necessary as mentioned in vygotskian's 'Zone of Proximaldevelopment'. However, these mediators are the members of the society and the culture who are again greatly influenced by the social and the cultural background. Here for the out of schooling Badi children's concept of addition and subtraction was through the social interaction as Vygotsky's ZPD.

Multiplication and Division

Multiplication is nearly another yielding way of performing repeated addition the respective grouping to be combined contained the same number of elements. Hence multiplication is a special case of addition through observation. Similarly division is a special case of subtraction. Just as multiplication is concerned with totaling the result of repeated use of same add and division is concerned with determining a given subtracted can be withdrawn from a specified minuend. Hence division reverse the process of multiplication as stated in a common definition, "Division is a process for determining the value of one factor when the

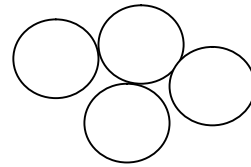
product and its other factors are known."(Spencer, 1966).during the research study, the researcher observed that the levels of difficulties are increasing through counting to addition, subtraction, multiplication and division respectively. On the way of observation it was found what the concept the division was slightly greater than that of multiplication on those Badi children.

The research asked respondent R1 and R2 taking 4 groups containing 3 marbles each and asked:

R : How many pebbles are there in this group?

R1 : 3

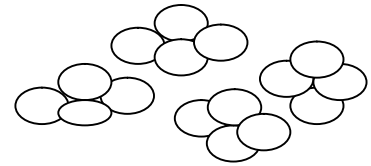
R2 : 4



R : If there are 4 such group how many will be?

R1 : 5

R2 : *No response.*



R : (showing 4 groups) how many in these groups in total?

R1 : 5,6, 7,.....12 here are twelve.

R2 : 2, 3, 4, 5,....,11 here are eleven.

R : If 3 marbles are in the one group and there are 4 such groups how many will be?

R1 : 12 marbles.

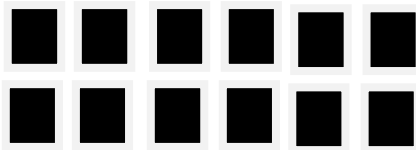
R2 : 13 marbles.

The researcher observed in another context i.e. he /she were sent to buy 3 biscuits each costing Rs. 5 and the research asked about the money to pay. He /she said 5, 4 thrice. Then researcher gave him thrice Rs. 5 then asked how much is the total costs of 3 biscuits? Then he / she replied Rs 20 and Rs 15.

Similarly, on other day while he / she were playing with his friends, the researcher gave him 12 marble and asked.

R : If you distribute these 12 marbles equally to your 4 friends, how much each will

get:



R1 : *I don't know.*

R2 : *3 marbles.*

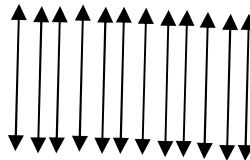
R : Distribute these 15 marbles to your 5 friends by giving each to 3 marbles.

R1 : *3 for one, 3 for second, 3 for third, 3 for fourth, 3 for fifth.*

R1 : *5 for one, 5 for second, 5 for third.*

Again, other respondent R1 and R2 were feeding his/ her hen and pigs. The researcher asked as:

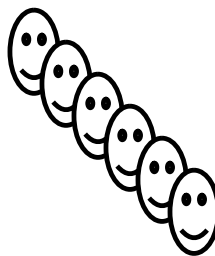
R : How many straight lines are there?



R1 : *There are 10 straight lines.*

R2 : *There are 12 straight lines.*

R : How many heads are there?



R1 : *No answer.*

R2 : 4 heads.

R : If a family needs 6 pathi of rice per months, how many pathi of rice they need for 3 months?

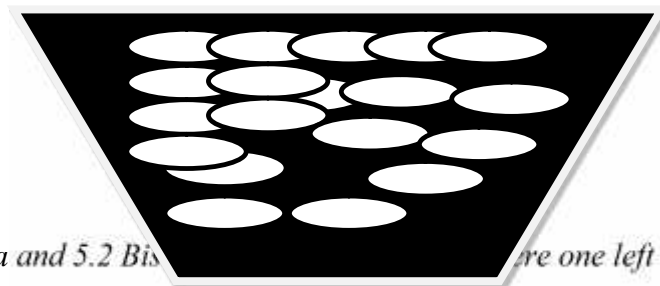


R1 : answer using the fingers, it is 18 pathis.

R : If there are 24 marbles in a group and four different groups are formed, how many marbles are there in total?

R2 : Answered using his fingers 20 chara 80 and 4 chara 16. Now it is about 96 marbles adding 80 marbles and 16 marbles.

R : You have 45 breads to be distributed for 9 men, how many bread do each gets?



R1 : 45 means 2 Bisha and 5.2 Bishas. There are one left 4 breads when 4 Das is divided to 9, in which the left breads 4 and 5 make 9 breads. Then each person gets 5 breads as the 9 breads are distributed one to each person equally.

R : How much money they get when the bills of 30 equally divided to 3 persons?

R2 : Answered drawing lines on the ground 30 are means 3 Das. Hence it is Rs 10 when Rs 30 is divided equally to 3 persons.

Above observation the researcher concluded that respondent R1 and R2 had the concept of division as the division of whole object in to equal parts.

By the observation and active participation with respondents, it was concluded that, they feel the concept the multiplication is more difficult than division. They used the concept the multiplication and division although they did not know about the multiplication and division.

How did they make the concepts of multiplication and division?

Although they have the concepts of counting few numbers, they were able to the simple addition and subtraction as the process of counting and grouping for multiplication and division. They only transferred the knowledge learnt in other cases.

The researcher was observed the respondent's activities. The researcher wanted to know how did he/ she make the concepts, then the researcher questioned to respondent then she answered of one question was given like:

"When my mother was selling hen and doing the calculating of rupees. I sat hear her and listed carefully. My mother sold 1 hen at the rate of 300 rupees. In this way I learnt and used in different situation."

Another day, the researcher observed the activities of another respondent's' Puskar'. The researcher asked his father as question relating with the concepts of division.

"Ones my son was sent to shop to buy a pack of biscuit. He bought it and starting sharing to his brothers and sisters. He took himself many pieces and gave brother and sister a little. Then all started quarrelling. I went there and shared to them equally. After that he copied it and started to share any things equally."

It means that he made the concept through his father. Similarly, he was able to the divided the object but he was unable to answer the question like "If 25 divided by 5 then what will be the result?" So he had a concept of division in practically but did not have theoretical knowledge about division. In multiplication and division, they used method of grouping sum

system. They used sometimes finger with the help of base five and used one to one corresponding.

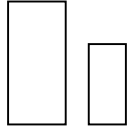
As the researcher observed their daily activities and interview wherever required, it was concluded that they had gained such concept of multiplication and division especially from their peers, family and other elder of society.

Vygotsky feels that the child thinks syncretically about unfamiliar situation on objects. Vygotsky emphasized on interaction. For him mind as an active, organizing principal collaborating with the environment in transforming through towards an increasingly delicate adoption of thought to things.

Analysis of Knowledge of Shape and Size

In the content of mathematics, shape and size related to concrete materials. In any materials we can see different length, breadth, height in different things. By the research researcher decide to know how Badi child develop the knowledge for shape and size. For finding their concept the following question were asked to the responded.

R : Which of the following things has more length?




R1 : 'I'(the figure first shows the high length) I II

R2 : 'II'(the figure second has high length)

R : Can you gas the length of these things?

R1 : ' Yes'(he has got the knowledge about the length)

R2 : ' No'(she has not knowledge about length)

R : What is the shape of the coin? 

R1 : *'Square'(he has not knowledge about circle)*

R2 : *'Circle' (she had the knowledge about round shape)*

By the asking this questions to the parents, child and neighbor for finding their knowledge towards the different things. By taking the response of different person following result would be obtained by triangulating among these views. In this research triangulation is to the views and knowledge of parents and their child. All the activity right answer or wrong answer was seen as their ethnical cultural activity in mathematics. In this research addition, subtraction, multiplication and division of mathematical operation was checked by the researcher by the study researcher found that all the mathematics activity depends upon their own society and their ethnicity.

Some of the parents response accurate result, some were the right answer but some parents cannot response. For the question to the child they were asked some answer to their context which they gain their own community and use themselves. On the result of this triangulation shows that they have no good knowledge for shape and size of the things. They cannot develop their knowledge as a school children.

Chapter-V

FINDINGS, CONCLUSION AND IMPLICATIONS

Summary

This study has been done to explore mathematical concept of out of school children of Badi at Thalara Bajhang and the research is descriptive in nature. The case study of two Badi children is related with how they use basic mathematics.

The chapter is concerned with the summary of study and findings, conclusion and implications as well as the information were collected through observation, interview, interaction and case study. Mathematic is a discipline and it is essential for every human in the world. It has own symbols, language, techniques and rules which are used other disciplines too as an interdisciplinary nature of the subjects.

This study is case study. It is related to the basic mathematical concept practices by out of school children of Badi community. The main objective of the study was to find out basic mathematical concept practiced by out of school children of Badi community and to analyze the basic mathematical activities of out of school children of Badi community. Although they were not sent to school and they didn't get formal education for mathematics. They used mathematical concept through their experienced and practice from their community.

To fulfill the objectives various literatures were reviewed. After reviewing the literature the researcher conducted this research into Bajhang district at Kotbhairab VDC Thalara of Badi community which was the population of the study. Only two children of Badi community named PuskarBadi and Samjhana Badi were slected as a sample in case study. The parents and friends were asked to validate the response of those out of school children. The

intonations were collected through case study, interview, observations, and interactions as well as photos. These information and data were analyzed mainly in descriptive form in sequential order.

Finding

From the study the main finding were as follow:

-) The study found that out of school children of Badi learnt mathematical concept in their daily life by doing the activities observing other, participating and peers to the friends in their community.
-) They learnt basic mathematical concepts like counting, addition, subtracting, multiplication and division and measurement shape and size through doing the household, working in the form and playing with peers.
-) They acquired most of the mathematical knowledge through their parents and their skills were practiced based rather than theoretical understanding.
-) They didn't have meaning of applied concept but they tried to apply mathematics through observation and imitations.
-) Village environment taught them practical skills on the basis of learning by doing.
-) They uplifted their knowledge about mathematics through community.
-) Most of the problems solved by the Badi children were seemed to be solved by Zone of Proximal Development (ZPD).
-) Their cognitive development process is increasing with their maturation, interaction with society and active participation at home.

Conclusion

Badi children who are out of school learnt most of the mathematical concepts and knowledge at home and in their own community because they do the household peers, they help their parents work to solve their counting the finger. They could do very simple mathematical tasks slowly with using methods and roles of mathematics. Many household skills related to mathematics were learnt in the social context. Children were able to use mathematical concept gradually by participating various activities at home. They knew their mathematical problem about what to do and how to do. Their respond was that they learned those mathematical skills playing with their friends working with their parents and community people even they tried it to solve the problems through observation. If they unable to do the household job their parents would shout on them. From the discussion above, the following conclusion can be drawn.

-) Out of school children had basic mathematical knowledge and concept.
-) They could perform simple mathematical calculation.
-) They acquired most of the mathematical knowledge from their parents, community and friends.
-) Their skill was practice based rather than theoretical understanding.
-) They felt subtraction and division are difficult task and they solved the problem too slower.
-) Measurement skill was no such accurate to theories but they could measure any size, shape and figure.

Implication

Although this research was conducted in Bajhang district at Kotbhairab V.D.C. Thalara, it can be generalized for other children who are out of school. The construction of mathematical skills of a particular age and environment can be equalized. It is found that out of school children learnt basic mathematics in their own environment through their own practices, effect, participation as well as their parent proper support and guided. They can learn without teacher and formal education. Thus, it should be kept in mind that when the government makes curriculum for out of school program (OSP), Lev Vygotsky's concept of Zone of Proximal development (ZPD) can be introduced and it is learnt from their parents and their social environment where they live by the curriculum Development Centre. On the basis of the parent study, the following recommendations are prepared.

-) Out of school children can do different mathematical activities. Therefore, detail study can be conducted to explore further mathematical concepts.
-) There are many Ethno groups and marginalized or minority groups which they have their own types of mathematical concept. Therefore, similar study can be done on other community.
-) Learning sequence should be developed for the process of family small groups of small numbers easily.
-) Out of school children use the means of measurement that are available in their own locality which are based on daily life needs. Therefore, the means of measurements should be introduced in the school education as a supplementary of the pupils learning.

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Appendix- A

Name of the parents

Name of the family member of child PuskarBadi

1. Rup singeBadi (father)
2. DeelaBadi (mother)
3. MicalBadi (brother)
4. NirajanBadi (brother)
5. SundariBadi (sister)

Appendix- B

Name of the family member of SamjhanaBadi

1. Range Badi (father)
2. KeudiBadi (mother)
3. BikasBadi (elder brother)
4. DhanaBadi (sister in law)
5. MausamBadi (brother)
6. AjuBadi (brother)
7. BinaBadi (sister)

Appendix-C

Interview for Parents

1. Why did no
2. How do your children learn idea of counting?
3. Can you help your child for doing subtraction?
4. Did you provide the maximum time for learning to your child?
5. How your child can multiply when he/she doing their activity?
6. Can you solve division problem easily in your daily activity?

Appendix – D

Interview for the PuskarBadi

How many family members do you have? Can you count?

1. How old are you?
2. How many cow and buffalo in your house?
3. If five pebbles in one group and these are four such groups, How many will be?
4. Do you use sticks or other concrete materials for adding?
5. If you have fifty rupees and you spend 30 rupees then how much money you have?
6. If you have 20 hens among them 7 were killed then, how many are remaining?
7. If you need 5 pens each cost 15 rupees then, how much you pay for 5?
8. If a person collected 3 rupees per day, how much money can 5 persons collect for a day?
9. If there are 24 marbles in a group and 4 different groups are formed, how many marbles are there in total?
10. How do you identify the shape of the different things?

Appendix E

Interview for the SamjhanaBadi

1. If you have 5 pigs and 15 hen then how many all of this?
2. If there are 5 pigs and 4 hens kept in case how many pigs are hens are there all together.
3. You have 6 buffalo, if you tell 3 buffalo, how many buffalo you have?
4. If a person collect 3 rupee per day, how much money can five persons collect?
5. How many marbles do each get when 8 marbles are equally divided for the 2?
6. How many Rs.20are there in Rs. 100?
7. What is the shape of the coin?
8. How many marble do they get when at marble are equally divided for 2? How do you do?
9. Do you know your birth day?
10. You have 45 brads to be distributed for 9 manes, how many brads do eat gets?