

Chapter I

Introduction

Background of the Study

Mathematics can be taken as the backbone of all civilizations. It has led to the development of the various subjects, vocations, science and technology. It is useful science which plays a vital role in various ways of life. In our daily life we must use mathematics to history, logic, science, philosophy, social science, arts etc. It is also related to measurement, calculation, discovering, relationship, and dealing with the problems of space. So it can be considered as an exact science.

Mathematics is a powerful and practical subject. It is a pillar of science and technology. For each and every step of development, present of mathematics should be necessary. It is believed that without mathematics human civilization cannot be continued. So everybody takes mathematics as an organized structure of knowledge. It is one of the beautiful creations of nature which had been helped the human since early phase of its development. It is one of the logical subject. So it is a way of thinking. By the help thinking and practice, human beings can create new knowledge and idea on mathematics. Characteristics of mathematics is the activity; engaging in interesting problems, making imaginative conjecture, testing, reflecting, examining, regulating informally, formalizing and testing result formally, publishing ideas for criticism and development by the mathematical community.

We already discussed that mathematics is a technological subject and seems an exceptionally difficult for the learners; its study requires special ability and intelligence. So, appropriate teaching method should instigate the learners. The successful learning depends upon the teaching procedure or method of teaching that can motivate the learner in the learning process through active participation doing

things themselves. It also believed that how to teach is really a difficult task for a teacher. Mathematics is difficult, challenging and exciting profession. In order to become an efficient and effective teacher, it is necessary to understand the relationship among the mathematics contents and various teaching strategy for presenting mathematics lesson. For the effective teaching, the teachers meaningful presentation of the subject matter and active participation of student are the most essential requisites. If the teaching/ learning situation is highly dominated by the teachers it becomes inefficient and ineffective. Certain teaching methods may be quite effective for promoting some topics in mathematics, But may be very intellective for other topic.

Nepal is a developing country. The situation of mathematics in Nepal is still very miserable in every aspect. First of all, I want to talk about the course of mathematics that is being offered in Nepal. Most of the courses are not practical in nature. They are conventional and completely based on theory. So, they cannot be taught through student centered method. They demand lecture method in the classroom. In the same way, some courses are implemented for the sake of course only. They do not have any practical value in the life of students. The next thing is teaching method. Since a long time, we are still following the Gurukul style of teaching. The teacher either delivers lecture in the classroom or solves the problem on the chalk-board, while the student have to patiently or jus make copies what teacher writes on the chalk board. So, we still need one revolution that brings changes in the field of Maths in Nepal. And the revolution should be able to depart from all the conventional methods of teaching mathematics. Here it means that both of the courses and the way of teaching should be reformed.

There are many methodologies for teaching. Among them teacher should select appropriate teaching learning strategies. It is taken as mathematics is a hard and intellectual subject. So for mathematics teaching, it is important to select practical way rather than theoretical. In This study researcher will try to focus out important and appropriateness of social constructivist approach through mathematics teaching. Generally, we can divide teaching method in to two parts,

- 1) Traditional method
- 2) New/Student centered/Constructivist method

Traditional method:

It is subject centered method which cannot advocate the student's needs and interest.

New/Student centered/Constructivist method:

Constructivism is one of the most popular schools of thought in the world of theory of learning. Students/ Learners need to construct their own understanding of each mathematical concept, so that the primary role of teaching is not to lecture, explain, or otherwise attempt to transfer mathematical knowledge, but to create situations for learners that will foster their making the necessary mental constructions. All of the Mathematicians who believes in constructivism; their thought is divided into two assumptions, they are:

- a) **Implicit Theory: Cognitive Constructivism (Piaget)**
- b) **Situated Cognition: Social Constructivism (Vygotsky)**

Individual/Cognitive Constructivism in Classroom

The main ideas of constructivism are not new. They started with the teachings of Socrates. His approach basically consisted of steering students through a critical thinking process by asking them a series of questions. But Piaget is thought to be the

father of constructivism. According to him, understanding is compounded step by step through students' active involvement. Modern theories relating to constructivism involve students connecting the meaning of a concept with their actual experience. When students are introduced to a new concept, they usually come to the table with a preconceived cognitive structure based on his previous experiences. The student will be able to change this structure if he is able to connect it with previous experiences. The student "must actively construct new information onto his/her existing mental framework for meaningful learning to occur" (Hanley, 1994).

Social Constructivism in classroom

Lev Semyonovich Vygotsky (1896-1934), psychologist of the early Russian Soviet period, has had continuing (though politically troubled) influence in Russia since the late 1920's and since the mid-1960's has been gaining increased attention in the United States and throughout the world. Particularly relevant to writing is his interest in the higher psychological functions, developed in the use of symbolic tools.

Starting out as a teacher of language and literature prior to the revolution, Vygotsky became interested in how structured texts can foster particular complex states of mind in the reader. The revolution, perceived to offer a radical break in human history, providing new conditions for the development of human personality, oriented his inquiry into the social formation of mind.

Vygotsky examined how minds develop within social interaction, transforming the individual's biological legacy through the group's cultural legacy. External forms of activity and social relationships he saw internalized as human mental activity; with the social nature of any psychological function preserved when it becomes internalized. Symmetrically, he saw culturally-transmitted tools as the externalization of psychological functions. The cultural legacy he found expressed in

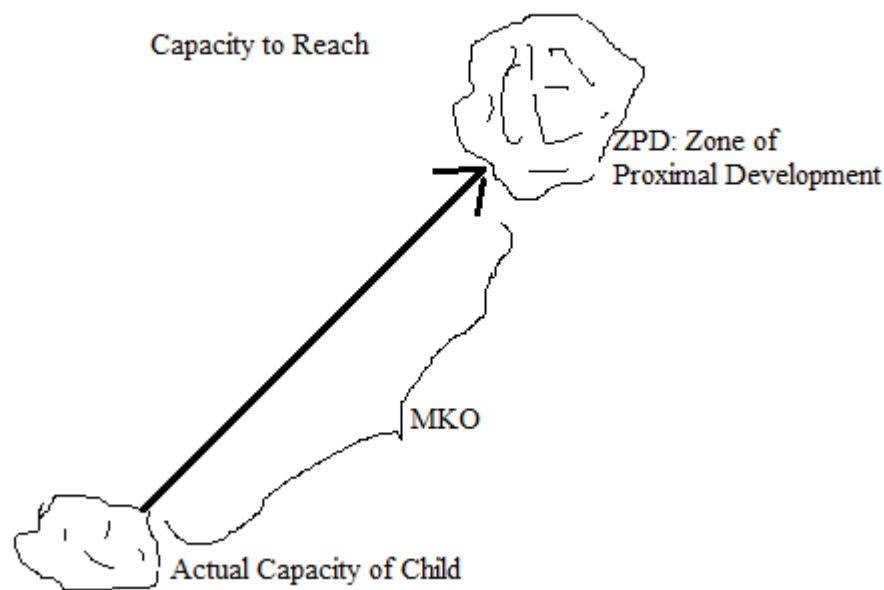
tools developed to aid us in activities, which we deploy purposefully in tasks at hand. These tools are symbolic tools as well as material. A string around the finger or an alarm clock act as an aid to memory. An abacus helps us remember and manipulate quantities, and thereby calculate financial transactions. Language helps us coordinate work and experiences with others, provide each other guidance in pursuit of tasks, and share representations of present, distant, or imagined worlds.

Social constructivism or social realism theories see mathematics primarily as a social construct, as a product of culture, subject to correction and change. Like the other sciences, mathematics is viewed as an empirical endeavor whose results are constantly evaluated and may be discarded. However, while on an empiricist view the evaluation is some sort of comparison with "reality", social constructivists emphasize that the direction of mathematical research is dictated by the fashions of the social group performing it or by the needs of the society financing it. However, although such external forces may change the direction of some mathematical research, there are strong internal constraints the mathematical traditions, methods, problems, meanings and values into which mathematicians are acculturated that work to conserve the historically defined discipline.

The area of interaction Vygotsky calls the Zone of Proximal Development. One's ability as a learner, for example is not to be measured simply by what one already knows, but by the extensiveness of the new situations one is able to enter into successfully and thus learn from. Similarly, to make learning available for students, instructors must bring new material and skills into a zone of intelligibility, possible participation, and motivated interaction. Students recognize and incorporate the new tools only insofar as they help direct and shape attention and motives already forming in pursuit of some desired object. Vygotsky originally conceived the Zone of

Proximal Development in terms of the dyad of a learner and an adult or more skilled peer, such that the zone was defined entirely by the larger knowledge and competence of a dominant matured person. We can, however, also think of a more open space of responsiveness as any two individuals of different skills, knowledge, and perception meet over a shared task, provide communicative challenges to each other, or together explore new tasks and situations. That is, learning through interaction can occur in a variety of circumstances that are not pre-determined by finite known skills embodied in a teacher.

In general, we can show the role of ZPD by the help of following figure.



This runs counter to the traditional beliefs of working mathematicians, that mathematics is somehow pure or objective. But social constructivists argue that mathematics is in fact grounded by much uncertainty: as mathematical practice evolves, the status of previous mathematics is cast into doubt, and is corrected to the degree it is required or desired by the current mathematical community. This can be seen in the development of analysis from reexamination of the calculus of Leibniz and

Newton. They argue further that finished mathematics is often accorded too much status, and folk mathematics not enough, due to an over-emphasis on axiomatic proof and peer review as practices.

Statements of the Problem

Man is the product of society. He grows on society and grows up. He does every activity on the basis of social norms and values. Every social norm and value guide him to be a good man. He learns every activity from society. Basically, we can see that social norms could be reflected on his every activity where he learnt it. If every man can learn more knowledge from society then teaching should be connected with social activities. From the different research and findings, it is seen that social activities are a part of teaching and learning. This makes the teaching comfortable and convenient. If we cannot be able to interlink the teaching learning activities with social activities, it cannot be the perfect teaching. Most of the teaching learning is founded to be autocratic and authoritative. It is very hard to choose the better one. Well teaching method must be advocated the students need, interest and level to subject matter.

In the context of Nepal, most of the teachers still are applying the traditional of teaching. Most of the teaching learning strategies are founded to be authoritative and autocratic which are still applying in the Nepalese schools. Most of the teachers still are applying the traditional approach although they have pedagogical knowledge and are trained. Mainly, this condition is responsible for the lower achievement in mathematics. According to SLC result of 2072 BS, most of the students were failed in Mathematics. Almost 77% of students had failed in that result. Every result is connected with teaching and learning strategy. There are some causes which are related with this result. Among them lack of good implementation of teaching method

is one of the big problems.

The study mainly concern about the effect of social constructivist approach of teaching over traditional method of teaching mathematics at the elementary level.

Especially this study was focused the answers to the following research questions.

- Does social constructivist approach play any influential role in mathematics achievement?
- Does social constructivist approach prove to be more useful and practical method then other approach?
- What are the benefits of social constructivist approach of teaching?

Objectives of the Study

To answer the research questions the researcher set the following objectives

- 1) To compare the achievement of the students taught by Traditional approach and Social constructivist approach.
- 2) To find the effect of social constructivist teaching approach on mathematics teaching.

Significance of the Study

As a key subject to understanding and application of science and technology mathematics is being marked as an essential part of school curriculum, so it is taught as compulsory subject and optional subject as well. However, different studies and research have shown that there exist many teaching approach in teaching learning strategy among them student centered method is more powerful and significant method. So, Constructivist approach can make the learning effective. Untrained teachers are very poor in the performance of mathematics teaching in comparison to trained teachers with regards to educational development.

Therefore, it is important to find out that the achievement difference in mathematics between taught by traditional method and social constructivist method. This type of research may be helpful for all mathematics teachers, policy maker and educationist to follow the right strategies to eliminate the unsuitable teaching strategies on mathematics teaching.

Statement of Hypothesis

There is significant different in the achievement score of student taught by social constructivist method and traditional method of teaching.

$H_0: \mu_1 = \mu_2$ (Null Hypothesis)

$H_1: \mu_1 > \mu_2$ (Alternative Hypothesis)

Where, μ_1 and μ_2 are the mean achievement scores of the students taught by social constructivist approach and traditional approach respectively.

Delimitation of the Study

This study has the following limitations:

- 1) The study was limited in a sample of Grade VIII as a lower secondary level students of Orbit English Secondary School, Gaththagar, Bhaktapur
- 2) The study was related with two teaching methods. They are traditional method and social constructivist method.
- 3) The study was limited only for elementary level students
- 4) The findings of the study were not fully generalized due to the limited area and time.
- 5) The study was an experiment of one and half week duration.

Definition and Terms:

- Social Constructivism - It is one of the most popular schools of thought in the world of theory of learning.
- Social Constructivist Approach -It is a method of teaching which is based on Social Constructivism.
- Effectiveness - Producing the better result towards Social Constructivist Approach.
- ZPD - Zone of Proximal Development.
- EFA - Education for All.

Chapter: II

Review of Related Literature

A review of related literature is a view of different educators and their findings in detail. It helps to the researchers to make the research more effective and useful. According to Wagle (1995) “Review of Related Literature is an integral part of research, helping the researcher in the clarification of his problem and the avoidance of duplication, the planning of an adequate research design and of duplication, the planning of an adequate research design and the rigorous and insightful interpretation of his finding”.

So, in this study the following related literatures are selected.

Upadhyay(2001,P.hd.) did a research on “ Effect of constructivism on mathematics achievement of grade V students in Nepal” from Panjab University, Chandigadh, India. The researcher mainly targeted to explore the fact whether constructivist approach produces better result than traditional approach in student’s achievement in term of immediate learning, relation and net gain. He further aimed if constructivism encourage the habit of self learning and self correlation and constructivism in mathematics be applied in Nepalese school situation.

Jane Irvin (Griffith University) did a research on”Social constructivism in the classroom: from a community of learners to a community of teacher”. In his research, we found that collaborative approach in teaching is more significant than other. In this research he has stated that mathematical thinking is based not on the symbols that are used, but on the meaning on which they are based and come to present.

Randel, Morris, Wetzel, and Whitehill (1992) reviewed the literature and they present a powerful case for changing the mode of instruction in the mathematics

class. They found that the use of collaborative constructivism in teaching mathematics is superior to traditional instruction in terms of achievement, retention and motivation for learning. For students using instructional games in the classroom, the findings show an increase in achievement, improved retention of information, heightened motivation to learn, greater participation, increased opportunities to learn, more complete engagement in the task, greater interest, improved confidence, and more risk taking/problem solving.

Alex Kozulin “International Center for the Enhancement of Learning Potential, Israel” has published a research article on “European Journal of Psychology of Education 2004 (Vol. XIX)” on the topic of “Vygotsky’s theory in the classroom”. In this article, he has stated that on the theoretical plane Vygotsky’s educational insights remained irrelevant as long as the predominant argument was between traditionalists who emphasized the transmission and progressivists who advocated discovery learning. According to Alex’s results Vygotsky’s model of education does not coincide with development but is constructed in such a way as to develop those psychological functions that will be needed for the next educational step. Finally, as a result he found that a social constructivist approach in mathematics teaching is one of the scientific ways of teaching.

Poul Ernst (University of Exeter) had published one journal on the topic of “Social constructivism as a Philosophy of mathematics”. In his article, he stated that every human being cannot live without society. He learns everything from his society. He does many activities in society. Also teaching is one of the important activities of society. So, teaching without collaboration is meaningless. So, his journal has focused on a social constructivist approach to teaching.

Neupane (2001) did an experimental research on “An study on the effectiveness of the play- way method of mathematics teaching at primary level”. The aim of research was to explore the effectiveness of the play-way method of teaching mathematics at primary level and to compare the achievement of the student taught by play-way method verses traditional method. His study shows that the Play-way method was significantly better method over traditional method of teaching at primary level.

Basnet (2004) did his research on the topic “The effect of constructivism on the achievement on Grade IV Students in Maths” the researcher selected the pre-test, post test non-equivalent group design. Two groups experimental and control groups were taught by using constructivist and traditional method of teaching respectively in the topic four fundamental operation of number. After the result the researcher concluded that the constructivist method is more effective than the traditional method of teaching in mathematics at primary level.

Shrestha (1975) did a research entitled “A study comparing the effectiveness of the discovery method and conventional method is a selected lower secondary class of Nepal. He selected two lower secondary schools of the Butwan and Khasili Bazaar and established two groups from these schools. The experimental groups consisting of forty four students were taught the unit fraction by the discovery method of teaching. The duration of instruction was five weeks. At the termination of the instruction period students of both groups were administered and achievement test

The test result showed that the performance of students taught by the discovery method of teaching improved significantly when compared to the performance of the students taught by the conventional method.

Raut (2000) did an experimental research on “A study on the effectiveness of inducto-deductive teaching learning approach in secondary schools”. The aim of the research was to compare the achievement of students taught by inducto-deductive approach to the achievement of students by conventional approach and to determine effective approach of suitable classroom teaching learning in secondary schools. This research concludes that the achievement of students taught by the inducto-deductive approach of teaching improved significantly better achievement than the performance of students taught by the conventional approach.

Kayastha (2006) did his research on “Effect of constructivism approach in teaching ,fifth grade students in geometry”. He chosed the pretest, posttest, equivalent control group design of grade V in Kaski district. He divided the same class into two groups and valued them experimental and control groups .The experimental group was taught under constructivist approach and the control group was taught by traditional approach .The researcher taught same chapter of geometry by using same kind of teaching materials to both groups, Indicated that the constructivist approach of teaching geometry of grade V resulted better than that of traditional approach.

Pokhrel (2004) did an experimental research on “Effectiveness of Teaching Mathematics with and without the use of constructivism”. The researcher intended to determine effectiveness of the constructivist method compared to the conventional method of mathematics teaching based on to measure and test the difference in the achievement score of students of the experimental and control groups. According to his result, constructivism is a better method on teaching mathematics.

Adhikari (2005) did her research on “Effect of constructivism in teaching mathematics at primary level”. She has chosen pretest, posttest – equivalent group design in which she selected 42 students from the same school of grade V. She found

that the students who were taught under the constructivist method performed better result than the students under the traditional method and she advocated that constructivism is appropriate method of teaching mathematics in primary level.

Gautam (2005) conducted a research on effectiveness of instructional materials in teaching menstruation at secondary level to find out whether teaching materials are effective to develop the concept and to estimate the surface area and volume of cone, prism and pyramid. A pre-test, post –test equivalent group design was adopted for the purpose of study. Seventy six students were selected as experimental and control group. Both group were taught by the researcher himself on unit menstruation with and without using teaching aids for fifteen days. The t-test was applied and conclusion was that the achievement of the students taught with instructional materials was better than the achievement of the students taught without using instructional materials.

Raikhola (2007) did a research on “Effect of Constructivist approach in teaching mathematics at lower secondary level”. In this research, researcher found that the constructivist approach of teaching is better than traditional approach of teaching.

Implications of the review for the study:

Literature review is one of the most important parts on research. By the help of the literature review, every researcher get encourage for the better result. From the above literatures, the researcher had taken following hints.

- Social constructivist teaching approach is one of the most useful and practical method.
- For the cognitive aspect, Constructivist method is better method than other.
- Experimental group and Control group were constructed by the help of above literatures.

- The researcher get encourage to find the effect of social constructivist approach.
- Each and every literature has rejected the traditional method and has advocated for constructivist method.

Theoretical Framework

This study was based on Vygotsky's theory of learning. He is father of Social constructivism. According to his theory of learning, society is main source of knowledge. So, human beings can gain the various knowledge from society.

The teaching strategy was based on the basis of following,

According to Schunk. D(1996) "Learning theories; Egalwood. Clifts, NJ: Prentice Hall (Page216)", we can apply the following strategy of teaching plane while we are going to teach by Social constructivist approach.

- Instructional scaffolding
- Participatory modeling
- Reciprocal teaching
- Peer Collaboration

Teacher should be facilitator, guider and co-participants. Co-construct different interpretation of knowledge, listen to socially constructed conception.

Teaching episodes are the highly technical documents that help teaching and learning process. The researcher had made some teaching episodes to measure the cognitive aspect of the students. On the basis of above theoretical framework the researcher made 7 different teaching episodes, which helped him to move towards the expected result. According to Schunk there are four processes to follow the social constructivist approach on teaching. The researcher made 2 episodes which were related to Peer Collaboration. Similarly, 3 were related to Participatory modeling. Likewise, others remaining were related to Instructional Scaffolding and Reciprocal teaching.

Chapter: III

Methods and Procedures

The present study entitled “Social constructivist approach in mathematics teaching” is essentially experimental in nature. It was designed to examine the effect of social constructivist approach on mathematics achievement.

Design of the study

The pre-test, post-test non equivalent control experimental group design was adopted for the purpose of this study. The paradigm of the study is as follows:

Group	Pre-test	Treatment	Post-test
E	T(I)	Social Constructivist method	T(III)
C	T(II)	Traditional method	T(IV)

Where, E= Experimental group, C= Control group

Population

All the students of grade VIII from private schools of Bhaktapur district were population of the study.

Sample

The researcher adopted purposive sampling for the collection of sample of this study. The investigator selected two private schools from Bhaktapur District on the basis of willingness to try the new approach.

- Orbit English Secondary School, Gatthaghar, Bhaktapur : It is one of the reputed school of Bhaktapur. It was established on 1991 A D. Here are all of the facilities of teaching like Boardus System, Projector, Library and Lab (Science & Maths). There are 725 students in this school. So, it has taken as the representative English School of Bhaktapur District. Therefore, the

researcher took this school as sample. The researcher has taken 16 students from this school.

- Little Blooms English Secondary School, Bhaktapur : It is also another reputed school of Bhaktapur. It was established on 1995 A.D. There are more than 1000 students and 50 teachers in this school. Almost all the teaching and learning facilities are available in this school. Therefore, the researcher took this school as another sample. The researcher has taken 14 students from this school.

Variable studied

This study was experimental in nature. Every experimental study deals with independent and dependent variables. So, it also deals with the dependent and independent variable which can be described as follows.

1) Independent Variables

In this study, the independent variable was method of teaching mathematics in the classroom instruction in accordance with the characteristics of social constructivism.

2) Dependent Variables

In this study, achievement score in the test of mathematics was dependent variables.

Non-experimental variables and control Exercised in the Experiment

The following non-experimental variables were tried to control or equate to each group in the following ways:

- Same subject matter were taught for both group
- The same test was used for both group
- Experimental and control groups were divided by randomization.
- The same teacher taught both groups.

Instrument of the Study

Teaching Episodes

To measure the achievement of mathematics by using social constructivist approach, the researcher developed some social constructivist lesson plane from the compulsory Mathematics of Grade VIII. The achievement test paper was developed on the basis of prescribed curriculum and text book of Grade VIII in mathematics from different topic. They are

- Profit and Loss
- Simple Interest
- Mean
- Circle
- Triangle
- Bearing

Teaching episodes were prepared to teach experimental group according to constructivist approach

Tools for the study

Test Items

To test the achievement of the student the researcher made some tests which consisted 20 questions. There were 10 objective type (Multiple choice) questions and 10 subjective type questions. All the items of the test were constructed from the different mathematical content. To establish content validity of the test the supervisor helped to the researcher.

Interview

To measure the non-cognitive aspect of students, the researcher took the interview with 7 students from experimental group according to his own choice. This

interview encouraged to respond towards the question for the students clearly. The direct interview was conducted with students in this study. The researcher not only asked the question but also observed all the behavior and answering method of respondents. In this study, on the basis of objectives, the researcher developed the interview guideline to collect the information from students.

Reliability and Validity of the Tests

First, Researcher prepared the test items and used following steps to test the validity and reliability

- Use Kuder-Richardson method to find the Reliability of tests.
- Calculate the Difficulty level of the items.
- Calculate the Discrimination index.
- Set the Power of Distracters in good manner.

Also, these research instruments will be prepared and validated by passing through different stages drafting, tryout and piloting as well as validating through expert comments.

Item Analysis

In order to analyze the items 27% upper and 27% lower scores were taken that is 4 upper and 4 lower scores out of 15 were taken for item analysis. For the item analysis, 15 students of grade VIII were taken from Emmanuel English Secondary School, Bhaktapur. The correct answer was marked with 1 and the incorrect with 0. The scoring criteria of 2 marks were divided in to two steps. The P-level and D- index of two marks items is average of P-level and D-index of each step. The item analysis table is given in Appendix C. The items having P- level 30-70 and D- index above 0.20 were accepted. But in this study no questions were rejected. The refined test paper contained 10 items of one marks and 10 items of two marks.

Stages of the study

This research work was completed in following three stages:

Pre- Experimental Stages

Following work was done by the researcher for 2072-11-01 to 2072-11-04.

- Preparation of episodes and the teaching aids.
- Piloting, validation and standardization of teaching episodes on with the help of subject experts.
- Preparation, piloting and validation of Achievement Test.
- The pretest was administered to both experimental and control group

Experimental Stage

The period of this stage was from 2071-11-05 to 2072-11-13. In this period, the researcher, taught the experimental group i.e. the students of Orbit English Secondary School, Gathaghar through social constructivist approach and the student of Little Blooms English Secondary school, through traditional approach.

Post Experimental Stage

In this stage, the researcher conducted posttest. Then he gathered the data and analysis and interpretation were done using statistical tools.

Data collection

The researcher taught the experimental group with social constructivist approach and control group with traditional approach for one and half week. Then data was collected by scoring of answer sheets given by students. Then the researcher tested the hypothesis on 0.05 levels of significant and also calculated mean, S.D. and variance.

With the help of interview schedule, the interview was conducted with some of the students from experimental group. And their responses were arranged in suitable manner.

Analysis of Data

The collecting data was analyzed and interpret using statistical devices by following procedure.

Means, variance, and Coefficient of variation were calculated for both groups with the help of their secured marks in the test.

T-test was calculated between two means on 5% level of significance.

Since pictorial representations of data often reduce complicated statistical tables to a form that can be quickly understood by the reader, the graphical presentation was applied.

According to the response of the respondents from the interview, the researcher took some important fact and used it to find the expected result.

Chapter: IV

Analysis and Interpretation of Data

This part of any research is the main body of reveal the factual output of collected data. The collected data, without analysis and interpretation are meaningless. The collected data should be reduced in desirable and simplified form, or in understandable form. The effort to analysis of concise data draws conclusion and make generalizations are main aim of this chapter. This study “Effectiveness of Social Constructivist Approach in Mathematics Teaching” is an experimental study. It involved pretest and posttest equivalent control group design. Since the objective of the study is to examine if it increases the achievement level of students by using social constructivist approach in mathematics in the comparison of traditional method upon the cognitive aspect. So, the quantitative data were collected before and after the experiment. They were tabulated and analyzed for mean; variance and one tailed t-test for differentiate the means

The data of the achievement test scores were analyzed as follows:

- Comparison of mean achievement scores of control group from pretest data.
- Comparison of mean achievement score of control group and experimental group from posttest data.
- Comparison of mean achievement scores of experimental and control groups from pretest.
- Comparison of mean achievement scores of experimental and control groups from posttest.

Comparison between the achievement scores of control group and experimental group from pretest data.

There were sixteen students in the experimental groups and fourteen students in control groups. The Pre test score of the students of both experimental and control group are presented in **Appendix A** and summarized statistical calculation of both the groups on the pretest is presented in the following table I.

Table I: Comparison between the achievement scores of control group and experimental group from pretest data.

Group	No.	Mean	Variance	Standard Deviation	t-value	Level of significance
E	16	3.8	5.65	2.37	0.443	One tailed at 5%
C	14	4.2	6.16	2.29		

Tabulated Value $t_{0.05, 28} = 1.701$

Discussion based on Table I

The above Table I present the mean, standard deviation and variance of both groups, experimental and control groups on pretest. In the table, both the mean and standard deviations of the experimental and control groups have not any remarkable difference. In other words, the mean score of experimental group was 3.8 and mean score of control group was 4.2. The standard deviation of experimental groups was 2.37 and the standard deviation of control group was 2.29. In order to see whether initial difference existed between the two groups, t-test was employed. The calculated t-value is 0.443 and the tabulated t-value is 1.701 at 5% level of significance. In other word, the null hypothesis was accepted (not rejected). By this we conclude that the means of two groups were not found to be significant and therefore the groups were treated as equal.

Comparison between the achievement scores of control group and experimental group from post-test data.

There were sixteen students in the experimental groups and fourteen students in control groups. The Pre test score of the students of both experimental and control group are presented in **Appendix B** and summarized statistical calculation of both the groups on the pretest is presented in the following table II.

Table II: Comparison between the achievement scores of control group and experimental group from pretest data.

Group	No.	Mean	Variance	Standard Deviation	t-value	Level of significance
E	16	17.8	16.35	4.044	3.75	One tailed at 5%
C	14	13.3	9.37	3.061		

Tabulated Value $t_{0.05, 28} = 1.701$

Discussion based on Table II

The above table presents the mean, variance and standard deviation of both groups, experimental and control groups on posttest. In the table the mean and standard deviations of both groups are different. The score of experimental group from certain range with the mean score 17.8 and score of control group on a certain range with the mean score 13.3. The standard deviation of experimental group was 4.04 and standard deviation of control group was 3.06. In order to see whether experiment has produced any difference t- test was employed.

The calculated t-value is 3.75 and the tabulated t-value is 1.701 at 5% level of significance with degree of freedom 28. The table II also shows that the calculated t-value is greater than the tabulated t-value. Therefore the null hypothesis was rejected but the alternative hypothesis was accepted. This implies that there is significant difference between the mean achievement score of both groups experimental and

control groups. In other words, there is significant different between social constructivist method and traditional method in student achievement was accepted. Therefore the researcher concluded that he students of experimental groups are significantly benefited in the achievement of score than the students of control group. It means that social constructivist method of teaching produces the better result achievement on the mathematical contents of Grade VIII. Therefore, the result indicates that social constructivist method of teaching mathematics is more effective than the traditional method of teaching mathematics in lower secondary level of Bhaktapur district.

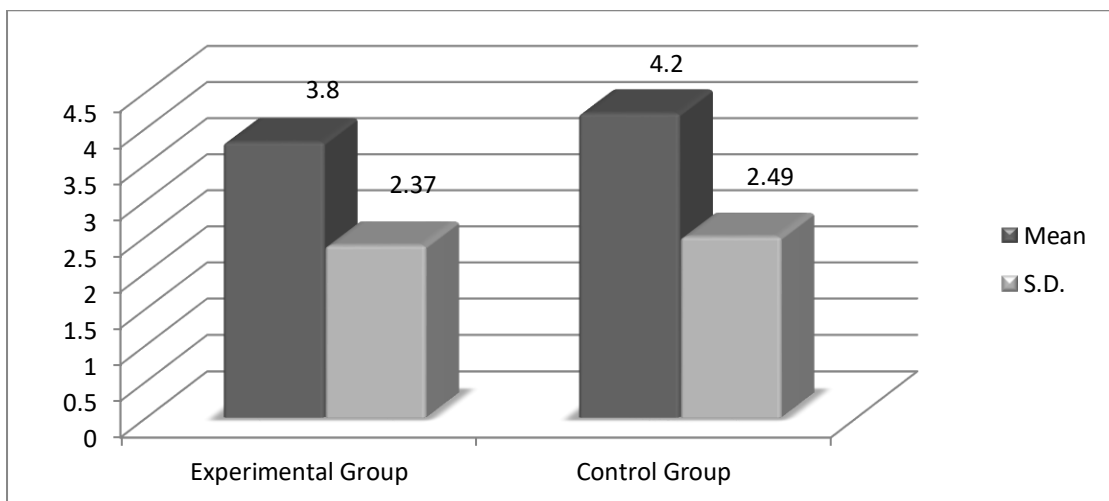
Bar Diagram Presentation of the Data

The above information and interpretation can be easily understandable if they are depicted through bar graph. If pictorial representation is effectively done, the data are seen rather than studied and grasped as a totality.

Bar Diagram

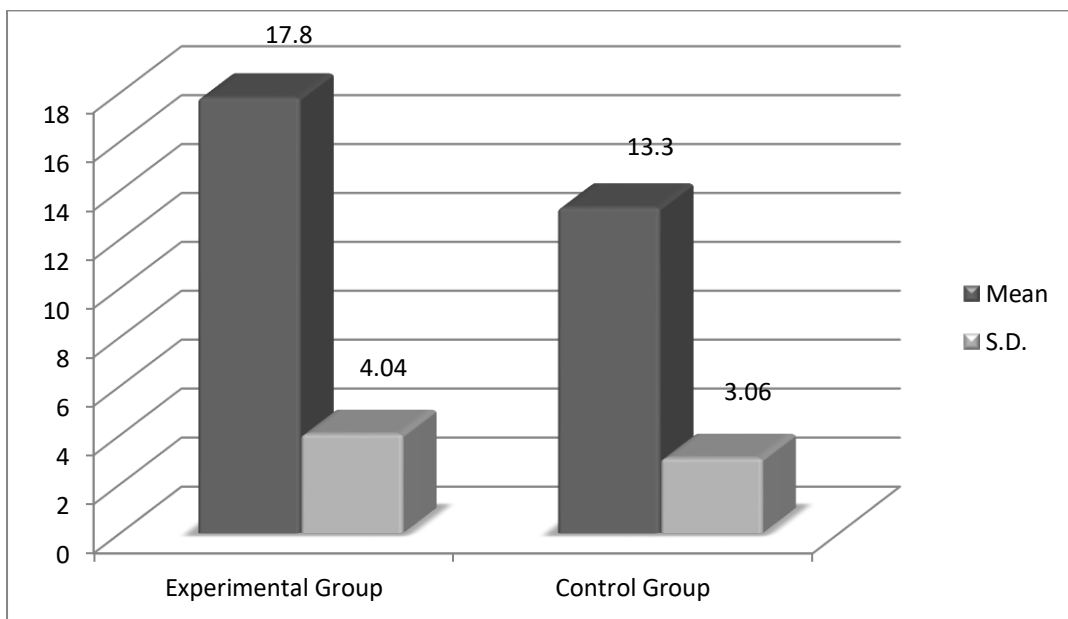
Bar diagram is the visual of the data. It helps a lay-man to understand the data result more effectively. So, the researcher presented the data in bar graph which are given below:

Bar Diagram I: Mean and S.D. score distribution of pretest result



The bar diagram I shows that the mean and standard deviation scores obtained by the students of experimental and control group on the pretest. The mean score of experimental and control groups are 3.8 and 4.2 respectively. And the standard deviation of experimental and control groups are 2.37 and 2.29 respectively. The result shows that there is no significant difference in mean score of both groups on pretest scores.

Bar Diagram II: Mean and S.D. score distribution of posttest result



The bar diagram II indicated that the mean and standard deviation scores obtained by the students of experimental and control groups on posttest. The mean scores of experimental and control groups are 17.8 and 13.3 respectively. The mean score of experimental group is greater than the mean score of control group.

The coefficient of variation (C.V.) of experimental group is 0.20 and C.V. of control group is 0.32. This shows that the individual student in experimental group was almost very near to each other than the individual students of control group. The experimental group seems to be more consistent than the control group. This indicates that the experimental group had better result than the control group. Therefore the bar

diagram II indicates that social constructivist method of teaching is proved to be more effective than the traditional method of teaching on mathematical contents of Grade VIII.

According to the response given by the students in interview, the researcher concludes that social constructivist approach helps the students in learning mathematical contents. Students feel easy to learn mathematics. Also, they are interested to do the homework as project work. It is seen that they all are happy in classroom while social constructivist approach is used as teaching method. Therefore, the researcher concludes that social constructivist approach is better method than other approach.

Chapter: V

Summary, Findings, Conclusions and Recommendation

An experimental study was conducted to find out the effectiveness of social constructivist approach in mathematics teaching of grade VIII students. For this purpose, this chapter includes the summary, findings, conclusions, recommendation and suggestion for the further study. They have been represented as follows.

Summary

The study was experimental design, which the researcher conducted a research, concerning with two type of teaching approach such as social constructivist teaching approach and traditional teaching approach. The experimental duration was one week. There were 7 lesson plans covering 6 different chapters and the achievement of the control group and experimental group were examined through a posttest. And for the non-cognitive aspects, the researcher was made interview schedule.

Findings of the Study

Based on the analysis and interpretation of the data obtained from the achievement test, It was found that the average score of the students of experimental group is higher than the average score of the students of control group. Statistically the mean difference was significant. Thus, it was concluded that social constructivist learning approach was effective approach in teaching mathematics of lower secondary grade. The main findings of this study can be listed below;

- The mean score of experimental group and control group were 17.8 and 13.3 respectively.
- The mean difference is significant statistically.

- Social constructivist learning approach is better than traditional learning approach
- According to interview, most of the students expressed that new methods made them easy to understand the arithmetical problem than other.
- Pretest and post test's result shows that social constructivist approach is more useful and practical.
- The benefits of social constructivist approach are
 - i) It can advocate the students' need and interest.
 - ii) This approach helps to increase the students' participation on learning.
 - iii) It is more practical method than other methods.
 - iv) We can easily teach arithmetic problems by using his method.

Conclusion of the Study

The researcher found in this study that the main achievement score of the students taught by social constructivist method was better than the students taught by using traditional method. In short, this study reveals that the social constructivist method can be more effective than the traditional method in teaching on the different mathematical content of grade VIII. From the result of the study it can be concluded that, the social constructivist method helps student to understand different mathematical contents and consequently perform better in achievement test over conversational method. The social constructivist method helps students to motivate and apply the known fractional concepts in unfamiliar conditions.

Recommendation for Better Learning

On the basis of the findings the researcher recommended some measures for the betterment of the teaching mathematics in lower secondary level which are listed as follows:

- Students should be encouraged to get involved in active participation in classroom activities.
- Individual difference exists in every classroom. So, mathematics teacher should provide the task and environment according to student's ability in social constructivist approach.
- The textbook writers and curriculum designer should emphasize on social constructivist method of teaching mathematics.
- The teacher training institutions should emphasize on social constructivist method of teaching mathematics.
- The teacher should leave the students to discover the answer of question on their own way instead teacher's answer.
- Teaching episode is the highly technical documents that help teaching and learning process. So, teachers should be encouraged to use teaching episode.
- Social constructivist models should be used to develop the mathematical ideas and concepts.

Suggestion for Further Research

From the wide-ranging reviews, reflections included in this study and the results of this study, the following suggestions have been put forward for further researchers.

- The similar empirical study may be conducted in different socio-cultural context.
- Similar empirical study may be conducted of different levels of school (Primary/secondary).
- The larger research must be designed and carried out in order to investigate the effectiveness of social constructivist method of teaching in large samples and various schools of different regions of Nepal.
- Different variables other than those which are included in present study may be taken as independent variable.

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Appendix A

Pretest Result of the Students of Experimental and Control Groups

S.N.	Control (x_1)	Experimental (x_2)
1	6	6
2	5	1
3	5	5
4	9	3
5	2	4
6	4	9
7	1	2
8	3	3
9	10	4
10	4	1
11	3	2
12	3	6
13	4	8
14	1	1
15		4
16		2
	$\Sigma x_1 = 60$	$\Sigma x_2 = 61$

Calculation for Pretest

Control Group

$$n_1 = 14$$

$$\Sigma x_1 = 60$$

$$\text{Mean } (\bar{x}_1) = \frac{\Sigma x_1}{n_1} = \frac{60}{14} = 4.2$$

$$\Sigma (x_1 - \bar{x}_1)^2 = 86.24$$

$$S_1^2 = \frac{\Sigma (x_1 - \bar{x}_1)^2}{n_1} = \frac{86.24}{14} = 6.16$$

$$\text{S.D. } (S_1) = \sqrt{\frac{(x_1 - \bar{x}_1)^2}{n_1}} = \sqrt{\frac{86.24}{14}} = 2.49$$

Experimental Group

$$n_2 = 16$$

$$\Sigma x_2 = 61$$

$$\text{Mean } (\bar{x}_2) = \frac{\bar{x}_2}{n_2} = \frac{61}{16} = 3.81$$

$$\Sigma (x_2 - \bar{x}_2)^2 = 90.49$$

$$S_2^2 = \frac{\Sigma (x_2 - \bar{x}_2)^2}{n_2} = \frac{90.49}{16} = 5.65$$

$$\text{S.D. } (S_2) = \sqrt{\frac{(x_2 - \bar{x}_2)^2}{n_2}} = \sqrt{\frac{90.49}{16}} = 2.37$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

$$= \frac{4.2 - 3.18}{\sqrt{\frac{6.16}{14} + \frac{5.65}{16}}}$$

$$= \frac{0.39}{\sqrt{0.44 + 0.33}}$$

$$= \frac{0.39}{\sqrt{0.79}}$$

$$= 0.443$$

Appendix B

Posttest Result of the Students of Experimental and Control Groups

S.N.	Experimental(y_1)	Control (y_2)
1	18	12
2	20	11
3	21	14
4	23	16
5	16	10
6	17	15
7	10	13
8	14	8
9	22	14
10	19	18
11	21	20
12	28	12
13	17	13
14	20	11
15	19	
16	20	
	$\Sigma y_1 = 285$	$\Sigma y_2 = 187$

Calculation for Posttest

Experimental Group

$$n_1 = 16$$

$$\Sigma y_1 = 285$$

$$\text{Mean } (\bar{y}_1) = \frac{\Sigma y_1}{n_1} = \frac{285}{16} = 17.8$$

$$\Sigma (y_1 - \bar{y}_1)^2 = 261.6$$

$$S_1^2 = \frac{\Sigma (y_1 - \bar{y}_1)^2}{n_1} = \frac{261.6}{16} = 16.35$$

$$\text{S.D. } (S_1) = \sqrt{\frac{(y - \bar{y}_1)^2}{n_1}} = \sqrt{\frac{261.6}{16}} = 4.044$$

Control Group

$$n_2 = 14$$

$$\Sigma y_2 = 187$$

$$\text{Mean } (\bar{y}_2) = \frac{\Sigma y_2}{n_2} = \frac{187}{14} = 13.3$$

$$\Sigma (y_2 - \bar{y}_2)^2 = 331.26$$

$$S_2^2 = \frac{\Sigma (y_2 - \bar{y}_2)^2}{n_2} = \frac{331.26}{14} = 9.37$$

$$\text{S.D. } (S_2) = \sqrt{\frac{(y_2 - \bar{y}_2)^2}{n_2}} = \sqrt{\frac{331.26}{14}} = 3.061$$

$$t = \frac{y_1 - \bar{y}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$$

$$= \frac{17.8 - 13.3}{\sqrt{\frac{16.35}{16} + \frac{9.37}{14}}}$$

$$= \frac{4.5}{\sqrt{1.022 + 0.66}}$$

$$= \frac{4.5}{\sqrt{1.682}}$$

$$= 3.75$$

Appendix: C “Item Analysis”

Students Items	Upper 27% students giving correct response				
	1	2	3	4	Total
1	1	1	0	1	3
2	1	1	1	0	3
3	1	1	1	1	4
4	0	1	1	1	3
5	1	1	1	1	4
6	1	0	1	1	3
7	1	0	0	1	2
8	0	1	1	1	3
9	1	1	1	1	4
10	1	1	1	0	3
11	1	1	1	1	4
	1	1	1	1	4
12	1	0	1	1	3
	1	0	1	1	3
13	1	1	1	1	4
	1	0	1	0	2
14	1	1	1	0	3
	1	1	0	0	2
15	0	1	1	1	3
	0	1	0	1	2
16	1	1	1	1	4
	1	1	1	1	4
17	1	1	1	0	3
	1	1	1	0	3
18	1	1	1	1	4
	1	1	1	1	4
19	1	0	1	0	2
	1	0	1	0	2
20	1	1	0	0	2
	1	1	0	0	2

Items \ Students	Lower 27% students giving correct response							
	1	2	3	4	Total	P%	D	Remarks
1	0	0	1	0	1	60	0.5	
2	0	1	0	0	1	42	0.5	
3	0	0	1	1	2	50	0.5	
4	0	1	0	1	2	65	0.5	
5	1	1	1	0	3	45	0.25	
6	0	1	0	0	1	75	0.5	
7	0	0	1	0	1	55	0.25	
8	1	0	1	0	2	80	0.25	
9	0	0	0	0	0	90	1	
10	1	1	0	1	3	95	0.75	
11	0	0	1	0	1	50	0.6	
	0	0	1	0	1	50	0.5	
12	0	0	1	0	1	55	0.3	
	0	0	1	0	1	55	0.3	
13	0	0	0	0	0	54	0.8	
	0	0	0	0	0	52	0.83	
14	1	1	0	0	2	62	0.33	
	1	0	0	0	1	65	0.30	
15	0	0	1	0	1	45	0.5	
	0	0	1	0	1	50	0.5	
16	0	1	0	1	2	83	0.5	
	0	1	0	0	1	76	0.5	
17	0	1	0	0	1	85	0.42	
	1	0	0	0	1	65	0.45	
18	1	0	0	0	1	70	0.74	
	0	0	0	1	1	72	0.66	
19	0	1	0	0	1	64	0.25	
	0	0	0	0	0	68	0.5	
20	0	0	0	0	0	70	0.5	
	0	0	0	0	0	75	0.5	

APPENDIX- D

Semi-structured interview questions for students

Name of students:

Date:

..... Address:

Age:-

Questions asked to students

- What do you think about mathematics subject?
- Which method of teaching is easier to understand mathematical problems?
- How do you feel while you are doing project work as homework?
- How long do you spend time for mathematics at home?
- Is this new method encouraging you to solve mathematical problems at home?
- Are you happy to learn mathematics by peer collaboration?
- Which parts of mathematics do you like the most?
- What makes you bored to learn mathematics?
- Have you ever used any materials instead of book to do homework of mathematics?
- Are you willing to learn mathematics by using such new method?

Appendix-E

Teaching Episode -1

On the basis of Peer Collaboration

Simple Interest

Objectives:

- 1) To derive the formula of simple interest.
- 2) To solve the problems related to simple interest.

Introducing Task

Ask some fact about money and discuss about banking system.

For e.g. 1) Why do people deposit the money on bank?

2) Why does bank provide a lone for people?

Collaborative Activities

- Divide the students in some groups in which each group having two students. Some group of students will be Lender and some group of students will be borrower.
- Borrower teams take some money from opposite group.
- Tell them the concept about principal, interest, rate, time and amount.
- Guide them to find the formula of simple interest by using unitary method.

$$1 \text{ yr's interest of Rs. } 100 = R$$

$$1 \text{ yr's interest of Re. } 1 = R/100$$

$$T \text{ yr's interest of Re. } 1 = T \times R/100$$

$$T \text{ yr's interest of Rs. } 100 = P \times T \times R/100$$

$$\rightarrow \mathbf{I = P \times T \times R/100}$$

By using this formula they will find interest, amount, rate, time etc.

Evaluation Scheme:

Find the interest and amount of the money that you have taken the money from your friend.

Home Work as a Project Work:

Collect the banking rate of different banks (at least 3 banks are necessary) by the help of news paper, economic journals or from parents. And then find which bank is better for lender? And why?

Teaching Episode – 2

On the basis of Peer Collaboration

Profit and loss

Objectives:

- 1) To calculate the profit and loss from general business.
- 2) To find the profit and loss percent by using formula.

Introducing Task

- Ask them some terms which are used in this chapter, like profit, loss, C.P., S.P. etc
- Encourage them to say some business experience done by them
- And ask some questions
 - Why are the people interested on business?
 - What are the ways to calculate the profit? Do you have any idea?

Collaborative Activities

- Divide the students in two groups. One group will be the business man and another group will be the Costumer.
- The costumer group of the students deal with business group by buying different goods
- The business groups of the students calculate profit and loss without using formula.
 - i.e. They will calculate the profit and loss in their own way.
- Help to derive the formula of profit and loss on the basis of their result.
- Tell them about profit percent and loss percent are always calculated on C.P. And connect it with initial value of percentage.

- Give the concept to find Percentage. i.e.

$$: \text{ Part value/Whole value} \times 100\%$$

- Then encourage them to find formula of P% and L%.

Evaluation Scheme

Find the P% and L% from that business that you have recently done with the customer group.

Homework as a Project work:

Go to the market and study the business skill of any one shop and try to find his/her profit and loss of the transaction of one week.

Teaching Episode – 3

“Instructional scaffolding with participatory modeling”

Triangle

Objectives:

- 1) To prove (Experimentally) sum of the interior angle of triangle is 180°
- 2) To find the some unknown angle of triangle

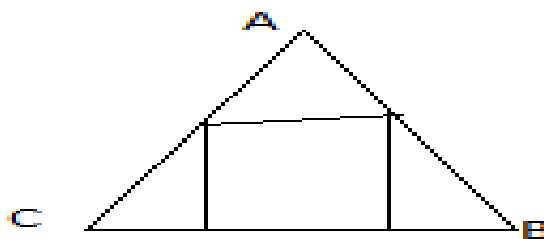
Introducing Task:

- Ask them some features of triangle including its side and angles.
- Discuss about some examples of triangles of triangular shapes which are included in their daily life.
- Provide a triangle (which are made by cars board paper) for each students and let them find the sides and angles of the given triangles.

a) Angle A?

b) Side BC?

etc.



- Divide students in to three groups (each group having almost 5 students) and let them discuss about different angles and sides. Also provide the rules of questionnaire for each group.

Exploration Activities:

➤ As a facilitator, will give the right direction to cut down the triangle, which is provided in the cardboard paper.

➤ Say the ways of joining angle A,B, and



➤ From this experiment, let them explore the idea of sum of angle A, B and C discuss among them.

➤ By measuring all the sides, guide them to fill up the table.

Evaluation Scheme:

➤ Guide them to construct a triangle in their copy and let them to measure three angles of triangle.

Home work as a Project work:

Find the unknown angles from exercise.

Teaching Episode – 4

On the basis of Instructional Scaffolding

Mean

Objectives:

- 1) To find the mean.
- 2) To compare the mean between any two individual data. (Related to each other).

Introducing Task

- Discuss about average value, mid value, midpoint of any line etc.
- Use a scale of length 30 cm and let them find the midpoint of the scale.
- Guide them to find average value i.e.

Sum of all items/Total no of items

Exploration Activities

- Teacher will give some task to each student.
i.e.
 - Collect the height of all students of this class.
 - Collect the weight of all students of the class.
 - Collect the marks of mathematics that you had got on first and second term exam
- Find the average height, weight and marks
- Compare between the marks of first term exam and second term exam of mathematics
- And ask some question
 - Which term exam has the more average score?
 - Which question paper was easy? Etc.

➤ Teacher will write the sign Σ and \bar{X} on white board and discuss about it.

➤ Finally, write the formula.

$$\bar{X} = \Sigma(X)/N$$

Home work as a Project Work:

Find out the average height and weight of the students of your class.

Teaching Episode – 5

On the basis of Participatory Modeling

Circle

Objectives:

- 1) To derive the value of π .
- 2) To find the circumference of any circle by using formula.

Introducing Task

- Ask them about circle. And discuss about its radius, diameter and circumference.
- And ask some questions as follows:
 - If diameter is given, then how can we find the radius?
 - What do you mean by circumference of circle?
 - How many diameters can be constructed on a circle?

Students Participations:

- Divide the students in to two groups. And named them as Diameter group and Circumference group.
- Take them to the school ground. Let them draw at least three circle having more than 1m radii by using rope and chalk.
- Diameter group will measure the diameter of each circle and circumference group will measure the circumference of circle.
- They will collect the data in their copy.
- Guide them to find the ratio between circumference and diameter of each circle as follows

Diameter of circle	Circumference of circle	Circumference/Diameter {C/D}
2 cm	6.28 cm	$6.28/2 = 3.14$ cm
3 cm	9.42 cm	$9.42/3 = 3.14$
.....
.....
.....
.....

- Give the name of that new value. i.e. $\pi = C/d$
- Then derive the formula. i.e. $C = \pi d$ or $C = 2\pi r$

Homework as a Project work:

Measure the circumferences of different circular objects which are available in your home by using formula.

Teaching Episode – 6

On the basis of Participatory Modeling

Bearing

Objectives:

- 1) To find the direction with the help of given map.
- 2) To draw a location of any places with the help of given instruction of direction.

Introducing Task:

- Ask them the main prime direction (North, South, East, West)
- Ask them to express the direction between any two prime directions, such as direction between north and east is the north east and similarly others.
- Provide a map of Bhaktapur and let them to find the direction between the given places with the help of north direction.
 - The direction from Sanothimi to Suryabinayak.
 - Gatthaghar to Thimi

Students Participation:

- Provide the map of Bhaktapur by showing different places.
- Say the way of Bus road from Sanothimi to Suryabinayak bu expressing direction.
- Express the way of causeway given in the map from Sanothimi to Suryabinayak by directions.
- From Gatthaghar let them explore the directions and discuss among themselves.

Summarizing:

- The four main directions can find with the help of north direction of middle of compass.
- In any map, if the north direction is shown then other directions can be found by left, right and front back representing the directions, west, east, north and south respectively.
- Any location on the map can be expressed in the direction form.

Teaching Episode – 7

On the basis of Participatory Modeling

Bearing

Objectives:

- 1) To define the bearing with examples.
- 2) To find the angle of the compass bearing.
- 3) To express the three figure bearing.

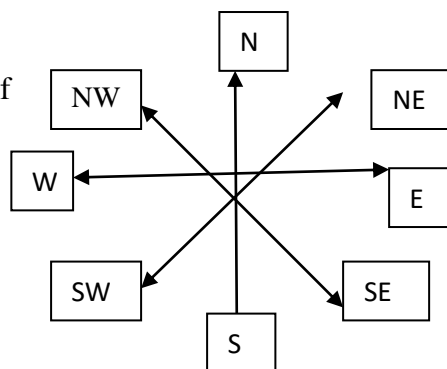
Introducing Task:

- Ask them if they understand the bearing let them tell if they know.
- Encourage them to draw different angles.
- Tell about the base line of the angles which are drawn.
- With the help of the base line let them to measure the angle clockwise.
- Provide the map of Bhaktapur by showing north direction and let them to express the different places with angles.

Extended Task:

From the figure, express the angle of bearing of

- i) North- east (NE)
- ii) North- west (NW)



- Ask the base line to measure the angle of the bearing North-East.
- Ask the measure of angle in clockwise or anticlockwise from the base line.
- Examine that the angle of North-East angle is smaller than North- West, though both the directions are in same distance from the north.

Students Participation:

- Express each of the following compass bearing in terms of an angle

- i) North- North East (N-NE)
- ii) North- North West (N-NW)

Summarizing:

- The process of expressing the distance of any point in clockwise direction in the three digits towards the North Direction is known as three figure bearing or compass bearing.
- The compass bearing can be found from the given directions.

Appendix-F

Questions (Pretest & Posttest)

Name:

Class:

Subject:

Symbol No:

Time: 15m

Full marks: $10 \times 0.5 = 5$

Group: - A

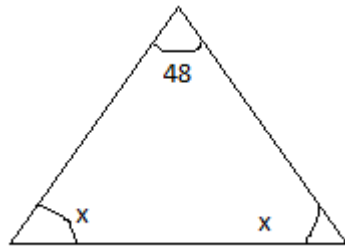
- 1) Which of the following formula is correct?
 - a) $A = P + I$
 - b) $P = A - I$
 - c) $I = P + A$
 - d) a) and b) both
- 2) If Principal (P) = Rs 6000, Rate R = 25/2 % and Time T = 10 month, then which one of the following is the following is the correct amount?
 - a) Rs 6250
 - b) Rs 6390
 - c) Rs 6625
 - d) Rs 6000
- 3) Ram bought a pen on Rs C.P. and sold it on Rs S.P. If he got P % profit then which of the following is the suitable relation between them.
 - a) $P\% = \frac{CP - SP}{CP} \times 100\%$
 - b) $P\% = \frac{SP - CP}{CP} \times 100\%$
 - c) $P\% = \frac{SP - CP}{SP} \times 100\%$
 - d) $P\% = \frac{Loss}{CP} \times 100\%$
- 4) If you bought a pen on Rs100 and sold it on Rs 90 then the correct loss percent is
 - a) 10%
 - b) Rs 10
 - c) 9 %
 - d) All of the above
- 5) If two interior angle of a triangle are 60° then the third angle is
 - a) 60°
 - b) 120°
 - c) 30°
 - d) 180°

Group B

Full Marks: $10 \times 2 = 20$

Attempt all the questions

- 1) If a radio is sold for Rs 500, there is a profit of Rs 100. Find the profit percent.
- 2) An article bought for Rs 480 and sold that a profit of 20% of SP. What is the profit?
- 3) At what rate percentage SI will Rs 700 amounts to Rs 847 in 2 years.
- 4) Sita borrowed Rs 170000 from Radha at the rate of 24% p.a. at the end of 1 year 6 month. How much interest will she have to pay?
- 5) Prove experimentally that sum of interior angles of a triangle is 180° .
- 6) From the figure alongside find the value of x.



- 7) 5.809 m long rope is needed to hold a tree around the circular stem. Find the diameter of that tree.
- 8) If diameter of a circular object is 42 m, then find its circumference?
- 9) Find the mean of the following data,
25.5, 28.6, 29.7, 31.4, 32.8, 35
- 10) The bearing of Kathmandu to Pokhara is 090° . What is the bearing of Pokhara to Kathmandu?