

2023

PUSPA ADHIKARI

MATHEMATICS LEARNING CULTURE OF STUDENTS IN PUBLIC SCHOOLS

**MATHEMATICS LEARNING CULTURE OF STUDENTS IN PUBLIC  
SCHOOLS**

**A  
THESIS  
BY  
PUSPA ADHIKARI**

**IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE  
DEGREE OF MASTERS OF EDUCATION**

**SUBMITTED  
TO  
DEPARTMENT OF MATHEMATICS EDUCATION  
CENTRAL DEPARTMENT OF EDUCATION  
UNIVERSITY CAMPUS, KIRTIPUR  
TRIBHUVAN UNIVERSITY  
KATHMANDU, NEPAL**

**2023**



त्रिभुवन विश्वविद्यालय  
शिक्षा शास्त्र केन्द्रीय विभाग  
**गणित शिक्षा विभाग**

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**Letter of Certificate**

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Date: 23 January, 2023

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Mr. AbatarSubedi

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**Letter of Approval**

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By

**Puspa Adhikari**

Entitled

**“Mathematics Learning Culture of Students in Public Schools”** has been approved

in partial fulfillment of the requirements of the Degree of Master in Mathematics

Education.

**Viva-voice Committee**

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### Recommendation for Acceptance

This is to certify that Mrs. **Puspa Adhikari** has completed her M. Ed. thesis entitled “**Mathematics Learning Culture of Students in Public Schools**” under my supervision during the period prescribed the rules and regulations of Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward her thesis to the Department of Mathematics Education to organize the final viva-voce.

Date: 23 January, 2023

.....

Mr. AbatarSubedi  
(Supervisor)

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## **Dedication**

This thesis is dedicated to my father **Mr. Tek Raj Adhikari**, and my mother **Mrs. Kalpana Adhikari**. Whose love, support, and encouragement have enriched my soul and inspired me to purpose and completed this research.

### **Declaration**

This dissertation contains no material which has been accepted for the award of another degree in any institution. To the best of my knowledge and belief, this dissertation contains no material previously published by any authors except due acknowledgment has been made.

.....

**Puspa Adhikari**

## Acknowledgements

I would like to express my deepest appreciation to my respected supervisor Mr. AbatarSubedi Head, Department of Mathematics Education, T.U. Kirtipur for his motivation, patience, encouragement, guidance, suggestions, and continuous support. His guidance helped me in all the time of research and writing work of this thesis. Without his constant supervision and intellectual guidance, this research would never have appeared in this form.

should remember here all the principals and Mathematics teachers of selected schools for their sincere co-operation and support. I am also very much indebted to the selected school family of Shree Mangal Secondary School and Shree Arunodaye Secondary School at Kathmandu district for their kind cooperation and for providing the opportunity for the collection of data.

Also, my thanks go to the computer service man for typing and editing APA format of my thesis. I would like to express thanks to my all friends and mathematics teachers who provided me their valuable time and suitable information for my research. I must extend my heartfelt thanks to all my colleagues, who directly or indirectly help me in completion of this study. I wish to express my gratitude to those who may have contributed to this study directly or indirectly.

Puspa Adhikari



### **Abstract**

This is a case study related to explore “Mathematics Learning Culture of Students in Public Schools”. The objectives of the study were to explain the mathematics learning culture of students in public school and to compare the mathematics learning culture of students in rural and urban school. This study was based on case study approach under the qualitative research method. The study was based on only in Kathmandu district.

From the research it was found that the home environment of the students of urban schools in learning mathematics is much better than that of the students of rural schools is not good. The physical area of the rural school was small and limited facilities while the physical area of the urban school was large and wide facilities. The financial standard of urban school students was higher than that of rural schools students. The female students of urban schools were found to be more active in mathematics studies comparison to that of rural school. In urban school, while teaching mathematics, the teacher was found to be using student-centered method, problem solving method and demonstration method. In rural public schools, other teaching methods have also been used, but more and more lecture methods have been used. Some of the culture of teaching mathematics was found to be similar in urban and rural schools. In the both public schools, the operating system, the environment for teaching mathematics in the school, some facilities for learning, language difficulties, the ways in which students learn mathematics were found to be similar. Hence, it is concluded that the mathematics learning culture of urban public school is more supportive for students in comparison to rural public school of Nepal.

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**List of Abbreviation**

B. Ed	=	Bachelor of Education
B.S	=	Bikram Sambat
HSEB	=	Higher Secondary Education Board
ICT	=	Information and Communication Technology
M. Ed	=	Master of Education
Ph. D.	=	Doctor of Philosophy
S.L.C	=	School Leaving Certificate
SS	=	Secondary School
T.U	=	Tribhuvan University
ZPD	=	Zone of Proximal Development

## **Chapter I**

### **Introduction**

This chapter presents the background of the study, statement of the problem, the objective of the study, justification of the study, delimitation of the study and definition of related terminology.

#### **Background of the Study**

Mathematics is the central part of school curriculum in Nepal and the others countries of the world. Every society has observed mathematics as basic needs of human civilization. Mathematics has started at the infancy level from the beginning of human civilization to the advanced level at twenty-first century. Human being is divided in many respects. They belong to particular place, religion, caste, ethnicity, language, culture, and different forms. It has diversity in many respects such as geophysical setting, socio-cultural formation as well as deep rooted caste system, kin system and inhibition of mixed ethnic group along with their own different norms, values, culture, and religions. As school reflects the society, Nepalese public school's classroom therefore consists of all this heterogeneity in its construction. In this context without examining the micro-social setting or life of the classroom and understanding its meaning, structure and interaction, no mathematics learning business and any forms of outside intervention would be meaningful, effective and successful, Considering this context of pluralities, learning culture is also becoming an increasingly salient topic of discussion in education .So this research has made a study of mathematics learning culture of student in public school (Shrestha,2016).

There are many cultural programs in teaching and learning mathematics in the context of Nepal. The students leave their own family culture outside the school and enter the school that is different from their home culture. Because of this different in

the home and school culture. Many student struggle to learn mathematics that is even more decontextualized from their community and society (UNESCO, 2008).A common image of mathematics relates to calculation and it goes against empirical background. Present academic circle also asserts that mathematical conceptualization must be linked to the problem solving. They further assert that mathematics is deeply linked to culture and hence it cannot be isolated from social, political and economic factors of the living world. In Nepal community tends to consider mathematics as culture free subject. This shows orthodoxy prevalence in the academic in the circles .Butethno mathematics is different because it is the study of a cultural group's mathematics. It examines how different cultural groups use and discourse mathematics "Nepal has multicultural and multilingual communities residing in all parts of the country. There are 125 ethnic groups in Nepal contributing to immense culture diversity in the small land area of 147181 Square Kilometers"(UNESCO,2015).Each ethnic groups and sub-groups have different cultural traditions. The different cultural traditions and festivals may affect out learning mathematics. The students are absent for many days because of the local cultural festivals. Human being is divided in many respects. They belong to particular place, region, caste, ethnicity, language, culture and different value system. All these things contribute a person to be different from one to another. Nepal as a multicultural, multiethnic and multilingual society has more divisions and these divisions are manifested in different forms. It has diversity in many respects such as geographical, socio-cultural formations as well as deep rooted caste system, kin system and inhibition of mixed ethnic group along with their own different norms, values, culture and religions. As school reflects the society, Nepalese governmental school's classroom therefore consists of all these heterogeneities in its construction. In

this context without examining the micro social setting of the classroom and understanding its meaning, structure and interaction, no classroom business and any forms of outside intervention would be meaningful, effective and successful (Adhikari, 2007).

Culture is a way of life. This includes the way of eating food, wearing clothes, using language, making love, getting married, playing the games etc. It also includes reading, writing, listening, looking a bounds. All of this represents the culture of society. Different society has their different cultures. In our educational institutions, many children from different cultural backgrounds come to acquire education. A major goal of mathematics learning cultural educations stated by specialist in the fields to reform public schools, colleges and universities so that students from diverse racial, ethnic and social cultural class group swill experience educational equality. Another important part of learning culture is to give students equal chance to experience educational source and mobility (Acharya, 2015). Culture generally refers to patterns of human activity and symbolic structure. There are many different definitions of 'culture 'and each one of them reflects a different theoretical basis for understanding or criteria for evaluating, human activity. The culture term includes technology, art, science, as well as moral system and the characteristics behaviors and the habits of the selected intelligent entities. Anthropologists most commonly use the term 'culture' to refers to the universal human capacity to classify, codify and communicate their experiences symbolically. It can also be argued that culture is the way people live in accordance to beliefs, language, history or the way they dress. Similarly, culture is continually being socially constructed and because individual identifies are constructed through the interaction of racial, ethnic, class, gender and other experiences (Acharya, 2070 Studies in Mathematics Education p.92).

Nepalese society is ethnically diverse and complex. The varied ethnic groups were evolved into distinct pattern over time. There are many ethnic groups such as Magar, Rai, Sunuwar, Tamang and Gurung live in the eastern mountain observing their own culture and speaking their own language. Sherpa ethnic region influenced in the northern Himalayan region influenced with the Tibetan cultural. Newar ethnic group is famous in the Kathmandu valley having own culture and language. The ethnic groups of Tharu, Maithli, Bhojpuri, Danuwaretc live in the Terai region. Braman and Chhetri also play an important role in Nepalese society. Newars have lived in the Kathmandu valley since prehistoric times, and immigrants that arrived at different periods in its history eventually merged with the local population by adopting their language and customs. Newar is a linguistic cultural community mostly of Tibeto-Barman and some in do- Aryan ethnicities. They are bound together by a common language and culture. Their common language is Nepali Bhasa or linguistic progenitor of that language.

So, in public school there are the students of diverse culture groups. There are various problems. In teaching, mathematics learning in the culturally diverse classroom of children. So many problems are occurring frequently. That is why I decided to carry out systematic study on the topic “Mathematics Learning Culture of Student in Public School.” In the context of Nepal all people do not get the chance to be educated due to socio-economic, and cultural minority and the groups face mainly problems, which directly affect the education system. Our tradition concept and learning method play vital role in mathematics learning culture .Hence I was motivated to carry out the study on “Mathematics Learning Culture of Student in Public School”.



### **Statements of the Problem**

This study was concerned to find mathematics learning culture of students in public school. Students are culturally backward and have to face different problems than other students. Mathematics is a major for every student to his/her career. The learning culture and learning mathematics research is an emerging field of study in the context of Nepal. This research focuses on to find out the mathematics learning culture. Cultural variations in mathematical behaviors are also seen in the ways people use mathematical representations in their every activity. Mathematics is used in everyday life in to pursue the goals that differ from goals of academic mathematics found in schools and universities. Learning is an inherently cultural activity. It is situated in the bed of routines, traditions, beliefs, expectations and values of students, teachers, administrations, parents and the public. Thus, the inclusion of cultural and everyday mathematical knowledge in school mathematics must take into account to appropriate way to teach mathematics. Such practice help the students grasp a deeper understanding of their local environment and circumstances. The cultural discontinuity and children's learning would be the state controlled national curriculum and teaching methods. So, the investigator has taken up a research titled "mathematics learning culture of student in public school".

### **Research Questions**

The research questions of this study were as follows;

1. What is the relation between culture and learning mathematics?
2. What is the present condition of mathematics learning culture of student in public school?
3. Do the mathematics learning culture similar in rural and urban public school?

### **Objectives of the Study**

This study was designed specially to fulfill the following objectives as;

1. To explore the mathematics learning culture of students in public school.
2. To compare the mathematics learning culture of students between rural and urban school.

### **Justification of the Study**

Mathematics is an essential part of school curriculum, so every student should study. It has been taught for all pupils as a compulsory subject at school level as well as optional subject. Learning mathematics is a difficult and challenging because of its nature, course content, social need, student interest and exploration of new field of knowledge. The world now has become a global community. In this context this study can make significance contribution in the public school improvement process and building up the model of learning culture in an ineffective government school. This study is helpful to get information about the effects of mathematics learning culture of student in public school. It's major point are follows.

- ) This study provides the knowledge about the relation between culture and learning mathematics.
- ) This study helps to find the mathematics learning culture of student in rural and urban schools of Nepal, the finding of this study contributes to generate new knowledge about learning culture in mathematics at secondary level.
- ) It helps to teachers for understand the learning difficulties of students select the suitable teaching method for their ease.
- ) This research helps to dig out the mathematics learning culture so that curriculum designer and policy maker can construct the curriculum as per the learning culture of student.

- ) This study helps researcher to dig out learning problems and also mitigate them.
- ) It is helpful to be the integrated learning mathematics. And also, it is helpful to make the inclusive classroom teaching.

### **Delimitation of the Study**

This study was conducted within the following delimitations;

- ) This study was based on only Kathmandu district.
- ) This study was bounded on Shree Mangal Secondary School, Kirtipur and Shree Arunodaye Secondary School, Dakshinkali
- ) This study was included head teacher, two mathematics teachers and four mathematics students as respondents of the study.
- ) In-depth interview, classroom observation and document analysis were used as tools of data collection.
- ) This study was based on case study approach under the qualitative research method.

### **Operational Definition of Key Terms**

**Diversity.** The concept of diversity encompasses acceptance and respect. It means understanding that each individual is unique, and recognizing our individual differences. These can be along the dimensions of race, ethnicity, gender, sexual orientation, socio-economic status, age, physical abilities, religious beliefs, political beliefs, or other ideologies.

**Culture.** Culture has defined as the distinctive patterns of ideas, beliefs and norms that characterize the way of life and relation of a group within a society.

**School culture.** School culture reflects the values, beliefs and traditions of the school community delineation, the relation among students, parents, teacher and head teacher.

**Learning culture.** Every member in society perform their social activity being bounded with social, norms values and beliefs mean while they have been using mathematics either verbal or written form Mathematics education present include from in society with more practice and exercise, development, promoting and tending its area of application is called learning culture.

**Urban public school.** For personal development of children's, the school established in urban area with suitable teaching method and techniques are called urban school.

**Rural public school.** For personal development of children's, the school established in rural area with suitable teaching method and techniques are called rural school.

## **Chapter II**

### **Review of Related Literature**

Review of related literature is an essential part of research for the researcher because related literature helps and gives the guidance to researcher for the future study. This study was concerned with the mathematics learning culture of students in public school. Actually, there is a few numbers of studies about mathematics learning culture of students.

#### **Empirical Literature Review**

Empirical review deals with the review of the books, thesis, journal and internet and so on. I have reviewed related to mathematics learning culture So, I have reviewed some research related to my study.

Adhikari (2007) carried out the study entitled “Learning Culture in Mathematics Classroom in an Effective School (A case study)”. His topic was related to government school’s mathematics learning culture. His aim was to explore the “mathematics classroom culture climate in an effective school” He used qualitative research design and the tools where in on participant observation, ethnographic interview and school documents. He concluded that indeed classroom is full of heterogeneity constituted and influenced among other things by the socio-cultural complexities. There is certain structure, culture and a value in which classroom is operated. They have their own rituals and traditions. The achievement of the student responds to the cultural capital of the students, the rich have different culture capital than the poor students.

Wagle (2017) has conducted a research study entitled “Classroom Discourse in Mathematics: A Multicultural Perspective”. His aim was “To explore the ways for making classroom discourse students friendly” and “To explore teaching strategies of

classroom discourse from multicultural perspective”. He used to qualitative research design and the tools where in on classroom observation, interview guideline of teachers and student and data collection procedure. His findings and conclusion were related with existing classroom discourse and making classroom discourse students friendly. Mathematical concepts based on cultural perspectives allow students to not only reflect and appreciate their own culture but also the culture and traditions of others. The involvement of members of the community is an essential part of the integration of cultural components into mathematics activities.

Fasheh(1980) pointed that the diverse basic assumptions of cultural norms and values deviate the mathematics learning culture of students in developing and underdevelopment countries. His finding and conclusion were related with the distinct variance of learning culture in Third World Countries and Western Countries.

Cultural learning is the way a group of people within a society or culture tend to learn and pass on information. Learning styles are greatly influenced by how a culture socializes with its children and young people. Cross-cultural research in the past fifty years has primarily focused on differences between Eastern and Western culture (Change, et al, 2010). Some scholars believe that cultural learning differences may be responses to the physical environment in the areas in which a culture was initially founded (Change, et al,2010). These environmental differences include climate, migration patterns, war, agricultural suitability, and endemic pathogens. Cultural evolution, upon which cultural learning is built, is believed to be a product of only the past ten thousand years and to hold little connection to genetics (Change, et al, 2010).

Khanal (2015) completed the Ph.D. entitled “Learning Strategies of Mathematics Students”. His aims were to explore students learning strategies in mathematics, to analyze the different in students learning strategies by gender, ability

group, location and school types, to identify the most effective learning for better achievement in mathematics, to examine classroom practices as learning strategies. He used mixed method research design to deal above research question. The research tools were questionnaire, observation and open-ended interview. He found that student created and used different learning strategies while learning mathematics like; peer learning, elaboration, help seeking, effort management, rehearsal, time and study management, organization and critical thinking. The present curriculum of mathematics was elite favored and designed to meet the need of urban school students and rural school. As a result public school students used more learning culture and strategies.

Shrestha(2016) has conducted a research study entitled “A Cultural diversity and difficulty in learning mathematics”. His objective was “To identify the causes of difficulties in learning mathematics of culturally diverse students at school and to explore the relation between culture and learning mathematics”. He researches design was qualitative research design within ethnographic study. His major tools were observation, In-depth interview and document analysis. He found that pupil’s weak perception on mathematics, lack of culture friendly curricular materials, mathematics anxiety, traditional teaching learning activities, family’s socio-economic status and discrimination in classroom and home-school mismatch are causes of difficulty in learning mathematics of culturally diverse students at school.

### **Research Gap**

I found many books, and previous research studies, they have not discussed in this area. I noticed the gap between the reviewed literature and my purposed title of the study. Thus, to fulfill this gap I am motivated to study on this topic. So, I believe my title for this dissertation is suitable for carrying out a research. Among identifiable

cultural groups. It refers to a broad cluster of ideas ranging from distinct numerical and mathematical systems to multicultural mathematics education”. Very few research works have been carried out on the “mathematics learning culture of student.

### **Theoretical Literature**

There are different learning and sociological theories, which can be used for the analysis and interpretation of data such as Vygotsky’s social constructivism theory of constructivism and Ausubel’s meaningful verbal learning theory.

**Constructivism.** Constructivism is a theory of knowledge that argues humans generate knowledge and meaning from an interaction between their experiences and their ideas. During infancy, it was an interaction between human experiences and their reflexes or behavior-patterns (Pandit, 2069). The constructivism theory is based on observation and scientific study about how people learn. People construct their own understanding and knowledge, through experiencing things and reflecting on those experiences. In general case, it usually means encouraging students to use active technique (experiment problem solving) to create more knowledge and then to reflect and talk about where they are doing and had their understanding is changing. Constructivism transforms the students from a passive receipting of information to active participant in learning process.

**Vygotskian social constructivism theory.** Constructivism is the new theory. Vygotsky has developed socio-cultural theory and he believed that children are active seeker of knowledge. In this theory, rich social and cultural context deeply affect children’s cognition knowledge is constructed in social situation of discussions rather than being the reflection of the objective reality, which is known as social constructivism. In social constructivism theory, each human being makes sense of the world in a unique way. According to Vygotsky, the children’s development can be



understood by studying the individual that it needs to examine the external world. Child can capture every kinds of information which is needed from the context to construct the knowledge. The role of experienced person is to assist the child providing the structure and questions that provide the assembly of the information and organizations (Vygotsky,1978).Vygotsky's zone of proximal development (ZPD) has many implications for those in the educational milieu. One of them is the idea that human learning presupposes a specific social nature and is part of a process by which children grow into the intellectual life of those around them. According to Vygotsky, an essential feature of learning is that it awakens a variety of interacting with people in his environment and in cooperation with his peers (Vygotsky,1978).

Children construct knowledge not only from individual but also from the context and the interaction with others who have more knowledge. The child needs some mediator like parents, teachers, adults or peer to uplift his knowledge from the knowledge s/he has (Burton,1999).Thus, Vygotsky proposes that child's knowledge could be predicted if we could understand a social context. Thus, Vygotsky's child is a social, outer culturally determined child. The mathematics learning culture should be set up in such a way to foster group work and student collaboration in order to allow student to take on the role of instructor with their peers as they master the skills at hand.

**Ausubel's meaningful verbal learning.** David P. Ausubel has developed a theory of meaningful verbal learning that contains arationale of expository teaching and shows how lecture type's session can be made more meaningful in any discipline (Khanal, 2009). According to Ausubel, if a student has positive attitude to learn certain task, he/she is likely to learn certain task, he/she is likely to learn the task in meaningful way. Therefore, for meaningful learning, the learners should employ

positive learning set and the material they learn should be meaningful to them. The same type of learning can be rote or meaningful depending entirely on the process (Bell, 1978).

As far as I'm concerned, "Mathematics learning culture is related with ethnomathematics. Ethnomathematics is the study of the relationship between mathematics and culture. The mathematics which is practiced in public school".

### **Conceptual Framework**

As discuss above literature and theoretical perspectives cultural difference can be regarded as one of the most influential factors for students' learning. The student with different cultural background in the classroom may expose different learning culture in according with home culture. Here the researcher has developed the framework with the help of above literature and theories. In this study, the conceptual framework was used as follow;

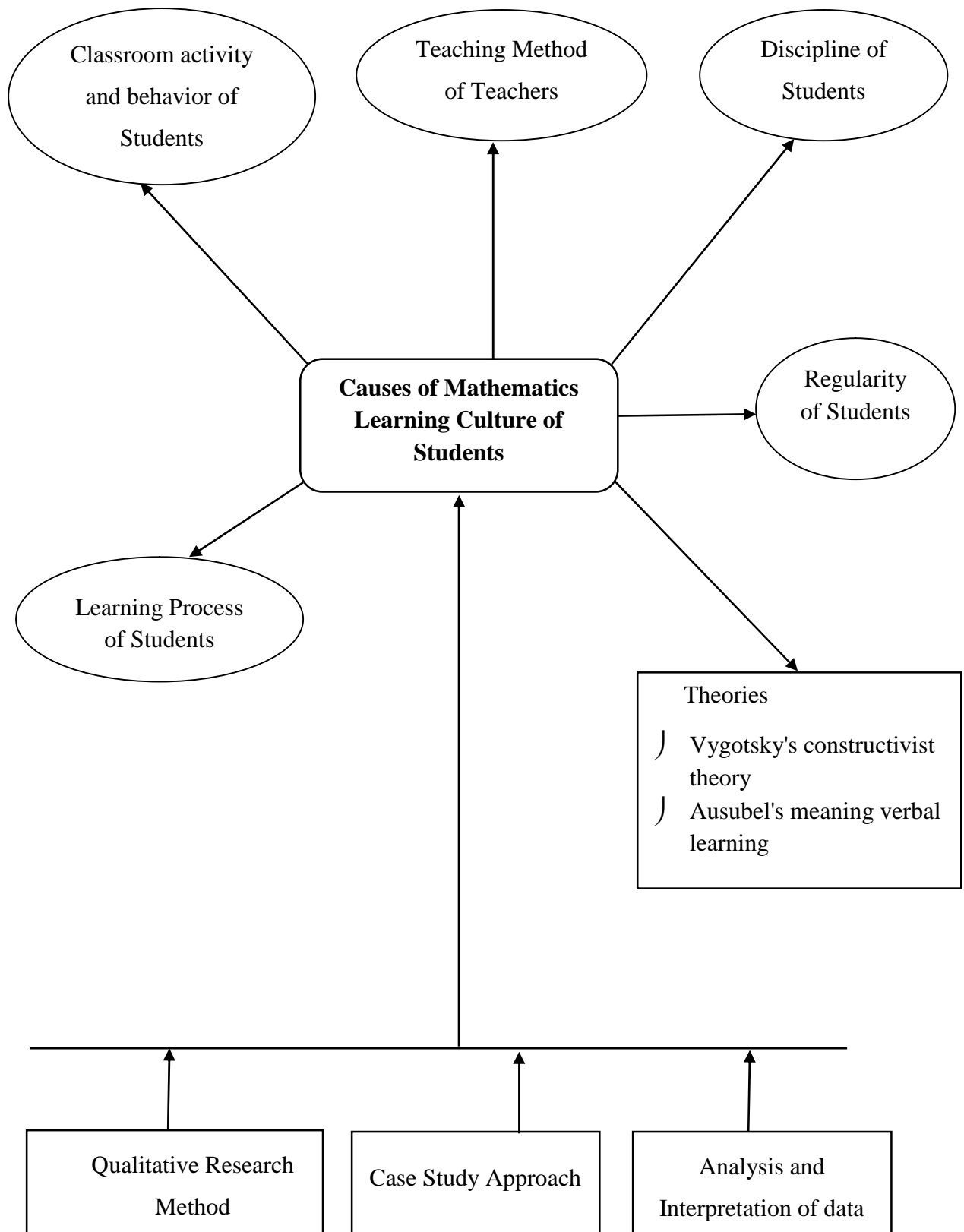


Figure 2.1: Conceptual Framework

The conceptual framework which mention in above figure is the important part of this study mathematics learning culture of student in public schools of this study. I have applied the qualitative research design, different theories are Constructivism theory, Vygotskian social constructivism theory, Ausubel's theory to interpret the data. This study has centered to explore the way of addressing the mathematics learning culture of students in public school. Data collection, analysis and interpretation process has done by the help of different theories mention in theoretical literature.

## **Chapter III**

### **Methods and Procedures**

This chapter delineates the design of the plan and procedure of study, That determines how the research becomes complete and systematic. The methods applied in the study has been discussed in the following sections: Research design, site selection, sample and sampling strategies, research tools, reliability and validity of the tools, data collection procedure, data analysis and interpretation.

#### **Research Design**

A research design is the document of the study. Research design is the framework that is created to seek answers to research questions (Carool, 2007). According to Hersh (1997) case study research is a qualitative approach in which the investigator a bounded system (a case) or multiple bounded system (cases) over time, through detailed, in-depth data collection involving multiple sources of information and reports a case description or case-based themes. A comprehensive study of a social unit-be that person, a group, a social institution, a district or a community is called a case study (Young, 1998). One of the important things in qualitative research is that the researcher has to perform a role of human tool of data collection that needs relevant and appropriate knowledge and skills about it. Qualitative research emphasized on inductive analysis of data that proceeds to find theory to explain the data.

This study based on the qualitative research designs with case study. The case of this research was two public school whose learning culture were studied. Regularity in class, learning process, activity and behavior relating to students studied in this very case study.

### **Area of the Study**

My study is related to the mathematics learning culture of student in public school, the Location selection is also a very important task in order to find the relevant information. So, I selected Shree Mangal Secondary School, Kirtipur Municipality, Kathmandu as urban public school and Arunodaye Secondary School, Dakshinkali Municipality, Kathmandu as rural public school as sites of my research program.

### **Selection of Case Respondents**

This study was based on qualitative research desing. So, the sample size of this study need not to be large. For this, I selected two schools by purposively. For this purpose, only four students were selected for the case respondents as one boy and one girl from each sample schools. For the detailed of the study I chose mathematics teachers and head teacher as case respondents of this study.

### **Tools of Data Collection**

In a case study researcher used the relevant tools and techniques as interview guideline, observation note, school document and so on in order to collect information from the respondents. The tools were modified and developed according to the suggestion of the supervisor.

**In-depth interview.** I had developed the different interview schedule form for head teacher, mathematics teachers and mathematics students which I have selected for case respondent. In this study, the required information was not possible to gather through the observation and documents. Interview guidelines were used for head teacher, mathematics teacher and student to find out faced problems of learning environment, teaching process, cultural and society, learning process, students interaction and so forth. To go in-depth of the information interview was much more

helpful. So, I had carried out open ended interview to clear his/her cultural regarding learning mathematics. I had taken in-depth interview of head teacher, mathematics teacher, mathematics students using unstructured questionnaires. I used this tool as required to the key students and their mathematics teacher. On the basis of objectives, I developed the interview theme in semi-structured form

**Observation note.** Observation note was used to identify the students' activities, teachers' activities, interaction between students-students and students-teachers, classroom management and physical environment of the classroom while teaching/learning mathematics. Observation guideline was developed with reference to research objectives. Observation was helped me in collecting detail information about respondents, their everyday practices and capture actual experiences of the participants. I observed school overall as well as key respondents individually and collectively during their work at school, classroom, playing with peers, interacting with teachers and friends, school behavior, culture, and participation. I became a friend of students. also, I observed teacher's collaboration and discussion in subject matter, participation of students in classroom activities as well as extracurricular activities in terms of gender, caste, religion etc., teachers' behavior towards students in teaching learning process, and teaching learning strategies of teachers and students. Participating in a naturally occurred setting, whether either classroom or school, I get a great opportunity to see, feel, test, hear and interact with the informants very closely through the senses that can produce necessarily data.

### **Data Collection Procedure**

Data collection refers to gathering information from different sources through the application of multiple data gathering methods to attain the objectives of the research under consideration (Niure, 2014). First of all, I visited the sample schools

which I had selected for my research then I met the principal and mathematics teachers of this school. I told all about my study, and I gave my research proposal. The mathematics teacher informed for all students about my study. After that, the mathematics teacher of this school agreed to give the permission for me about class observation. I had observed the mathematics classroom for the five times, after continue five days class observation, I had chosen four mathematics students for case respondent. Then, I organized the interview schedule in a related person. A few days after, the interview schedules were prepared with selected four mathematics students, then the data was collected according to the interview schedule time. The primary information was collected from head teacher, mathematics teacher and mathematics students.

### **Data Analysis Procedure**

This study is qualitative and descriptive in nature. In this study, the data collected through above mentioned tools from different respondents and sources were processed in different steps. First of all, I organized or categorized the collected information according to the category of the respondents and then I edited to the information which I had collected from interview and classroom observation. I generated the difference code according to the response of participants. I gathered those codes according their similarities and I give the title for them which are known as theme. I collected together and explained in their perspectives. And I used general inductive approach for data analysis and interpretation. At last, I analyzed and interpreted those themes by using the theories and conceptual framework which I have developed in literature review.

### **Quality Standard**

After finishing the construction of the research tools, it is necessary to



maintain quality standard. For quality standard, I had used cross match, triangulation, member checking, prolong stayed in the field. For quality standard, I had followed the following ways:

**Credibility.** To keep credibility of my research I tried to spend as much time as the observation needed and engaged with different people with their work. After receive information I wrote notes, I had asked similar types of questions to others people and tried to find real practices from that information.

**Transferability.** Transferability replaces the concept of superficial validity. This criterion refers to the relevance of finding is one context (where the research is done) to other contexts or setting (where the interpretations might be transferred). To maintain transferability, I had explained mathematical practices found in different community students briefly.

**Reliability.** This is the third standard for judging qualitative standards and refers to stability or consistency of the inquiry processes used over time. To maintain it I had presented the logic used for selecting people and events to observe, interview and include in the study. I would try to maintain credibility and transferability to ensure reliability standard.

### **Ethical Consideration**

I had addressed the ethical concerns in this study. I observed the mathematics classroom observation from taking the approval of head teacher and mathematics teacher of related schools. I had taken the interview of related person given the all priori information about my study. Participation of the respondent was entirely voluntary. I had not published the name and address of respondents without their permission. For my personal benefit, I had not collected the personal information from the respondents.

## **Chapter IV**

### **Analysis and Interpretation**

This chapter deals with the analysis and interpretation of the collected information. The objectives of this study were to explain the mathematics learning culture of students in public school and to compare the mathematics learning culture of students in rural and urban school. This study was based on only Kathmandu district. This study was bounded on Shree Mangal Secondary School, Kirtipur and Shree Arunodaye Secondary School, Dakshinkali. This study was included head teacher, two mathematics teachers and four mathematics students as respondents of the study. In-depth interview, classroom observation and document analysis were used as tools of data collection. This study was based on case study approach. The researcher carefully and systematically arranged to analyze the mathematics learning culture of student in public school. The information were collected from secondary level students and teachers from Kathmandu. The schools that were taken as samples were Mangal Secondary School (MSS) and Arunodaye Secondary School (ASS), Kathmandu.

This case study is related to the mathematics learning culture of students of class nine of secondary level of public school. In this chapter I have address my research question; What is the present condition of mathematics learning culture of students in public school? Do the mathematics learning culture similar in rural and urban public school? The interviews were taken with focused students and teachers with the help of interview guideline. The information from students and teachers has carefully compared and contrasted on the base of their answers and classroom observation of the researcher. The obtained information has been analyzed and interpreted under the following heading;

- ) Introduction of case schools
- ) Introduction of respondents
- ) Mathematics learning culture of student in public school
  - a) Culture of urban public school (MSS)
  - b) Culture of rural public school (ASS)
- ) Compare the mathematics learning culture in rural and urban school.

### **Introduction of Case Schools**

**School environment of Mangal Secondary School.** This school is located in Kirtipur Municipality-01 at Kathmandu district. There are total 65 teachers, 1160 students. On the classroom observation time I saw that, most of the Newari community's students are involved/participated in mathematics classroom. MSS makes commitment to provide quality education for students' individual career development and their competency development. The school was awarded twice by Nepal Government for contribution of quality education. In this school, compound is surrounded by walls and business compact of school. The school has 3 concrete buildings with 114 rooms. The school has one Library, one computer Lab, one science Lab, one principal Room, one staff room, one play ground, one program hall, one administration room and other are used store room. At present school has 400 Desk Bench, 76 chairs. The furniture is enough for student and staff as well. Drinking water facility is available in school. The toilet facility is available in school. Other facilities are such as; Sports (Basketball, Cricket, Football, Table Tennis, Volley ball, Kho-Kho etc.), Guidance and Counselling Center, Audio Visual Room, Smart Classroom, Quiz contest and others Cultural programs, Extra classes and Hygienic Canteen.

**School environment of Arunodaye Secondary School.** This school is located in Pharping, Dakshinkali Municipality-5, Kathmandu. This school was established in the year 1958 AD. The school had 27 teachers and 700 students involved in teaching learning. This school is located in a rural area far from the capital. In this school, the compound is surrounded by walls and is business compact. The school has a building with 38 rooms. The school has one Library, one computer Lab, one science Lab, one principal Room, one staff room, one play ground, one program hall, one administration room and other are used store room. At present school has 200 Desk Bench, 32 chairs. The furniture is enough for student and staff as well. Drinking water facility is available in school. The toilet facility is available in school. Other Facilities are such as Hygienic Canteen, Field trip / Education tour, Psychological and personal counseling, and Extra classes.

### **Introduction of Case Respondents**

**Respondent A.** The name of respondent A was Gopal Khadka (Pseudo name). He came from Chitwan to Kathmandu with his family. He is studying in this school from childhood. He is the student of class nine at Mangal Secondary School. His family has belief on Hindu religion. His father worked as taxi driver and mother worked in garment. He has six family members. He stayed in Kathmandu with his family in a rented room. His family's economic status is low, so he has a problem in his study. He has not enough materials for his study. His father and mother are educated; father has passed SLC and mother has passed eleven classes. He is the regular student of the class, and he always does his homework and classwork. He has the following view about culture and mathematics.

*“There is good relation between mathematics and our culture because we use mathematics in our daily life. Mathematics helps us to solve our mathematical*

*problem. We use mathematics for pay phone bill, electricity bill and for change money etc. We can also found use of mathematics in historical heritage”.*

In the classroom observation period, I have found his behavior good in school; he stayed calm with his friends. He has good relation with his friends and teacher. He wants to do more practical in classroom if possible. He has no interest in lecture method in mathematics class. He has belief on learning by doing.

**Respondent B.** The name of respondent B was Rinku Tharu (Pseudo name). She is student of class nine at Mangal Secondary School. She entered in this school from eight class. She came from Bardiya with her family. She lives in Naya Bazar with her parents in rent room. Her father work in photo studio Near Kalimati and mother worked in Sanjen hydropower office as a helper. Her mother was uneducated and father has passed SLC. Her family's socioeconomic status is not good. She has an enough time in home but she gave few time for mathematics because there was no one for help her. She felt difficult in mathematics; geometry was more difficult for her because she could not get any good idea to read geometry yet. In the classroom, she always sit first bench. During observation, she seemed active and serious for her learning. Some times she did cross-question to mathematics teacher. She has good relation with friends. She said that, sometimes boys dominate girls in classroom. They did not want to give more chance for girls in classroom. In Tharu community, there was discrimination between son and daughter. They did not provide equal opportunity for daughter here fore, her mother did not get chance to study. Her mother was uneducated but she has positive concept for study of her daughter. In her views,

*“Mathematics is important subject. It is difficult as well, we could use math in counting, measuring, for pay bill etc. In classroom teacher should give equal*

*emphasis to the weak students as that of talented students. Environment of our school is good, all the teachers and students are helpful. We have lack of curricular materials in school; our mathematics teacher mostly used lecture method”*

**Respondent C.** Respondent C is 15 year old girls studying at grade IX in Shree Arunodaye Secondary School, Dashinkali. She has lived in Dashinkali Municipality- 03. It takes at least ten minutes to reach school from her house. She had eight members in her family. She had very weak economic condition. To go to school, she has felt difficulty to go to school from the house. She became usually absent in her school. She had weak economic condition and her father couldn't get any formal education but he has made agricultural tool. The researcher just talked about learning difficulties in mathematics. Everyday life was one of the components of the discrimination participation observation in the field the researches come to know. She used friendly language in her classroom. Due to her own mother tongue language she could not ask any question to the teacher and she could not understand any problems. She could need this language for her father and mother and other members of her family and other member of the community in her house there was silence culture. This silence culture discouraged to learn in school. They had to used first language used in house and second Nepali language they used in school. Nepali is different from their home language and which were never used in her house. Although the role of modern education system was contributing progressively to betterment the education condition of disabled students.

**Respondent D.** The name of respondent D was Bhupendra Rana Magar (Pseudo name). He was the student of class eight at Shree Arunodaye Secondary School, Dashinkali. He came from Rolpa with his parents. He has four family

members. His father worked in private office and his mother has gone Malaysia for work. They all do work hard in their area. He has not enough time to read in home, he reads two hours in home and he helps his parents household work. He has good opportunity at school for his study. He has good relation with teacher and friends. The teacher motivates him by telling story and giving example. He takes a mathematics subject as hard, medium and easy. His parents always support him for learning. His parents always tell him to read books. His family's economic condition was not good so his mother had gone foreign country to earn money. In the observation period, I have seemed he is active and energetic student. He does cross-question in class and he always want do problem on whiteboard. He wants to be extra than other in classroom so he always seems active. He likes teaching method by using teacher but he wants it to be more practical. Geometry is very difficult part for him than others. He always participates in extracurricular activities held by school. His view on culture and learning mathematics as follows;

*“I speak Magar language in home but I need to speak Nepali at school, which affects me for understand. My family’s economic condition is not good, so I am unable to take tuition class. I have not enough materials related to mathematics for do practice in home. Mathematics is important subject; it is most useful in every area”.*

### **Mathematics Learning Culture of Student in Public School**

The education act defines a community school as a school that has received permission or sanction to receive regular grants from the Government of Nepal. The term public school culture generally refers to the beliefs, perceptions, relationships, attitudes, and written and unwritten rules that shape and influence every aspect of how a school functions, but the term also encompasses more concrete issues such as the

physical and emotional safety of students, the orderliness of classrooms and public spaces, or the degree to which a school embraces and celebrates racial, ethnic, linguistic, or cultural diversity.

**Teaching and learning environment in MSS.** In this school there are more service facilities. "Culture" is generally defined as the beliefs, customs, arts, traditions, and values of a society, group, place, or time. This may include a school, community, a nation, or a state. Culture affects the behavior of educators, students, staff, and community. It often determines curriculum content. A community's socioeconomic status directly influences its ability to support a learning institution; its ability to attract high caliber educators with appealing salaries; a safe, secure, and comfortable secure facility; and provide even basic needs for students, such as adequate nutrition, health care, adequate rest, and support at home for homework and obtaining adequate rest.

Social climate, including a safe and caring environment in which all students feel welcomed and valued, and have a sense of ownership of their school this helps students in their moral development (Character Education Partnership, 2010). Intellectual climate, in which all students in every classroom are supported and challenged to do their very best and achieve work of quality; this includes a rich, rigorous and engaging curriculum, and a powerful pedagogy for teaching it. Rules and policies that hold all school members accountable to high standards of learning and behavior. Traditions and routines built from shared values that honor and reinforce the school's academic and social standards. Structures for giving staff and students a voice in, and shared responsibility for, solving problems and making decisions that affect the school environment and their common life. Ways of effectively working with parents to support students' learning and character growth. Norms for



relationships and behaviors that create a professional culture of excellence and ethical practice. On the interview time, the responses are respondent as follow;

*"The culture created in the learning and teaching activities between the teacher and the student in the school is taken as the public school culture".*

*(Respondent A)*

*"Achieving the right results by using all the services available in public schools in a regular manner by teachers and students is considered as the culture of public schools". (Respondent B)*

This means the creation of educational activities for teacher and students. In this response, it was said that if the school bring good result, it will be a culture. On the same question,

*"All the activities that take place every day from the time of opening of the public school to the time of closing of the school are part of the public school culture".(View of Head Teacher)*

*"As the first quarterly, second quarterly, third quarterly and annual examinations of the school are approaching, the important things are re-taught to the students by conducting re-learning classes". (View of Math Teacher)*

In response to this all the activities conducted in the school from 10 am to 4 pm were found to be culturally frightening. The mathematics teacher said, It was found that in order to be fearless with the exams, the exams are always conducted on Saturdays and the parents are assembled after checking the answer scripts and the teaching methods are discussed to improve the teaching and learning style.

Banks & Banks (1995); as cited in Acharya, (2072) suggest that, Teaching mathematics requires addressing diversity because it is needed for the people of

different cultures. Multicultural education is a field of study designed to increase education equity for all students. Moreover, the pedagogy which the teachers use to teach multicultural students should be made students' culture friendly. Through acculturation students will have the chance to socialize and maintain peace and harmony in the country (Acharya, 2072).

**Teaching and learning environment in ASS.** During the on-site study of ASS school, it was found that the teacher used to teach the students in the classroom by adopting traditional teaching method, collaborative teaching and guided research method. The culture of a school is considered to be the product of the process of learning and teaching in the school. "The rural public schools rely heavily on rote learning and suffer from lack of transportation and an underdeveloped infrastructure. There has been a mass migration from the rural regions to large cities and so there is a lack of educated young individuals. Rural schools do not have areas to practice or produce educational activities or creative ways to reinforce learning. Many of the students are from nearby farming communities" (Bouck, 2004). In an interview with as ASS math teacher on this subject, he said,

*"Cultural is the existence of a variety of traditional or ethnic groups within our school society". (View of Math Teacher)*

*"The public-school culture is various educational activities that take place in the school". (View of Head Teacher)*

In this statement, the ethnic diversity and traditional culture within the school was found to be culture. It is understood that it includes many activities such as combing and going to school on time, dressing, reading, writing, playing, eating, conducting various cultural programs. In the same question, the students said,

*"The traditional that has been going on from human civilization is the culture that is also applicable in our school".(Respondent D)*

*"Culture is innovation, curiosity and practical experience". (Respondent C)*

With this statement the old custom was found culture. In this statement acquiring new knowledge was taken as school culture'.

### **Culture of Urban Public School (MSS)**

I have taken three study materials while preparing the thesis under the title "mathematics learning culture of student in public school" of which observation, interview guideline and school document. Here I have presented the awesome achievements gained from school observation note.

**School information and facilities.** MSS was established in the year 1962 AD .At that time various environmental as well as religious activities effected the running of the time of rain strom and religious function. Keeping all those hardship in mind the then head of local village Panchayet Mr. Dwarika Maharjan handed over about 26 Ropanies of land located at Kirtipur -3 to the school.

The school had 65 teachers and 1160 students involved in teaching and learning. In this school, compound is surrounded by walls and business compact of school. The school has 3 concrete buildings with 114 rooms. The school has one Library, one computer Lab, one science Lab, one principal Room, one staff room, one play ground, one program hall, one administration room and other are used store room. At present school has 400Desk Bench, 76 chairs. The furniture is enough for student and staff as well. Drinking water facility is available in school. The toilet facility is available in school. Other facilities are such as; Sports (Basketball, Cricket, Food ball, Table Tennis, Volleyball, Kho-Kho etc.), Guidance and Counselling

Center, Audio Visual Room, Smart Classroom, Quiz contest and others Cultural programs, Extra classes and Hygienic Canteen

**School learning environment for mathematics.** Learning environment refers to the diverse physical locations, contexts, and cultures in which students learn. Since students may learn in a wide variety of settings, such as outside-of-school locations and outdoor environments, the term is often used as a more accurate or preferred alternative to classroom, which has more limited and traditional connotations a room with rows of desks and a chalkboard, for example. The term also encompasses the culture of a school or class its presiding ethos and characteristics, including how individuals interact with and treat one another as well as the ways in which teachers may organize an educational setting to facilitate learning. Environment is the totality of the education atmosphere at classroom (Khanal, 2017). They learn to behave, how to cooperate to each other. School is the second home of any child. The teachers, students and parents are the components of the school. School environment reflect belief and tradition of the school community delineating the relation among parents, students and teachers.

While doing research here, I asked the teacher and student, what is the learning environment for math in your school? In the interview taken, they have mentioned the statement given.

*"The environment of this school is peaceful and quiet for the study purpose.*

*The school is equipped with lots of physical facilities i.e. sports / games, library, Science Lab, computer lab, program hall, etc. This school is selected to develop as the model school by Nepal Government."(Head Teacher's view)*

*"The environment of our school is calm, fresh air, bright, clean, suitable temperature, students have the necessary materials". (Math teacher's view)*

*"In our school, various learning related posters are hung on the wall, creating an environment that enhances each student's personal ability and interest in learning." (Boy student's view)*

*"School learning environment refers to a space or a place where learners and teachers interact with each other and use a variety of tools and information resources in their pursuit of learning activities". (Girl student's view)*

A classroom is a haven for many students living with adversity. It is also a place that is conducive to learning because it takes into consideration students' needs and preferences. For instance, students should have input in the arrangement and design of their classroom including desks and wall space to facilitate collaboration, discussion, and individual work. This type of environment fosters a sense of belonging and of feeling valued, competent, and safe.

**Home learning environment for mathematics.** "Home environment" is not an abstract concept. It is the combination of physical and psychological environment(Poudel, 2017). First one includes rooms, basic facilities such as water, shelter, clothes, food and other physical needs of the individuals, while the psychological environment of home includes the mutual interactions of family members, respect, say in family matters and such other things. Both the aspect has a direct and significant influence on the overall development of students (Muola, 2010). When I asked a boy student about the environment in which you study mathematics in your home, he said,

*"I have a fun reading environment at home using educational tools. I read mathematics learning videos from YouTube, using educational games and school apps." (Respondent A)*

When I asked a female student about the environment in which you study mathematics in your home, she said,

*"I have a quiet and clean environment in my home. Both parents are teachers. You focus more on reading and writing. You practice mathematics the most."*

(Respondent B)

Future success in mathematics learning relies on a positive home and classroom environment and teachers, parental attitudes are a key factor for children to develop good learning skill.

**Teaching method of teachers in cultural classroom.** The term teaching method refers to the general principles, pedagogy and management strategies used for classroom instruction. Choice of teaching method depends on what educational philosophy, classroom demographic, subject areas and school mission statement. Teaching method can be organized into four categories based on two major parameters: a teacher centered approach and student centered approach. Observing the classrooms of this school, it was found that the student-centered method, problem solving method. For effective and better teaching activities, the teacher should be familiar and well acquainted with the cultural aspect and beliefs of the students and of their cultural psyche. These are needed for the better classroom management, effective teaching, establishing good relation between books and minds of the student and so on mental growth. Awareness capacity learning process and there consequences are also directly and indirectly affected by the teachers belief. On the other hand teachers' beliefs and understanding are manifested in their teaching behavior. Different understanding of cultural perception in math education particularly in mathematics classroom management is revealed discussion (Laborde,

1993). In my research, when you ask what method you use to teach, the head teacher says,

*"We teach using problem solving method, demonstration method. We teach using a flow chart, photos, Venn diagram, or web, students get to see the information in a new light. Give students a problem and ask them to solve it. You use many similar methods". (View of Head Teacher)*

This helps them organize the information in their minds, so they can better grasp the new concepts. When I asked the same question to the math teacher, he said

*"In our classroom, English medium teaching method has been adopted. We are always trying to develop students' physical, mental, social, intellectual and emotional through various curricular and extra-curricular activities. We use a student-centered method when teaching mathematics to a large extent"*

*(View of Math Teacher)*

This statement implies that teaching is done using a student-centered approach. When asked by your teacher how to teach mathematics, the boy student answered,

*"Our teacher solves one mathematical problem on the whiteboard and lets us do another mathematical problem accordingly and help us when we don't know how to solve that problem". (Respondent A)*

*"Our math teacher shows and explains graphs, charts, slides and other materials to make learning meaningful". (Respondent B)*

It is clear from this statement that the teacher used the problem-solving method of the student-centered method. From this it is clear that the teacher taught using the demonstration method. These methods develop learning outcomes such as critical thinking and problem-solving skills. From the above teacher and student

statements, while teaching mathematics the teacher was found to be using student-centered method, problem solving method and demonstration method.

**Learning activities of students in mathematics.** Learning is an experience. Learning is the cognitive process of acquiring skill or knowledge. Learning is the process of acquiring new knowledge or modifying existing knowledge, or modifying behaviors and preferences, or improving skills, or obtaining a better understanding of values. Learning is getting to know something better, or becoming more aware of something. When asked how she learns mathematics in the classroom, the student said,

*"We learn by interacting in groups, and also by explaining in group and explaining mathematical problems literally by showing them on graphs. We divide the class into two to three groups of students based on the same particular topic in the class. Each group presents its own ideas on the same subject." (Respondent B)*

In this statement, Students who best internalize and synthesize information when it is presented to them in a graphic depiction of meaningful symbols are described as visual learners. They may respond to arrows, charts, diagrams and other visualizations of information hierarchy, but not necessarily to photographs or videos. There are interaction and collaboration among the students. Here students are learning from each other inputs. In the same question, the boy student said,

*"I present my own reasoning and logical answers to the questions given by the teachers and if I make a mistake, I will learn more with the help of the teacher".*

In this statement, students were found to solve complex learning problems using logic, reason, new strategies and scientific methods of thinking. There develop



creative and innovative ideas .Also improves their reading and writing skills. In the same question, the math teacher said,

*"We create questions based on a particular topic taught in the classroom. We give students enough time to think and they are able to share their thoughts on their particular topic."* (View of Math Teacher)

With this task students will be able to engage themselves in conversation with partners and develop their confidence and communication skills. In the same question, the head teacher said. *"When we teach students, we teach them to solve their personal learning problems."* From this statement, it was found that mathematics is taught keeping in mind the personal ability.

According to the above teacher and student, it was found that learning mathematics is done keeping in mind individual ability, learning through group interaction, learning through logic and reason method. Learning in groups and working with others is favored by social learners. These students know how to communicate effectively and enjoy collaborating with others, brainstorming and discussing ideas and concepts. Social learners are generally good listeners who are thoughtful and understanding.

**Gender diversity in cultural classroom.** Gender equality in education includes the equal opportunity and equal availability of education. None of the students should be excluded from the educational opportunity according to their caste, gender or economic class. Every boys or girls should have knowledge of mathematics to cope with the problem in the future. Equality in education has become the most interesting and important topic in the present world. Though there are no final conclusions, remedial methods are used to minimize the problem of discrimination in mathematics learning. There are four models namely, assimilation model, deficit

model, pluralistic model and social justice to minimize the gender problem (Pandit, 2015 p. 149). Gender Diversity can help your school provide a supportive, non-discriminatory environment for all students, including gender diverse and transgender children. We help administrators, teachers, and staff gently move from awareness to action in order to create more inclusive learning and social environments. A classroom is place where there is the presentation of diverse culture, class, language, religious group, community, culture, environment and different intellectual background people who make a miniature society.

When I surveyed urban schools, I did not find much gender diversity. It was found that both boys and girls participated in the student presentation. In this regard, both the student and the teacher were asked, what is the gender difference in math teaching in your classroom? His remarks have been mentioned in the interview. The boy student said,

*"When we choose a class of boys as monitors from within, they obey us. After the boy's turn to become a monitor, we choose a monitor from among the girls". (Respondent A)*

*"There is not much discrimination in our classrooms. We girls are happy to be given the same opportunity as boys". (Respondent B)*

*"There is no such thing as gender discrimination. Both boys and girls have done their homework in mathematics. Both genders are present in all learning activities in the classroom". (View of Math Teacher)*

*"Both boys and girls participate in the school's weekly extra activities. And the achievement of both is equally in education. There is no such gender discrimination in our school". (View of Head Teacher)*

From the above statement, that is much diversity in urban schools. Both boys and girls were found to have behaved fairly. Both were found to be leaders in the classroom and both were equally successful in their studies. Similarly, both the schools were found to be participating in other extra programs as well. Gender differences also occur in the realm of classroom behavior. Teachers tend to praise girls for good behavior, regardless of its relevance to content or to the lesson at hand, and tend to criticize boys for bad or inappropriate behavior (Golombok&Fivush, 1994).

**Language problem.** Language is the principal method of human communication, consisting of words used in a structured and conventional way and conveyed by speech, writing, or gesture and a system of communication used by a particular country or community. Teachers and students use spoken and written language to communicate with each other to present tasks, engage in learning processes, present academic content, assess learning, display knowledge and skill, and build classroom life.

*"Most of the students are from Newar community in my class. They sometimes don't understand Nepali but I also don't Newari numerical system."*

(Teacher's view)

This view by a school teacher denotes the language problem in cultural classroom for mathematics students from multiracial and multi-language society can't understand the mainstream language that is Nepali. Numerical word problem seems much more complex. Mathematics committee needs to develop different teaching materials in multi languages, too. So language obstacle has created problem for all teachers, students, education and planner etc.

### **Culture of Rural Public School (ASS)**

A rural area is a geographic area that is located outside cities and towns. All population, housing, and territory not included within an urban area. Whatever is not urban is considered rural.

**School information and facilities.** ASS school is located in Pharping, Dakshinkali Municipality-5, Kathmandu. This school was established in the year 1958 AD. The school had 27 teachers and 700 students involved in teaching learning. This school is located in rural area far from the capital. In this school, compound is surrounded by walls and business compact of school. The school has a building with 38 rooms. The school has one Library, one computer Lab, one science Lab, one principal Room, one staff room, one play ground, one program hall, one administration room and other are used store room. At present school has 200 Desk Bench, 32 chairs. The furniture is enough for student and staff as well. Drinking water facility is available in school. The toilet facility is available in school. Other Facilities are such as Hygienic Canteen, Field trip / Education tour, Psychological and personal counseling, and Extra classes.

**School learning environment for mathematics.** While doing research, I found that the classroom observation was conducive to a suitable learning environment. The teacher was found to be a mentor and to help the students solve the mathematics learning problems. Such a learning environment is called a positive learning environment. During the research, when asked what is the environment for learning mathematics in your school? Head teacher said,

*"We have a positive environment in our school. The environment has been created in such a way that positive changes take place in the behavioral,*

*cognitive and emotional development of the students towards mathematics".*

*(View of Head Teacher)*

*"Our school has physical facilities for teaching mathematics, open space, green area, necessary furniture, lighting, humidity, classroom decoration, appropriate amount of educational materials etc., so our school has a convenient environment". (View of Math Teacher)*

From this statement, it was found that the school environment has been prepared for overall development of the students. From this statement, it is clear that there is a conducive environment in the school. In an interaction with a boy student on the same question, he said,

*"The environment of our school is calm, fresh air, bright, clean, suitable temperature, students have the necessary materials". (Respondent D)*

*"As our school is in a rural area, mathematics is taught in noise-free environment". (Respondent C)*

It was found that the atmosphere of the school was good. In an interaction with a girl student on the same question, he said, This statement also means that there is a suitable environment for learning mathematics in school. Creating a positive learning environment begins with the teacher's self-reflection, continues with planning, and then is ongoing and dynamic during the implementation of the curriculum. Maintaining a positive learning environment is a work in progress .Good facilities in schools should be designed to nurture the intellectual, physical, social, and emotional development of students. Schools should also continually improve their campuses in response to student need and the latest research. From the above statements and from my observation of the school, it is known that clean, quiet, noise-free, student-centered environment has been provided in the rural school.

**Home learning environment for mathematics.** Children need an environment at home where they can focus. Parents need to set up desk and place for this. Only then can inspiring messages and arts be produced to encourage their progress and bring them into the mood for mathematics learning.

While doing research here, I asked the students, what is the learning environment for math in your home? In the interview taken, they have mentioned the statement given. Student said,

*"My parents are not educated they go to home and focus more on house work. I do not have separate time for mathematics practice at home. I give priority to what I read in the school classroom. I like to read but after going home, I can't study due to house hold chores". (Respondent D)*

*"My parents are farmer. They are uneducated, they work hard, but they have low income. My brother and I are living in Kathmandu from childhood. I am studying in this school from nursery class. Our economic status is no good, so I am studying in public rural school. My result of mathematics is medium because of parents' economic situation I cannot got chance to read tuition. I respect my parents a lot they gave me chance to read in Kathmandu".*

(Respondent C)

According to the students, their home environment is not good for studying mathematics. Although they like to study, they have not been able to continue their studies at home. Due to the poor financial condition of the family, they have not been able to study tuition. In short, academic performance of any student cannot be separated from the home environment in which the student lives healthy home environment offers emotional security to a student. Education has one of its basic task as to train student to become useful members of the society. This training begins at

home in the informal way. The home of the student is the first place he enters as he is born into the world by his or her parents.

**Teaching method of teacher in cultural classroom.** The most basic teaching method is explanation. Explanation is characterized by its function as a tool that is used by a speaker for understanding or 'giving a sense' to the object of communication, of a debate, or a discussion. The role of an explanation is to make clearer the meaning of an object (method, term, assignment) maintaining formally the necessary distance between the object of the action or study and the tools. In the learning/teaching process, explanation is a tool used by both, teacher and students. Its goal is to manifest comprehension. In the observed class the mostly used teaching methods and strategies were lecture/expository in teaching mathematics with much focus on drill exercise.

While doing research here, I asked the teachers, what teaching method do you use to teach in a cultural classroom? In the interview taken, they have mentioned the statement given. The head teacher said,

*"I apply all the teaching methods, which are in use. to a large extent, we use the pre-existing method of lecture". (View of Head Teacher)*

*" When we teach in the classroom, we show it written on the white board, explain it and discuss it. Only then do you make a presentation from PowerPoint in case you don't understand it clearly". (View of Math Teacher)*

While doing research here, I asked the teachers, how does your teacher teach mathematics in the cultural classroom? In the interview taken, they have mentioned the statement given. The girl student said,

*" Sir teaches us in classroom, showing us what is written on the whiteboard, explaining it. In case of misunderstanding, you can also teach by giving slide presentation.*

The boy student said,

*"Some of the problems are solved by Sir himself in white board and explains and teaches. He also tells us to solve other problems".*

From the above statements and my research, it has been found that with the development of modernity in public schools in rural areas, other teaching methods have also been used, but more and more lecture methods have been used. In short, Lecture method is most convenient and inexpensive method of teaching any subject. It hardly requires the use of scientific apparatus, experiment, and aids materials except for the black board. Lecture method is teacher controlled and information centered approach in which teacher works as a role resource in classroom instruction. In this method, the only teacher does the talking and the student is passive listens

**Learning activities of students in mathematics.** Learning is an experience. Learning is the cognitive process of acquiring skill or knowledge. Learning is the process of acquiring new knowledge or modifying existing knowledge, or modifying behaviors and preferences, or improving skills, or obtaining a better understanding of values. Learning is getting to know something better, or becoming more aware of something. The teacher's fundamental task is to get students to engage in learning activities that are likely to result in achieving [the intended learning] outcomes. It is helpful to remember that what the student does is actually more important than what teacher does (Schuell, 1986,p.4290).



While doing research here, I asked the teachers, how do your students learn mathematics in the cultural classroom? In the interview taken, they have mentioned the statement given. The head teacher said,

*"We teach mathematical problems when students are first mentally ready to learn. Based on the process we teach, they learn through student-to-student discussion and teacher-to-student discussion".*

From this statement, it was found that the students learn by discussing according to the process taught by the teacher. Asked the same question to the math teacher, he said,

*" In my class, students learn by being active in learning, by being creative, by understanding the solution process, by repeating and by discussing in groups".*

This means that students learn by being active, discussing, repeating and discovering new things. While doing research here, I asked the students, how do you learn mathematics in the cultural classroom? In the interview taken, they have mentioned the statement given. Girl student said,

*"We learning and practicing mathematics through reasoning and interaction".*

*(Respondent C)*

*"When I can not solve my math problem alone, I seek the help of a teacher and when there is no teacher, I create an environment to solve the learning problem with the help a friend." (Respondent D)*

It was found that students learned mathematics through reasoning and interaction. Asked the same question to the boy student said, It was found that learning was done the help of friend and teachers as they could not solve mathematical problems on their own. From the above, it was found that in rural

school students learn with the help of friend and teachers as they can't solve mathematical problems on their own, as well as mathematics was found to be learned through logic and interaction, mathematics was found to be active, discussed, learned by repeating, mathematics was found that the students learn by discussing according to the process taught by the teacher.

**Gender diversity in cultural classroom.** Beside all this learning theories, the teaching learning process is affected by gender inequality, cultural discontinuity, power in classroom etc. Gender difference in mathematics still exists learning of complex mathematics, personal belief in mathematics and choice that involve in mathematics. Gender difference in mathematics may be decreased by improving socio-economic status and ethnicity, politics of school and teachers' attitude (Acharya 2015). Gender diversity is another inevitable diversity inside a mathematics classroom. Almost every classroom is compiled of students from diverse gender. The students/teachers were asked about the performance of the students from diverse gender and I have presented the few samples of those answers.

*"There are many boys inside our class and we feel shy to ask questions because they laugh without reason."* (Girl student's view)

In this answer the problem of girl students from all over the country is presented. Girls feel too much hesitation regarding the frank performance inside a classroom.

*"When the teachers ask the questions we respond quickly."* (Boy student's view)

In this answer boys shows that girl students are shadowed inside a classroom.

*"Most of the girls have poor performance because they do have many tasks in their house before and after the school."* (Head teacher's view)

Though this teacher did not refer to the teachers' failures, he is clear that the tasks provided to the girl child inside her house are in fact a burden to the girl student.

*"The discipline of girl student is praiseworthy but they are weak in mathematics because they get less time to practice."* (Math teacher's view)

This reply also seemed similar to the previous teacher because both of them have similar understanding regarding their time at home. According to the above teacher and student, when a girl friend is active in learning, the boy laughs as much as the girl, the boy answers the question asked by the student faster than the girl and the girl is weaker than the boy in mathematics learning.

**Teacher and students' view on language.** Language is an important element of symbolic interaction. Language is a form of symbol communication through structured and sound pattern which are infused with shared meanings (Abraham 2006). Language is not only known for the words and the grammar. It is a particular way of thinking and perceiving. Language matters in all human activities and shape their thinking and learning. Following are the responses of the teachers and students based on language in cultural classroom.

*"The main problem for us in the cultural classroom is difficulty in understanding their language"*(Math teacher's view)

*"While teaching in cultural classroom some of the students can understand the language of the teacher while others takes time to understand"*. (Head teacher's view)

The difficulty in communication gap between teacher and students can create a mess inside a classroom and hampers their learning. The teacher will definitely get stressed to reach to the genuine problem of the students and will be unable to provide feedback too. The teacher says the language of teacher too becomes a problem

sometime. For example if the teacher is from an ethnic community, his tone and speaking style will vastly different to the students from other linguistic background. The hardship in language understanding of teacher can Holt the learning process and group works.

*"Language understanding is problem because it creates hardships in understanding".(Girl student's view)*

According to this student, the problem is equally faced by both the teachers and student to have a smooth classroom practices.

*"Since Newari is my mother tongue, I definitely feel easy in learning problems in mother tongue. Secondly, Nepali learning is easier for us than English, So learning the English language of teacher is hard for us". (Boy student's view)*

In this regard, the language other than mother tongue has created a challenge to the students who are from culturally different community. A child's self-confidence and sense of self in society are undermined if the home language cannot be used for learning, and these are further undermined by the experience of repeated underachievement. This disadvantage has cognitive, psychological, social and cultural aspects, all manifested in the ongoing failure of our education system.

### **Difference Between Rural and Urban Public School**

In the course of research, I have mentioned the differences I found between urban and rural schools.

- ) It was found that the home environment of the students of urban schools is good, the parents also encourage them to study while the home environment of the students of rural schools is not good and encouraged.
- ) The physical area of the rural school was small and limited facilities while the physical area of the urban school was large and wide facilities.

- ) The financial standard of urban school students was higher than that of rural school students.
- ) The female students of rural schools were found to be weak in math while the female students of urban schools were found to be active in mathematics studies and in other school's activities.
- ) In urban school, while teaching mathematics, the teacher was found to be using student-centered method, problem solving method and demonstration method. In rural public schools, other teaching methods have also been used, but more and more lecture methods have been used.

### **Similarities of Rural and Urban Public School**

In the course of research, I have mentioned similarities between urban and rural schools such as Both schools had similar system focused on the quality of education, Both public schools, it is known that clean, quiet, noise-free, student-centered environment has been provided schools. School open and closed at the same time The uniforms of both the school staff were the same and the uniforms of the students of both the schools were also the same. Both the schools had drinking water, toilets, playground, canteen, library, science lab, computer lab, program hall, administration etc. Both the schools were found to have suitable environment for learning mathematics. Students at both schools were found to be learning mathematics through practice, logic, reason, discussion, and repetition. And also, Linguistic difficulties were found between students and teachers in both the school.

## **Chapter V**

### **Findings, Conclusion and Implications**

This chapter includes that a summary of the whole study. It also includes findings and conclusions derived from the analysis and interpretation of the previous chapter and finally recommends how these findings can be used in the academic field. This chapter concerns in the following heading or sections;

#### **Findings of the Study**

This study entitled "Mathematics learning cultural of student in public school" is the emerging field in mathematics education in public school. The main objectives of this study were to explain the mathematics learning culture of students in public school and to compare the mathematics learning culture of students in rural and urban school. The design of this study was qualitative. Observation, interview guidelines and school documents analysis were used in collection information. This is case study research approach. The major findings of this study are as follows;

- ) There were highly multicultural mathematics classroom in both school but the majority of students were from Newar community. The language of teaching in both schools was Nepalese which had made difficult to students whose mother tongue was not Nepali.
- ) The home environment of the students of urban schools is more supportive for learning mathematics in comparison to that of rural school. The parents of urban school have made encouragement to their children for mathematics learning.
- ) Physical facilities, number of students-teachers, school building and area, economic conditions, classroom, desks benches were found more sufficient in urban public schools that of in rural public schools.

) In urban public schools, both boys and girl had active participation in learning mathematics, studying and doing homework while in rural public schools, it was found that female students were weaker, inactive irregular in mathematicsclassroom.

### **Conclusion**

From the findings of my researchit is conducted that the home environment of the students of urban schools is more supportive for mathematics learning in comparison to thatof the students of rural schools. The physical area of the rural school was small and limited facilities while the physical area of the urban school was large and wide facilities. The financial standard of urban school students was higher than that of rural school students. The female students of rural schools were found to be weak in math while the female students of urban schools were found to be active in mathematics studies. In urban school, while teaching mathematics, the teacher was found to be using student-centered method, problem solving method and demonstration method. In rural public schools, other teaching methods have also been used, but more and more lecture methods have been used. Some of the culture of teaching mathematics was found to be similar in urban and rural schools. In the both public schools, the operating system, the environment for teaching mathematics in the school in the school, some facilities, language difficulties, the ways in which students learn mathematics were found to be similar. The current culture of student learning mathematics in public schools can be interpreted as achieving specific results in mathematics by conducting first, second, third and annual examinations to evaluate students by conducting teaching and learning process using the facilities available in the school every day from the time of opening to closing of the school.

### **Implications of the Study**

Every research has implications in different sectors. The study entitled " Mathematics learning culture of student in public school" also has educational implications, which are as follows;

- ) This study provides the knowledge about the relation between culture and learning mathematics.
- ) This study helps to find the mathematics learning culture of student in rural and urban schools of Nepal, the finding of this study contributes to generate new knowledge about learning culture in mathematics at secondary level.
- ) This research helps to dig out the mathematics learning culture so that curriculum designer and policy maker can construct the curriculum as per the learning culture of student.
- ) To explore the relation between students created from culture and learning mathematics.
- ) To enhance cooperative learning in teaching mathematics at school.
- ) To promote the student-centered approach in classroom.
- ) It helps to teach by using culturally relevant approaches.
- ) To enhance equality and equity in mathematics classroom.
- ) For the development of inclusive mathematics classroom.

### **Recommendations for the Further Study**

Thus, after analyzing the conclusions and implications of the study has made the following recommendations or suggestions for the further study to variable study's findings:



- ) This study was done in only Kathmandu district. For generalization of the result of the study, similar study should be done in another district with wide scope and large sample.
- ) This study was limited to only for secondary level. A similar study can be done other primary and lower secondary level.
- ) A similar study can be done as a mixed method.

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## **Appendices**

### **Appendix A**

#### **Interview Guidelines for Head Teacher**

Name.....

Date: .....

Qualification: .....

Gender: .....

Experience as a Principal: .....

Religion: .....

The interview with head teachers was taken on the basis of following main topics/area;

#### **Interview Guidelines**

- Ways of planning and decision making.
- Educational activities of teachers and students.
- Professional development of mathematics teacher.
- Learning opportunity for cultural deprived children.
- Perspectives on cultural diversity.
- Evaluation of student's learning difficulties and progress.
- Instructional leadership.
- Relation with students.
- Policy of school.

## Appendix B

### Interview Guidelines for Mathematics Teachers

Name: .....

Gender: .....

Qualification: .....

Caste: .....

Training: .....

Experience: .....

Religion: .....

The interview with mathematics teachers was taken on the basis of following main topics/area;

#### Interview Guidelines

- ) Relation with students.
- ) Impact of culture in learning mathematics.
- ) Learning opportunities.
- ) Languages problem in instruction process.
- ) Special treatment provided to culturally deprived students.
- ) About individual differences.
- ) Problem in teaching mathematics.
- ) Role of teacher in increasing the good learning culture in classroom.
- ) Relation between culture and learning mathematics.
- ) Effective teaching methods.

## AppendixC

### Interview Guidelines for Respondent Students

Name: ..... Permanent address: .....

Temporary address: ..... Age: .....

Roll No: .....

The interview with case students was taken on the basis of following main topics/area;

- ) Family background (members, education, social values, economic status, occupation, participation in social works).
- ) Reading opportunity at home.
- ) Learning opportunity at school.
- ) Views about mathematics.
- ) Views about school environment and teacher's behaviors.
- ) Parent support in learning.
- ) Mathematics learning style.
- ) Teaching methods.
- ) Views about peer group.
- ) Homework and classwork.
- ) Cultural perspective.
- ) Participation in extracurricular activities.