

USE OF TEACHING LEARNING MATERIALS IN MATHEMATICS
CLASSROOM

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DEDICATION

I would like to dedicate this to my parents

And

To my daughter, Manjisha

DECLARATION

I hereby declare that this dissertation has not been submitted for candidature of any other degree.

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AN ABSTRACT OF THE DISSERTATION OF

Mahesh Kunwor for the degree of Master of Education in Mathematics Teaching

Presented on 4th July, 2012, Title: Use of Teaching Learning Materials in
Mathematics Classroom.

Abstract Approved.....

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Student's poor learning has been a matter of concern for parents, teachers, and all educational stakeholders. Despite intensive interventions in Nepali public schools in the past 60 years, low learning achievements of students have remained one critical challenge. One argument is for such situation teaching materials are not used in Nepali classrooms resulting in poor learning. What contributes or motivate teachers to use teaching learning materials in mathematics classroom. Successful teaching is possible when teaching materials are used appropriately. Teaching materials are a crucial factor for systematic teaching. They create an interesting environment in the classroom teaching. It has also been found that use of teaching learning materials also contributes to students' enhanced learning. Teaching learning materials are prominent to use in the classroom for boosting the learning of other concepts, principle and solving the real problem of life by making possible and appropriate transfer of learning.

I have gone through different literature related to the teaching learning materials. I have adopted the Bruner's theory in teaching learning materials and Diene's teaching theory in mathematics. In order to achieve the objectives of this study, I used survey method. I have selected the schools of three resource centre of

Lalitpur district where I adopted cluster sampling procedure. I selected 54 schools and 104 mathematics teachers from the schools for the questionnaire by using the statistical formula to find the sample size. I used the descriptive statistics with crosstabs, mean, mode to find the condition of the respondents related to the age, marital status, and budget for teaching learning materials. Correlation test and t-test were also used to find the relationship between the different characteristics of respondent with use of teaching learning materials.

The findings have shown that mathematics teachers had positive perception towards the use of teaching learning materials but there are various problems in the reality. The inexperienced teachers and untrained teachers had less used the teaching learning materials than the experienced and trained teachers. Majority of teachers thought that they need to think new way of teaching and presentation and updated method in every new session. There was a significant difference in mean attitude scores between the male and female teachers. Also there was no significant difference in mean attitude scores between teaching level of the teachers.

This research indicates that the teachers were not friendly to use the teaching learning materials. I also found that lack of teaching materials and lack of training and less support of school administration are the main challenges for them to use teaching materials. The environment can make the experienced and trained teachers stay on job as a long term basis. The perception of school administrator towards the use of teaching learning materials can find through the research in future.

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Mahesh Kunwor,

Degree Candidate

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ABBREVIATIONS

KU	Kathmandu University
TU	Tribhuvan University
SLC	School Leaving Certificate
MOE	Ministry of Education
VDC	Village Development Committee
DOE	Department of Education
NCTM	National Council of Teachers for Mathematics
SD	Standard Deviation
SPSS	Statistical Package for Social Science
DEO	Office of Controller of Examination

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CHAPTER I

INTRODUCTION

General Background

The culture and practice of mathematics continue to evolve. These changes signal the need for reform in mathematics education. Due to the improper management of the school it cannot give the quality education in math. As per the researchers experiences teachers want to teach mathematics by the method which is more convenient for them rather than the needs of students. They have less interest to seek the existing knowledge of the students. New knowledge, tools and ways of doing or communicating mathematics continues to emerge and evolve.

Students today need mathematics skills, concepts and understandings different from those needed by their parents and grandparents. It helps in different sectors like business, media, industrial sector, agricultural sector etc. According to Berthelot, “Mathematics is the indispensable instrument of all physical research”(as cited by Sidhu, 2005). Bhatta (2005) said,

qualitative evidence based on discussions with students and teachers, as well as quantitative evidence based on OCE data indicate that students have historically found some subjects (Mathematics, English and Science) more challenging than others (Nepali, Social Studies and HPE). The mean pass rate in six subjects is Nepali-92.44, English- 76.19, Maths- 63.01, Science- 81.51, Social - 89.33 and HPE- 98.08 (Bhatta, 2005, p.86).

This evidence shows that the students are very weak in mathematics. It is due to untrained and less experience in teaching also.

As per the researchers teaching experience in most of the school, students feel difficult to solve the mathematical problems that are why they feel it is really hard. As a result they don't give much interest on math and they fail although school gives more emphasis on this subject. Schools have less attention on the teaching method, teaching learning materials and training. Only they give the extra classes so that students will pass with very good score but they don't have knowledge of application and concept. They have learned by lecture method or teacher centered method. These all problem are due to the untrained teacher who has lack of knowledge as teaching learning principles. "Being able to reason is essential to understanding mathematics (Nepal Council of Teachers of Mathematics, 2000). Teacher can solve the problem and they present how to solve the problem. They should give the local examples many times. Different Nepalese societies have different culture. Teacher should know their culture to address cultural diversities of the mathematics classes. Legends can construct a house though there is mathematics because they have deep knowledge of practical math though they have not attended math class formally. "They're not dumb, they're different" (Tobias, 1999 , p. 34). That's why students are better given practical education and that is how they can play with mathematics. The teachers should find out the background of the students and teach them accordingly. The researcher's opinion is that the students can perform well if the above mentioned way is followed.

Secondary school students must be prepared to live in a society that requires a significant understanding and appreciation of mathematics. It would not be possible to manage in the real world without the necessary knowledge, skills and applications of mathematics. It is not enough to merely compute the total of a grocery bill or determine whether a personal checkbook is balanced. Students must be able to apply

mathematical skills in real life problem solving situations. Stepelman (2002) says that there is a national consensus that present- day methods of teaching mathematics are ineffective for students. These traditional methods of teaching are illuminated in the results of the National Assessment of Education progress (NAEP) and the third International mathematics and science study (TIMSS).

As per the researchers experience in most of the school, the researcher has found that the result of mathematics is not satisfactory as teachers want. At the time of mark sheet distribution most of the parents complain the subject mathematics so mathematics has been a villain in the secondary school. H.J.S. Smith says that Poor teaching leads to the inevitable idea that the subject (Mathematics) is only adapted to peculiar minds, when it is the one universal science and the one whose ground rules are taught us almost in infancy and reappear in the motions of the universe (Adeyemi,2008). The focus on content knowledge fits with the commonsense notion that teachers must know the contents they are teaching. The inadequacies of measures typically used for teacher certification, number of mathematics courses or teacher licensure exams have made it difficult to develop a definitive chain of evidence linking domains of teacher knowledge to specific instructional practices to student achievement in mathematics. One domain noticeably missing is “pedagogical content knowledge.” Shulman (1986) defined this component of teachers’ professional knowledge as

The teacher taught most regularly topics with the most useful forms of representations of those ideas, the most illustrations, examples, explanations and demonstration to make the topic more understanding for other.

Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult; the conceptions and

preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons (Shulman, 1986, p 38).

By understanding the pre knowledge of the students, the teachers should use the teaching learning materials in the classroom from which the students can learn easily.

In the context of Nepal, it seems that most of the medium level schools have problem of infrastructure and that is why they are not focusing on teaching learning materials. The researcher also had very less knowledge of teaching learning materials before joining education faculty. The researcher has just got the information from the senior that learning materials is important in teaching learning activity. The researcher decided to join Master Degree in mathematics Education in KU. Now the researcher has more understanding towards the learning materials than before. Definitely the researcher has got the knowledge of learning materials from the institution which changed his perception towards the materials in the classroom while teaching to the students. From the researcher's experience the teachers who have education background their understanding is different than them who did not study 'education' in their university.

If the teacher does not use the teaching learning material in the classroom the students cannot understand what the teacher try to teach. If the teacher asks some creative question to the students they get confused to give the answer or take more time to give the answer because they only know how to solve the problem rather than the concept. They do not know how subject matter is contextualized. One of the factors behind it may be the attitude towards the use of teaching learning material in the classroom. What may be the perception of the teacher about teaching learning

materials? Can the teacher afford the teaching learning materials in the case that there are no other sources? When the researcher was a student in the school at that time his mathematics teacher was so energetic and he used teaching learning materials in the classroom but now a days he is not using teaching learning materials in the classroom. The researcher has not understood why he has not used teaching learning materials in the classroom.

Problem Statement

As per the researchers experience in majority of the private schools the teachers are from non- education background and are with limited skills necessary for better teaching. Schools want to complete the course earlier than the curricular expectation because the schools want to repeat (revisit) course again and again so that students can memorize the difficult sections of syllabus. This practice promotes lecture method of teaching which contributes little understanding of the concepts being discussed by the students. This often results in poor learning and poor pass percentage in the subject. This is expressed in low learning achievement in mathematics as revealed by different studies conducted in the country. There might be several explanations for such limited learning achievement for math anxiety often found in students. One explanation for such reason is, as already discussed; schools focus on course completion and memorization rather than on understanding by the students. Besides, teachers are not motivated in using student friendly teaching methods and hence they do not use any teaching learning materials in the classes to facilitate students learning process. Why this happens, why teachers do not use teaching learning materials? Although the environment of the school does not support to use of teaching learning materials, some of the experienced/ trained teachers may

use the teaching learning materials to make their subject better and to make the students creative in their subject.

As per the researchers experience, some Principals/ Founders have experienced traditional methods of teaching and they have little interest in investing on teaching learning materials. The Principal/ Founder have little concept of the supervision, leadership and how to motivate their teachers as a result the teachers have little interest towards the teaching learning materials. Most of the teachers are using problem solving method only due to the mark oriented trend which may cause the math's repulsion of the students. Concretization of elementary mathematics may help to solve the math repulsion of the students. What are the attitudes of teachers towards the teaching learning materials in the mathematics? What are the attitude of less experienced teachers and experienced teachers towards the learning materials in the mathematics classroom?

What contributes or motivate teachers to use teaching learning materials in mathematics classroom.

Purpose of Study

This study mainly aims to investigate the present situation of using teaching learning materials in mathematics classrooms along the line of meaningful understanding of mathematics as expected by the curriculum. Since the attitude of mathematics teachers is important in using materials in teaching, teachers' attitudes were also the purpose of the study.

Research Questions

1. To what extent do mathematics teacher use teaching learning materials in their classroom?
2. What problems are there in using learning materials?

3. What attitudes mathematics teachers show towards the use of teaching learning materials?
4. What relationships exist between teacher's attitudes and use of teaching learning materials in teaching?
5. What relation is there between teachers' use of teaching learning materials and their sex, educational qualification, salary, experience, age, training and teaching level?

Research Hypothesis

1. Education of teachers is associated with the attitude towards the use of teaching learning materials.
2. There is relationship between teaching experience and attitude towards the use of teaching learning materials.
3. Age of teachers is related to the attitude towards the use of teaching learning materials.
4. Salary of teachers is related to the attitude towards the use of teaching learning materials.
5. There is difference between the male and female teachers in terms of attitude towards the use of teaching learning materials.
6. There is difference between secondary and lower secondary teachers in terms of their attitude towards the use of teaching learning materials.

Statistical Hypothesis

1. Null Hypothesis: Education of teachers is not correlated with the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Education of teachers is correlated with the attitude towards the use of teaching learning materials.

2. Null Hypothesis: Experience of teachers is not correlated with the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Experience of teachers is correlated with the attitude towards the use of teaching learning materials.

3. Null Hypothesis: Age of teachers is not related to the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Age of teachers is related to the attitude towards the use of teaching learning materials.

4. Null Hypothesis: Salary of teachers is not related to the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Salary of teachers is related to the attitude towards the use of teaching learning materials.

5. Null hypothesis: There is no significant difference between mean attitude scores and male and female teachers.

6. Alternative hypothesis: There is significant difference in the two means of sex.

7. Null hypothesis: There is no significant difference between mean attitude scores between secondary and lower secondary.

Alternative hypothesis: There is significant difference means attitude scores between secondary and lower secondary.

Significance of the Study

This study was concerned with the use of teaching learning materials in mathematics of school teachers of Lalitpur district. Though in this study researcher wanted to study about the teacher attitude towards the learning materials. This research has following significances: Its finding would help to improve the use of

teaching learning materials in the classroom and the school thinks to give the in service training to the teachers to improve the teaching method by using teaching learning materials. Its finding also would help to the curriculum designer while designing the mathematics curriculum and other stakeholder related to education. The teacher will also start to think about the teaching learning materials to use in the classroom and ask to the school to support economically also.

Definition of the Terms

Attitude: Southwell, B. (n.d) says that

Attitudes are generally regarded as having been learnt. They predispose an individual to action that has some degree of consistency and can be evaluated as either negative or positive (Fishbein & Ajzen, 1975). Caraway's (1985) data revealed that mathematics competency and achievement were both positively correlated with attitude toward mathematics. This is also true for pre-service teachers, as is reported in the study by Rech, Hartzell, and Stephens (1993) who compared the mathematical competencies and attitudes of American pre-service elementary education students against a representative college population, over three years. The results supported Caraway's findings and also showed that the pre-service students possessed significantly more negative attitudes toward mathematics than the general college sample. (as cited in Southwell, B., n.d)

Teaching Learning Materials: It means that concrete materials, paper materials like flash card, paper solid, gogi calendar etc, local materials like doko, nanglo, plates, cooking pots, ghum, spade, halo (plough) and calculator, cassette and TV.

Novice Teachers: The teacher having less than two years of experience.

Experienced Teachers: The teachers having more than two year's experience are experience teachers.

Trained Teachers: trained teacher are those who have a Bachelor's Level in Education, Proficiency Certificate Level in Education and having 10 months training from the institution or having license.

Concrete Materials: It includes solid materials, paper folding materials, and manipulative materials.

Math Lab: It is a room where mathematics teaching learning materials are found and practice.

Structure of the Thesis

The thesis has included following points which give the outline structure of the research which are given in the following points.

The outline of the research is as follows:

Chapter I: In this chapter the researcher has mentioned, why he wanted to do this research. He explained the background of the study. He also explained that the teachers should have the idea of teaching learning materials. There are so many factors related to the teacher.

In the problem statement he has mentioned the problem related to the school, economic condition, attitude of teachers and Principal/ Founder. He has raised the issue of attitude of novice teachers, experienced teachers, contribution or motivation to the teachers to use the teaching learning materials. Furthermore he has made research questions and again purpose of the study. He again made research questions and research hypothesis. It is needed to clear the significance of the study. Similarly, it also talked the delimitation of the research along with its significance.

Chapter II: In this research, the researcher reviewed the different researches on the teaching learning materials. It also discussed about the training, experience of teachers, gender difference and learning theory related the constructivism especially on Bruner's theory. He found the gap between the study and literature review so he has made the conceptual framework of the study along with expected outcome of the study.

Chapter III: This chapter is the methodology part details the data collection and analysis procedure that were used in this study to test the theoretical model. The research design and sampling procedure are given in brief. The researcher also explained the population of the study, sample size by using the formula method, instrument of the study. It has mentioned the reliability and validity of the study.

Chapter IV: The researcher has mentioned the statistical technique used for the analysis. In the first part of this chapter, he has described the experience, age, education, level of the teachers, number of female and male teachers etc. in tabular form.

In the second part, he has used the correlation coefficient to find the relationship between influencing factors (experience, sex, age, training, education) and understanding of use of teaching learning materials. To test the relationship he has used the SPSS 16 version.

Chapter V: This chapter talked with significant finding of this study. In the first section, the researcher has summarized the entire research and drawn the finding of the research are listed in different section.

Chapter Summary

The chapter discussed about the background of the research. It also pictured out the problem of Mathematics that urged the researcher to carry out this research. It

further highlighted about the use of teaching learning material and situation in the context of Nepal, importance of teaching learning materials and teacher's training. Similarly, it also talked about the limitation of the research along with its significance.

CHAPTER II

LITERATURE REVIEW

A literature review is a description of the literature relevant to a particular field or topic. It gives an overview of what has been said, who the key writers are, what are the prevailing theories and hypotheses, what questions are being asked, and what methods and methodologies are appropriate and useful. As such, it is not in itself primary research, but rather it reports on other findings. This chapter describes the review of relevant literature relating to various aspects linked to use of teaching materials in mathematics classroom.

The factors experience of teachers, training of teachers, gender of teachers, salary of teachers have relation with the use of teaching learning materials A short review of related references have been made under different headings as follows.

Views and Importance of Teaching Materials

Hade (1998 as cited in Devkota, 2001) states quality education depends on the knowledge, skills and attitude as well as the teaching skills of the teachers. There are many teachers who are appointed from non- teaching background and old teachers are still adapting lecture method in the classroom. The importance of teaching learning materials can be shown by Chinese proverb “If I hear, I forget, if I see I remember, if I do, I know.” Materials create the situation to do the activities by themselves to the students which inspires them to learn and know. Therefore, teaching learning materials are things to talk without to talk about. AllWright (1993) says “Teaching materials help learners to make efficient use of the resources in order to facilitate self-discovery”, it would seem that learners profit most if they invest interest efforts and attention in the learning activities.

Richards (1990) said that creativity is an important in the classroom but the rigid use of text books can take away the responsibilities of the pedagogical principle of the teachers. So, except textbooks, extra teaching materials are also equally important. This view is also supported by Tomlinson (1993) said that teaching materials and aids includes any material, programme or machine that can be used to help the teachers present or explain his/her lesson better.

According to Sharma (2005) said that teaching aid is anything audible or visible or both which helps students learn the language more quickly and more accurately. Teaching materials are the basic needs for any educational programme but not secondary and optional like teaching aids. Thus, teaching materials are the ones that contain the contents of the subject of the teaching. So, teaching aids as anything audible or visual which helps students learn the mathematics faster with full of interest.

Research Related to the Importance of Teaching Materials

Upadhyaya (1977) made a research entitled "A survey of instructional facilities in primary schools of Pokhara" and assessed the adequacy of teaching materials there and suggested the measures to develop them. The research found that essential teaching materials were not used regularly in the classroom teaching. Even the trained teachers were found showing least interest in using teaching materials. It was also found that the so called teaching materials were most common. The teachers were found neglecting to consult the curriculum guide, teachers guide or teaching manual and to prepare lesson plan before entering into the classroom. The research study also suggested that every school teacher should be provided with curriculum guide and the supervisors also should assist teachers to prepare the teaching materials and to prepare the lesson plan themselves.

The use of concrete materials has always been intuitively appealing.

Thompson (1961) says “Examples in the concrete are better for the student at this stage of his development, as he can more readily comprehend these.

Thompson (1994) further says the important of concrete materials looking form different psychological aspect as

...a number of studies on the effectiveness of using concrete materials have been conducted since Dienes’ and Bruner’s publications, and the results are mixed. Further their use with beginning learners while maintaining that older learners would not necessarily benefit from them....these apparent contradictions probably are due to aspects of instruction and students’ engagement to which studies did not attend (Thompson, 1994, pp. 556 – 558).

Evidently, just using concrete materials is not enough to guarantee success.

We must look at the total instructional environment to understand effective use of concrete materials -especially teachers’ images of what they intend to teach and students’ images of the activities in which they are asked to engage (Thompson, 2010).

Sowell (1989 as cited in Allen, 2007) said that the results showed that mathematics achievement is increased through the long-term use of concrete instructional materials and that students’ attitudes toward mathematics are improved when they have instruction with concrete materials provided by teachers knowledgeable about their use (p. 498). The researcher agrees this information that’s why he believes that the teaching materials have used in the classroom. The teachers should have the knowledge of manipulation of teaching materials.

Materials and Different Views

The researcher was interested to find the attitude of the teachers towards the use of teaching learning materials; how they use the teaching learning materials in their class room. The researcher has found that the materials will be very helpful to increase the potential capacity, concept and problem solving abilities of the students. The researcher has found that “In general, research on the incorporation of technology into the mathematics curriculum has shown many positive results. When used in conjunction with other mathematics education reform ideas, technological curricula have enriched students' understanding of mathematical concepts, increased their problem solving abilities, and improved their attitudes toward mathematics”. (O'Callaghan, 2011)

Freudenthal (1991 as cited in Eerde, 1998) said that Maths has its roots in real life, and children should be guided to reinvent the mathematics developed in the past. Through carefully constructed tasks they learn to transform a meaningful context problem (e.g. from daily life) into a representation that can be manipulated mathematically. It is desirable for teachers to provide students with the opportunity to verbalize and justify their solutions and to stimulate students to listen to each other's solutions, to compare and criticize these solutions and to ask for clarification; teachers should be ‘pushing discourse’.

Heddens (2007) states that teachers are constantly looking for ways to improve their teaching and help students understand Mathematics. Based on research from several countries, manipulative materials in teaching mathematics to students hold the promise that manipulative will help students understand the material being taught. The use of teaching learning materials in the classroom is very effective and interesting. (McClung, 1998) states that using manipulative aids and devices make the

classroom a more interesting and engaging place for both teachers and students. (as cited from Allen, 2007).

Sowell (1989 as cited in Allen, 2007) said that Manipulative usage can also improve students' attitude toward mathematics and give instruction that uses concrete materials to help students retain information and increase scores on test. The researcher accepted that if the teachers manipulate the teaching materials, the students can see and touch then they can learn what the teachers want to teach. This is also supported by Rust (1999 as cited in Allen, 2007) states that in order for mathematics to engage students interactively and entertaining for the purpose of learning, teachers must involve students physically in hands-on experiences. Although some research states that students learned the material no matter which way it was taught; there were definite differences in student enjoyment.

The teachers can use the local teaching –learning materials like in the context of Nepal, Geometry in our houses inside rooms, kitchen, roof and artifacts such as doko, nanglo, plates, cooking pots, ghum, spade, halo (plough) and so many others depict rich sources of geometry and its application in our daily life to classroom. Kathmandu University (1994) says, “It can start a practice of bridging the informal geometrical practices in home or culture into classroom teaching so that students not only enjoy the learning but also explore geometry and its application from their daily life. Ur (1999) said those good teachers made materials are arguably the best there are: relevant and personalized answers the need of the learners in a way no others materials can. Teachers can prepare teaching materials themselves if they are trained and aware towards teaching materials. So, we need to be good teachers to prepare best teaching materials.

Experience and Training

The pre-service teachers have less knowledge about the understanding level of the students and how to use the teaching learning materials. It may be problem for them since they do not know the most of the materials in the mathematics classroom, they teach by problem solving method but to give the concept of the mathematics through the materials is difficult for them. The researcher has found one conclusion “Preservice teachers seemed to be in the traditional phase of subject matter knowledge, where they could do the computations in an algorithmic manner, but were not able to transform that knowledge to either the pedagogical phase, or to the reflective phase.”(Menon, 2008)

Jaisi (1986)) stated in his research entitled "A study on the availability and use of instructional materials in teaching social studies at the lower secondary schools of Surkhet district" found the teachers seemed weak to distinguish the types of teaching materials for concerned lesson. It also found that only the usual classroom materials like text-book and chalk-board were available in most of the schools. He found that the teachers were not able to use the teaching materials because of the lack of training. Heavy teaching load in the school was another reason for them to be unable to teach effectively using the teaching materials. The necessary teaching materials were not available there and also there was the lack of space to keep the teaching materials safely.

Schools having more teachers with five years and above teaching experience achieved better results than schools having more teachers with less than five years teaching experience. According to Adeyemi (2008) government should encourage experienced teachers to stay on the job by providing them with more incentives and

better promotional prospects. The condition of service of teachers should also been improved.

Sandir (2008) said that Mathematics teachers need access to a motivating and well-structured in-service program that focuses on supporting their professional growth as they try to reshape how students learn mathematics in their classrooms. From this program the teachers can learn how to make the teaching learning materials and how can use in the classroom. Richard (2005) says that training involves understanding the basic concept and principles as a pre-requisite for applying them to teach and ability to demonstrate principles and practices in the classroom. Therefore, training is an important part to use teaching materials.

In the beginning of teaching profession the researcher was nervous and he didn't know the different ideas of mathematics but when he got the experience then he has learned through the teaching and came to know about the type of teaching-learning materials appropriate for the classroom. The researcher has added here that "Mathematics teachers and researchers agree that teachers learn through their teaching experience. Teachers' expertise is usually considered a function of their experience" (Roza, 2007.). The novice teachers need the training to teach mathematics effectively and should be updated. Wilson (1990) says that

What it takes to become a good mathematics teacher--one who can teach high school students to understand, care about, and be able to use mathematics--requires thoughtful and powerful interventions. Novice teachers, themselves the products of traditional mathematics classrooms, need to revisit and extend their own mathematical understandings. They need opportunities to examine and challenge their assumptions about the teacher's role, as well as to develop pedagogical content knowledge. And they need opportunities to see and

experiment with practices designed to help students learn” (Wilson, 1990, p. 15).

The mathematics teachers should have the concept of the teaching – learning materials from which the students get the deep understanding of the mathematics. The attitude of the mathematics teacher is a critical ingredient in the building of an environment that promotes problem solving and makes students feel comfortable to talk about their mathematics (Yackel, Cobb, Wood, Wheatley, & Merkel, 1990). The mathematics teachers should know how to use the learning materials in the classroom such that the students will understand the mathematics. Here the researcher has quote that “The responsibilities of the teacher as a professional have been redefined by the reform movement: A mathematics teacher today is responsible for understanding how each student constructs a personal understanding of mathematics within the complex environment of the ongoing mathematics classroom” (Steffe, 1988, p.80).

Adeyemi (2008) said that teaching experience is a critical variable in students’ learning outcomes in secondary schools in Ondo State, Nigeria. Evidence from the findings has led the researcher to conclude that inexperienced teachers formed the bulk of the teaching personnel in secondary schools in the State.

The experience teachers have more skills than novice teachers and the student’s achievement is more in the class of experienced teachers rather than novice teachers, it can be supported by the finding of the research says that,” The findings revealed that teachers teaching experience was significant with students’ learning outcomes as measured by their performance in the SSC examinations” (Adeyemi, 2008, p.18).

To use the teaching learning materials in the classroom the teachers should have their collegeous support as well as the infrastructure of the school and the

attitude of the principal also plays a vital role. In fact, teachers need a wide variety of ongoing opportunities to improve their skills. Effective professional development of teachers begins with an understanding of teachers' needs and their work environments (Gaible & Burns, 2005 as cited in Moeini, 2008).

James Hiebert (2007) states that prospective teachers bring some analytic competencies with them when they enter the program and that appropriate conditions might enhance and even accelerate the acquisition of intended skills. Furthermore, the prospective teachers in the current study who did display good analytic skills generated recommendations for revising the lesson that were judged to improve students' learning opportunities. The experienced and trained teachers try to find out the solution from the student's side, they do not give the answer immediately after asking the question from the students. They create the environment by showing the materials in the classroom in different ways like concrete materials but the untrained and inexperienced teachers do the solution only on the board. They have less idea about creating the learning environment in the classroom. It can be also supported by Manouchehri (2004) says that Autonomy-supportive teachers began each instructional period by asking students to either work on a new set of problems or share their solutions to previously assigned tasks. The teachers spend a minimum of 20 minutes a day on discussion of students' ideas, the teaching methodology is students centered. The teachers allowed students to work on computers or select other related activities that engaged them. This approach reduced the number of interruptive behaviors students exhibited in class (Manouchehri, 2004).

It is important for teachers to customize instruction so that it is developmentally appropriate for students learning. Students generally gain increased understanding of mathematics when they are given opportunity to develop their own

mathematical knowledge through direct experiences, reasoning problem solving, exploring and communicating. This type of instruction encourages student interaction, which furthers cognitive growth, self-esteem and mathematical power. Most teachers receive on initial training in which the levels of mathematics are not high. In many cases not only the teachers but also their trainers have had to redevelop their idea towards the new content. This at first led to an emphasis on content (mainly from the point of view of structure) much more than on methods (Upadhyay, 2064 B.S).

Gender Difference

Gender difference is the main issue for popularization of mathematics. In the context of Nepal, female are very weak in mathematics than male. The main causes are the amount of time given by the boys and girls, negative psychological impact of guardians and teachers as well as social discrimination or lack of self confidence. It is sometimes believed that mathematics is a male domain subject which is not justified or authenticated by any conclusive research finding (Upadhyay, 2064 B.S). A large number of societies consider girls as liability and their sons as an asset. In the context of Nepal boys were educated/ exposed to the society but girls were restricted to their kitchen and spent most of their time in helping to their mothers in domestic work. These factors influenced their mental development and achievement.

Kulkarni (1970) conducted a study at three levels of education: at the end of primary, middle and secondary stage and reported boys achieved higher than girls (as cited in Neupane 2003). In the supportive case, Bhatta (2005) reported that the female student's average score in math was 33.46 and male students were 40.02. This also shows that the knowledge of male students more than the female students this gives the female teachers has less knowledge than the male teachers.

In contrast CERID (1998) reported that the achievement of Tharu girls were better than boys on the test of mathematics achievement (as cited in Neupane 2003). But Astin (1974, as cited in Bajracharya, 2006) finds that boys are more likely than girls to have informal, mathematically related experiences such as playing with scientific toys, participating in mathematical games, and reading mathematics books.

Xiao, Yu & Yan (2009) scores of male students' beliefs on the dimensions of knowledge structure and learning style are slightly higher than those of female students', but on the dimensions of learning ability and knowledge stability there is no statistically significant difference. Females had a more negative attitude towards mathematics while males had a more positive one. In middle school females had a negative attitude towards mathematics even that underrepresented females had the worst attitudes towards mathematics. These negative attitudes were based in part on the parents' beliefs that males were better mathematics learners and it was more important for males to learn mathematics (Shelton, 2007). Mathematicians and scientists are often thought to be competitive, achievement-oriented, and not very social. In this regard, Jovanovice (1995) states

boys are given the chance to play with toys or objects (for example, building blocks, Legos, racing cars, and simple machines) that involve many of the principles inherent in math. Girls often lack these experiences, so they enter math and science classrooms feeling insecure about their abilities. Girls then begin to believe they cannot do math as well as boys. This belief is consistent with a stereotype in our culture that defines math as male domains. That is, males are better suited for math, and math is more useful to males than to females. Also, personality traits attributed to mathematicians are associated more with males (Jovanovice, 1995, pp.24– 28)

From this statement the researcher believe that the female teachers may have less understanding of use of teaching materials because they have not got more chance to create the mathematical concept from the beginning.

In different research it has been proved that the achievement score of boys were higher than the average score of girls. It showed that the girls have less interest towards the mathematics and they are less in higher level of education in mathematics as students. This is the cause; there is less number of female teachers in lower/secondary level. That's why the researcher thought that it may be the cause; the females have less understanding of use of teaching learning materials than the males. Some researchers are below which has proved the presence of girls in higher level in mathematics is less.

CERID (1982, as cited in Bajracharya, 2009) has conducted a study on "National achievement status of those who have completed primary schools" and concluded that performance of boys was better than the girls. CERES (1995) conducted a study that shows more boys (57%) were successful in mathematics test than the girls (as cited in Bajracharya, 2009).

The achievement of boys are more than the girls in mathematics, it can be supported by the research, Joshi (1997) concluded a research on "Determinants of mathematics achievement of grade X students" for PhD with the sample of 431 boys and 423 girls and found that the achievement score of boys was higher than the average score of girls in all tests and subtest level of mathematics (arithmetic, algebra and geometry). The same result was also found in the research, Neupane (2001) did a research on "Mathematics achievement of primary school children of various ethnic groups in Nepal" for PhD with the sample of 250 boys and 250 girls from ethnic groups and found that the boys were better than the girls in mathematics. The

researcher had found very less number of female teachers in secondary level, it is due to the fewer enrollments of girls students in higher level study and achievement of girls are less than boys which was supported by different research. Another one research also supported this views that is, Pradhan (2007) conducted a research on “students achievement in mathematics of Tanahun district” with sample of 200 students from 9 schools and found that mean score of boys was higher than the mean score of girls in all test from different parts of mathematics (arithmetic, algebra and geometry). But mean performance in statistics of boys and girls is no different. From the different researches it has proved that the females have got the less opportunity to have a higher study so that in the research the number of female is less and due the household work they don't have time to make the teaching materials as well as to find the resource also.

Learning Theories

During the teaching process the teachers should know the idea of constructivism through which the students can learn freely according to their experience and active learning from the activity which can be possible if the teachers will use the teaching learning materials sufficiently, the teachers should have the knowledge of the use of understanding of use of teaching learning materials. The researcher has chosen the constructivism in which the researcher has focused the Bruner's theory and Diene's theory in teaching mathematics because he had given more focus in teaching learning materials. The researcher has believe that the students can learn very effectively if the teachers used the teaching learning materials in the classroom which help the students to get the concept of mathematics. Learning theory is a model of psychology that explains human responses through the concept

of learning. Learning theory includes behaviorism, cognitive theory, cognitive-behavioral theory and constructivism (Hayes, 2003).

Constructivism Learning Theory

Constructivism learning theory is a philosophy which enhances students' logical and conceptual growth. The underlying concept within the constructivism learning theory is the role which experiences-or connections with the adjoining atmosphere-play in student education (Hayes, 2003).

The role of teachers is very important within the constructivism learning theory. Instead of giving a lecture the teachers in this theory function as facilitators whose role is to aid the student when it comes to their own understanding. This takes away focus from the teacher and lecture and puts it upon the student and their learning. The resources and lesson plans that must be initiated for this learning theory take a very different approach toward traditional learning as well. Instead of telling, the teacher must begin asking. Instead of answering questions that only align with their curriculum, the facilitator in this case must make it so that the student comes to the conclusions on their own instead of being told. Also, teachers are continually in conversation with the students, creating the learning experience that is open to new directions depending upon the needs of the student as the learning progresses. Teachers following Piaget's theory of constructivism must challenge the student by making them effective critical thinkers and not being merely a "teacher" but also a mentor, a consultant, and a coach (Hayes, 2003)

Bruner's Theory on Constructivism

Learning is an active, social process in which students construct new ideas or concepts based on their current knowledge. The student selects the information, forms hypothesis and then integrates this new material into his/her own existing knowledge

and mental constructs. This is a continual process. Learning occurs in three stages: 1) Enactive- in which children need to experience the concrete (manipulating objects in their hands, touching a real dog) in order to understand. 2) Iconic-students are able to represent materials graphically or mentally (they can do basic addition problems in their heads. 3) Symbolic- students are able to use logic, higher order thinking skills and symbol systems (Harper, Squires & Mcdougall, 2000).

In this research it has asked the questions related to the teaching learning materials and the use of teaching learning materials. Bruner's learning theory is related to the learning of students according to their stages which define about the position of the students and how they can learn so this research is guided by Bruner's learning theory. Bruner's theory on constructivism encompasses the idea of learning as an active process wherein those learning are able to form new ideas based on what their current knowledge is as well as their past knowledge. In this research the teachers should use the teaching learning materials then the students will guess and use their knowledge to find the solution. The teaching materials help the students to get the concept of mathematics that is knowledge is created by them. The teacher resources used should be focused on that of encouragement, aiding and allowing the student to uncover the main principles on their own. Communication between the learner and teacher is the key concept. It is possible if the teachers use the materials in the classroom.

Socratic learning is suggested as the best method of communication in this theoretical framework, as it allows the teacher to actively note any study skills the learner verbalizes, their progression, their frustrations, and form a rubric of their current learning state based on the dialogue. Seeing as this theory takes known information and expounds upon it, any teacher lesson plans, teacher worksheets, or

resources should in fact be constantly building the learner's knowledge in a spiral manner (Harper, Squires & Mcdougall, 2000).

From this information it can conclude that if the teachers make lesson plan then the teaching learning materials have to mention. To include the teaching learning materials, the teachers should have the idea of making learning materials and manipulate them in the classroom.

Principles.

1. Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).
2. Instruction must be structured so that it can be easily grasped by the student (spiral organization).
3. Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

Dienes' Theory

Dienes' theory relates specifically to teaching and learning of mathematics rather than teaching and learning in general. According to Harper, Squires & Mcdougall (2000). It consists of four principles:

1. Dynamic principle.
2. Constructivity Principle.
3. Mathematical Variability Principle.
4. Perceptual Variability or Multiple Embodiment Principle.

Some of the implications of Dienes' theory for the teaching of mathematics are:

1. concrete materials should be used to support early learning of mathematical concepts, and early activities for any given concept should be carefully structured;

2. concepts must be established (constructed) before children are expected to use them;
3. contexts used to teach concepts should contain enough variable elements;
4. a wide variety of contexts, each embodying the same concept, should be used to teach any given concept so as to allow children to perceive the common elements of these various contexts (which form the essence of the concept being taught) and to discard mentally all other elements of these contexts as being irrelevant to the concept which is to be understood (Zoltandienes.com).

The progression from concrete, through other representations, to symbols and formal structures applies to all areas of knowledge. Dienes' great contribution has been that he has provided evidence of his principles at all levels and his activities use mathematical concepts. In many respects, it is best to demonstrate these processes in mathematics, so Dienes' examples will continue to inspire mathematics teachers and cognitive scientists for years to come (Harper, Squires & Mcdougall, 2000).

Research Gap

In most of the researches, the researcher has found manipulation of teaching learning materials, achievement of students in mathematics, attitude of teachers, experience and training. The researcher has decided that the attitude of teachers on the use of teaching learning materials in mathematics has to find out which helps to promote the use of teaching learning.

The researcher believed that the students get the knowledge and concept of mathematics in the constructive environment and the use of teaching learning materials supports the constructive environment. The teachers should use the teaching learning materials to make them understand and Bruner's theory also accept that the manipulation of concrete materials helps to make understand the students but there

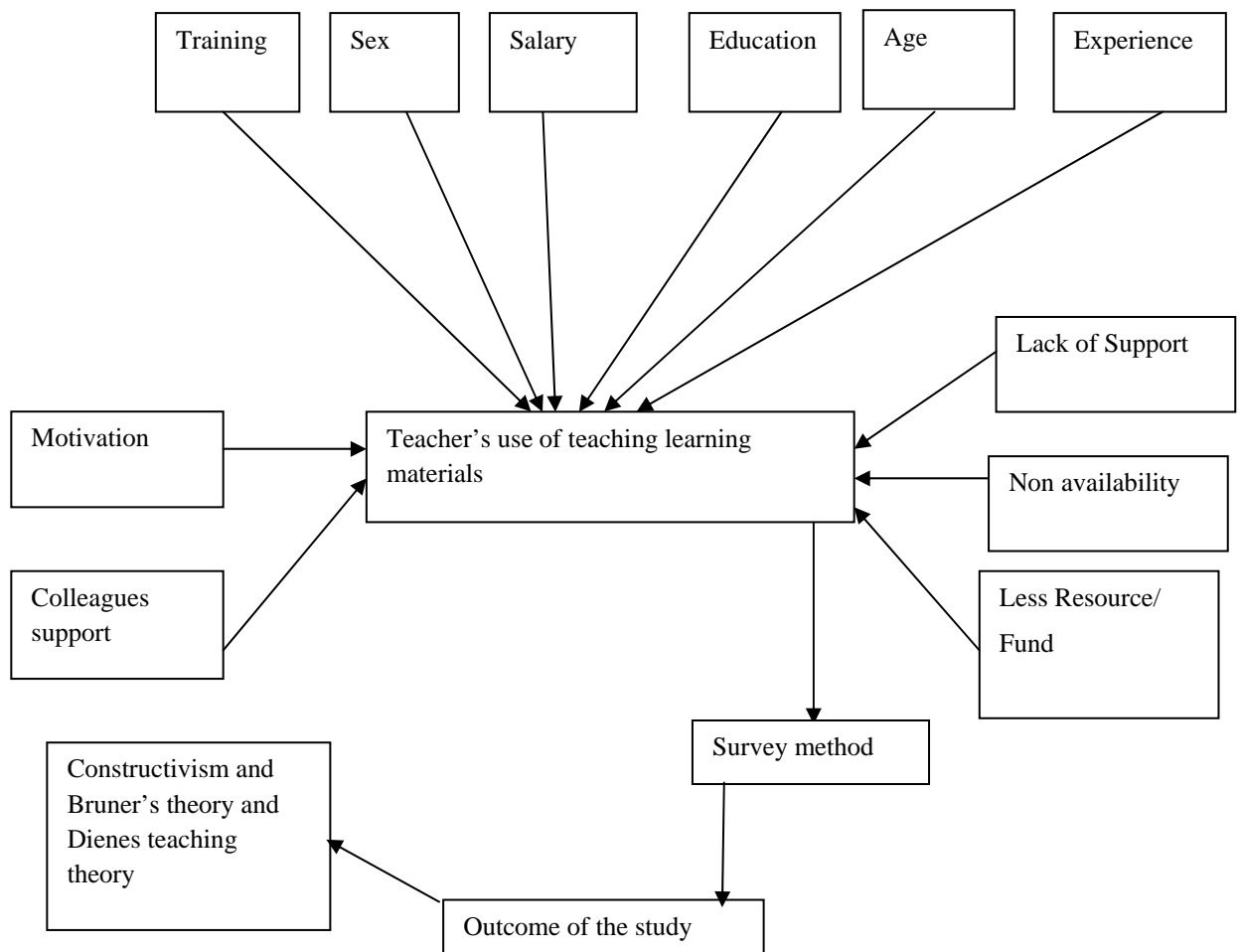
were some problems to use the teaching learning materials. The problems might be sex, training, experience, level of teachers, and education of teachers, school's support to the teachers and availability of the teaching learning materials in the schools. These all the problems were not examined in the other research so the researcher wanted to find out the problems to use the teaching learning materials in the mathematics classroom.

Conceptual Framework

After the study of different literature review related to the use of teaching learning materials and the different factors of teachers, the researcher has drawn his conceptual frame work which drags me to do this research. Different factors are there which effect to use the teaching materials in the classroom among them Training; Salary, Age, Education, Gender and Experience are the vital.

The researcher had supposed that the teachers' personal characteristics like training, sex, salary, education, age and experience are independent variables and teachers use of teaching learning materials is dependent variable. Support from the school, availability of teaching learning materials budget for teaching learning materials affect the use of teaching learning materials. Another independent variable motivation to the teachers by the school and colleagues also play important role for using teaching learning materials. Under these conditions the questionnaire has been made and got the data from the respondents by the mean of survey method. Then the researcher had edited, coded and cleaned the data and analyzed and interpreted with the help of literature reviewed, especially the outcome of the study was interpreted by the Bruners theory and Dienes teaching theory in mathematics.

Fig.1

Conceptual Framework**Chapter Summary**

This Chapter discussed about the literature review on the teaching materials. It also mentioned various questions and involvement of the researcher to find out the information that was required to be observed to fulfill the gap that researcher found studying various books and previous researches. It has included different writers' views about the use of teaching materials and its importance in the mathematics classroom. It also explained the importance of training and experience in teaching field.

CHAPTER III

RESEARCH METHODOLOGY

This chapter details the data collection and analysis procedure that were used in this study to test the theoretical model. The research design and sampling procedure is given in brief. The chapter concludes with details about the validity and reliability checks that are employed for the consistency of data and information.

Research Design

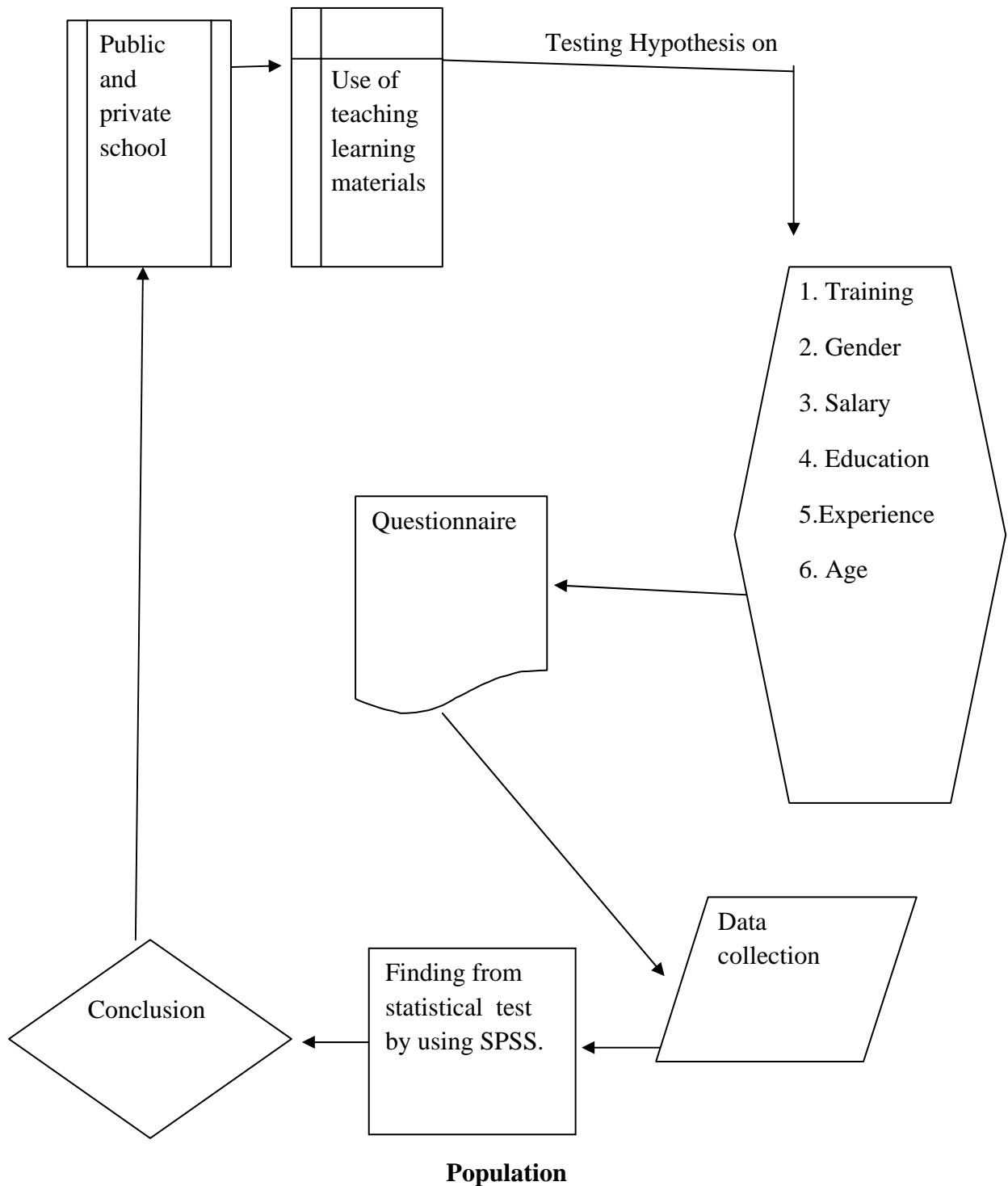
This research was survey which is empirical study of the population. So it was quantitative research. In this research, the researcher has collected the data from the mathematics teachers (Lower Secondary and Secondary level) through the questionnaire in a well manage way with discussing with the expertise and guide. The finding of research question and hypothesis has tested by using correlation, t-test, ANOVA and chi-square test with the help of SPSS 16.

Uddin and Hamiduzzaman (2009) say that positivism is a view of scientific methods and a philosophical approach, theory, or system based on the view that, in the social as well as natural sciences, sensory experiences and their logical and mathematical treatment are together the exclusive source of all worthwhile information. The roots of Positivism lie particularly with Empiricism, which works only with observable facts, seeing that beyond this is the realm of logic and mathematics. The basic principle of Positivism is that all factual knowledge is based on the "positive" information gained from observable experience, and that any ideas beyond this realm of demonstrable fact are metaphysical. On the case of positivism they said that positivists believe that reality is stable and can be observed and described from an objective viewpoint (Levin, 1988), i.e. without interfering with the

phenomena being studied. They contend that phenomena should be isolated and that observations should be repeatable. This often involves manipulation of reality with variations in only a single independent variable so as to identify regularities in, and to form relationships between, some of the constituent elements of the social world. Predictions can be made on the basis of the previously observed and explained realities and their inter-relationships.

The researcher has gone to survey to find out the condition of the teaching learning materials and problems of the teachers to use the teaching learning materials in the school. After the data collection what the data gave the information, the result and conclusion were as per the data of the respondent. Fig. 2 shows how the researcher designed the study. At first the hypothesis mentioned related to the use of teaching learning materials and Personal characteristics. After it the researcher had adopted questionnaire related to the hypothesis and general information and mathematical content. Then the data (parametrica and non parametric) were collected with scales (nominal, ordinal, ratio). According to the nature of the data the researcher used the different statistical test and interpret the result with the help of literature review and the theory then made the conclusion to help the private as well as public schools.

Fig. 2

Design of the study

The term 'population' or 'universe' for research means all the members of any well defined class of people, events, or objects (Pant, 1999). The entire group from which a sample is chosen is known as the 'population', 'group' or 'aggregation'

(Sharma, 2003). Krishnaswami (2000 as cited in Sharma, 2003) define that population is the target group to be studied. It is the total collection of elements about which we wish to make inference (Sharma,2003). Population or the universe of the research indicates to the entire mass that will be observed. The sample observation provides only an estimation of population characteristic (Sharma, 2003, p.71).

Best and Kahn (2007) states that a population is defined as a group of individuals with at least one common characteristic which distinguishes that group from other individuals (p. 13). According to the Government of Nepal there are altogether 12 resource centres in VDC area in Lalitpur district. Among them 3 resource centres, which are Bajrabahari Higher Secondary School, Chapagaon, Kitini Higher Secondary School, Godawori and Phulchoki Higher Secondary School, Thaiba, were selected. There were altogether 12 VDC in the study area. In this study the VDC are the clusters. In Lalitpur district there are altogether 154 schools (Lower Secondary and Secondary) but in his area there are altogether 64 schools which was the population.

Sampling Procedure

In random sampling, it is presumed that the population has been divided into a finite number of district and identifiable units called sampling units. The smallest unit into which the population can be divided is called an element of the population. A group of such elements is known as cluster. The number of elements in the cluster is not restricted (Sthapit, 2006).

The area or cluster sample is a variation of the simple random sample that is particularly appropriate when the population of interest is infinite, when a list of the members of the population doesnot exist, or when the geographic distribution of the individuals is widely scattered (Best & Kahn, 2007).

Pant (2005) said to make sampling more manageable, we could identify naturally occurring groups of participants (Clusters) and randomly select certain cluster. It provides an acceptable, cost effective method of acquiring a sample. This sampling method is widely use in conducting “area suvey” or “opinion surveys”.Therefore , the basis of cluster sampling is the geographical location.

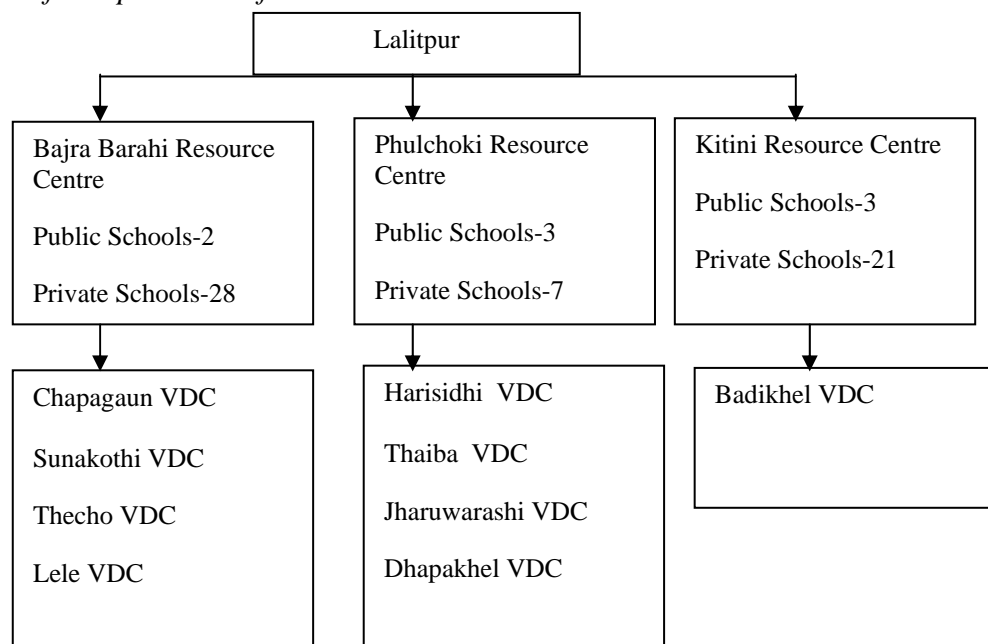
The researcher has selected the cluster sampling in the Lalitpur district (three clusters). According to the Nepal Government there are altogether 12 clusters in the VDC area, among them the researcher has chosen the three resource centers as his population. The researcher has further divided the three resource centre into the VDC as clusters. Then the researcher has found the total number of the VDC in each resource centre then the researcher has drawn VDC to get the required number 54 schools out of 64 schools in that resource centers by lottery method. Finally the researcher has selected the mathematics teachers of the selected school which were the sample and which represent the three resource centre.

Sample Design of the Study

The sample designs were as follow:

Fig.3

Selection of Sample School from Selected VDC



The entire schools of each selected VDC were studied and lower secondary and secondary mathematics teachers were the sample of this study. In this research the unit of the analysis represents the mathematics teachers of school level it means up to grade ten.

Determination of Sample Size

Consideration of formula developed by Creative Research Centre. Creative research centre of United states has developed a formula to determine the sample size of research work after the vigorous research in 2006. The formula according to Godden (2004) is as follows:

$$SS = \frac{Z^2 \times (p) \times (1 - p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)

p = probability of choice is 0.5

c = confidence interval, expressed as decimal

(e.g., .05 = ± 5)

The value of researched SS thus calculated is 384.16. This value is for the used to find actual sample size as below;

$$\text{Actual SS} = \frac{SS}{1 + \frac{SS - 1}{\text{pop}}} = \frac{384.16}{1 + \frac{384.16 - 1}{64}} = 54 \text{ schools}$$

Where: pop = population

The entire numbers (104) of lower secondary and secondary mathematics teachers of 54 schools were the sample teachers of the study.

Instruments

After the completion of research tools the researcher visited all sample schools of Lalitpur district himself to gather data from the Lower Secondary/ Secondary mathematics teachers. After the completion of research tools, required numbers of copies were produced to administer in the field. Information was collected by using the research tools. With the help of District Education office, the researcher located the rural parts of Lalitpur. The researcher personally approached the head teacher and then contacted to Secondary and lower Secondary mathematics teachers.

Questionnaire

The questionnaire is a widely used and useful instrument for collecting information. It consists of a number of questions in a definite order on a set of form. Wilson and McLean (1994 as cited in Cohen, Manion & Morrison, 2000) suggest that the questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyze (p. 245). Likewise, Myneni (2001) says, "Questionnaire is a list of questions to be answered by a group of people, especially to get facts or information and about their views" (p.197).

In the present study, the structured questionnaire was used to find out the Secondary mathematics teachers' Use of teaching learning materials in the mathematics classroom. The researcher had adopted the questionnaire from the Social Science research and thesis writing (Pant, 2005) and questionnaire of the study of instructional improvement (Michigan, 2001).

Components of the Questionnaire. The questionnaire had mainly four components, they are:

1. **General Information:** In this section the researcher has asked the questions related to the name, cast, age, sex, family members. The data related to age is parametric with ratio scale and data related to sex is non parametric with nominal scale.
2. **Educational History:** In this section, the researcher had included in Q.N.1 qualification degree, Q.N.2 years of teaching experience, Q.N.4 teaching level and Q.N.5 teaching license. Q.N. 1 to Q.N. 4 has given the non parametric data having ordinal scale and Q.N. 5 gave the nominal scale.
3. **Salary and Private Practice:** In this section altogether there are 13 questions among them Q.N. 1 is related to the salary having three options and gave the non parametric data with ordinal scale, Q.N. 2 to Q.N.10 related to the school and school support with non parametric data with both nominal and ordinal scale. Q.N.11 is the question related to the attitude of the teachers towards the use of teaching learning materials and there are 15 sub questions (a to p) which gives the attitude of the teachers with the help of Likert scale (1, 2, 3, 4 and 5). Q.N.13 represents the teaching approaches and it has four options to give the answer they are whole class grouping, ability or achievement grouping, mixed ability grouping and individualized instruction.. Q.N 11 and 13 have given the non parametric data with ordinal scale but the Q.N.11 had changed into parametric data also. The questionnaire included the items relating to the subject, positive and negative aspects. The five- point Likert - type scale ranging from “strongly agree” to “strongly disagree” for the convenience of the respondents was developed. Cohen, Manion and Morrison (2000) state that the attraction of rating scale is that they provide more opportunity than dichotomous questions for rendering data more sensitive and responsive to respondents. They further states that this makes

rating scales particularly useful for tapping attitudes, perceptions and opinions of respondents. Questionnaire based on rating scales were selected to address the main objective of research. The questionnaire is given in the Appendix I

Scores obtain by the respondents used to from standarized tests. The Teacher questionnaire form scale is developed in five points from Likert- Scale as shown in table 1 below.

Table 1

Likert -Scale of Scoring

S.N	Rating	Positive statement	Negative statement
1	Strongly agree	5	1
2	Agree	4	2
3	Normal	3	3
4	Disagree	2	4
5	Strongly disagree	1	5

4. Mathematical content: In this section the researcher had asked the questions related to the use of teaching learning materials and its knowledge. Q.N.14 related to the time given by the teachers to make teaching learning materials in a day, Q.N. 15, 16, 17, 18, 19, 20 and 21 related to the use and knowledge of solid materials, paper made materials in mathematics, use of Geo-board, and teaching algebraic equation with different teaching materials respectively. All the questions have the non parametric data having both nominal (Q.N.16, 17, 18, 19) and ordinal scales (Q.N.14, 15, 20 and 21).

Reliability and Validity

To test the validity and reliability of the study, the researcher conducted a pilot survey in 20 teachers in Lalitpur district in the first week of the session 2010/2011. The researcher used five points Likert- scale as mentioned above. Part I, however, is general part II is historical education and Part IV has multiple choice questions. Singh (2003) states that a meaning of the instrument is said to be reliable if it gives the same measurement under the similar conditions and becomes valid if correctly measured of what it is expected to measure. Reliability is stability, dependability or predictability and it is accuracy or precision in measurement (Parajuli, 2010).

The reliability is calculated using half split method by the statistical software package known as statistical package for social science (SPSS 16). The value of Guttman Split-Half Coefficient is 0.86. This is very high indicating the questionnaire used was a reliable measuring instrument.

There are various ways of measuring validity. Out of them the simplest way of measuring the validity is to use the measurement of index of reliability which is defined as the positive square root of the reliability coefficient (Sing, 2003). Its value is 92.95% which indicates that the measuring instrument used was valid. Validity is the extent to which what we measure reflects what we expected to measure. Validity refers to the degree to which evidence and theory support the interpretation of test scores entailed by proposed uses of test (Joint Committee on Standards for Educational and Psychological Testing, 1999, p 9, as cited in Best & Kahn, 2007, p. 282). The approved by the experts was also one of the ways to check the validity of the questionnaires; especially for those, which are related to the respondents' own information (Alrecjk and Settle, 1995; Pant, 2009, p.40). In this study, the researcher

consulted to the experts about the mathematics teachers' questionnaires form and made necessary refinements accordingly and assured its validity.

Ritchie and Lewis (2003) say that validity is explained with two distinct dimensions where the first one is known as internal validity (whether you are investigating what you are investigating) and the other is known as external validity (whether the findings are applicable to other groups to other setting) (p. 273).

Internal validity reflecting the phenomena under study as perceived by the study population? (Hammersley, 1992 cited in Ritchie & Lewis, 2003). In this study, the researcher was very conscious with both parts. The researcher maintained external validity through questionnaires. He did the best to maintain the internal validity by translating the exact message that informants forwarded, grading and dividing in different key points before the data analysis and interpretation. No modification of respondents views while analyzing and interpreting. Therefore, the researcher can make other people ensure that the research is valid. Beside this the researcher maintained the content validity. The researcher had involved all the questions which measure the attitude of teachers and the questions related to the use of teaching learning materials for the lower secondary and secondary level which help to find the knowledge of teachers in teaching learning materials. All the questions were supervised by the supervisor and the questionnaire was adopted from the Social Science research and thesis writing (Pant, 2005) and questionnaire of the study of instructional improvement (Michigan, 2001). The researcher had questionnaire which was designed according to the suggestion given by thesis supervisor. He did not force the informants to answer all the questions.

Statistical Technique

The following statistical techniques were used.

1. Descriptive statistics such as mean and standard deviation (SD) were used to find the age, experience of years, number of female and male teachers, education status of teachers, training of the teachers and level of teachers. In this part the data had nominal and ordinal scale.
2. Correlation test were performed to explain the relationship of independent variables (sex, education, age, level, experience, training) and dependent variables (attitude of teachers towards the use teaching learning materials and teaching approach) having ordinal scale .
3. t-test was used to find the significant difference between the attitude of teachers towards the teaching learning materials and sex, level respectively. In this part the attitude had ratio scale so the t- test could be tested. t-test was used for independent variables.

Data Collection

Once the research has selected a specific design for the study consistent with the objectives of the research as described in the previous chapter, it is time to collect data. In collecting the data it was important to use procedures which elicit high quality data, since the quality of any thesis writing depends largely on the quality of data collected and the quality of the thesis directly related to the data collection procedure so that this the most important chapter of thesis writing. Thus, well thought data collection procedure generally elicits high quality data leading to valid with finding and conclusion. Cohen et al.(2002)said “By methods ranges of approaches used in educational research to gather data which are to be used as a basis for inference and interpretation, for explanation and prediction”(p.44) . The method

enabled the researcher to find out the ground reality regarding the knowledge of teachers towards the understanding of use of teaching learning materials, available teaching aids in the school of Lalitpur district (Three resource centers) and use of the teaching materials in the classroom.

Before collecting data, the researcher got the recommendation letter provided by the School of Education, Kathmandu University. The researcher personally visited the schools purposively, consulted the principal/ head master and mathematics teacher of each school, produced the recommendation letter provided by the School of Education, Kathmandu University and clarified them the objectives of the study and took permission to give the questionnaire form to fill up the corresponding teachers. During the data collection, the researcher felt difficult to collect data. In one school it has been taken nearly one hour. In some of the school, some teachers took more time and had not shown interest to fill the form. During the data collection, the researcher has got knowledge and learnt from the event that is the attitude of teachers and how to tackle with them. In few schools, the researcher has found there was reader of campus who has been teaching mathematics in secondary level. The researcher is so grateful for them to encourage him to collect the data. They also inspire him also.

The research is mainly based on primary data. The researcher himself had gone to collect the primary data from the teachers through the means of questionnaire. The collected data were parametric and non parametric having different scale which was mentioned in components of questionnaire section. The secondary sources of the study were the books journals, research articles, dictionaries and he took some information with the help of District Education office, Lalitpur.

A variable is called dependent variable if it depends upon the other variable or values. If the variable is not influenced by other variable is called independent variable (Pant,2009,p.168). This research study is concerned on to what extent the the use of teaching materials is dependent upon experience, training, education, sex, salary and age.

Data Analysis

The finding of any research also depends on the data collection and analysis procedure. It required systematic planning for the successful completion of any kind of research. The data analysis is a process of transforming data with the aim of deriving useful information and facilitating inclusions and at the same time it is a challenging and exciting stage.

All the collected datas from Lower Secondary / Secondary Mathematics teachers from the sample schools were entered into the statistical package for social sciences. The raw data were retrived using the SPSS package. Cross tables, correlation and t-test were applied . t-test was run to detrmine the significant difference between two and more than two categories respectively.

Correlation is the relationship between two or more paired variables or more sets of data, the degree of two or more sets of data. The degree of relationship is measured and represented by the coefficient of correlation (Best & Kahn, 2000). The researcher had found the relation between the dependent variables (Attitude and Teaching approaches) with the independent variables (Sex, experience, age, training, education and teaching level).

The data got from the general information was analyzed with the help of descriptive and cross tabs since they gave the nonparametric data with nominal and ordinal scale. In the part III Salary and Practice of the questionnaire, Q.N.11 was the

question related to the attitude of teachers was derived from the perception of teaching learning materials and its importance, student's performance in their classroom and teacher's satisfaction, views towards the training and Q.N. 13 was teaching Approaches, the respondents were elaborating the questions related to the learning environment of the students and how they divide the students to teach. In the mathematical content section, questions related to the use of teaching learning materials and its knowledge gave the ordinal and nominal scale (see in detail in questionnaire).

When the researcher has got the result of the data which were tested through the SPSS then he analyzed and drawn the conclusion with the help of literature review and he got the help from the constructivism theory and especially through the Bruner's theory related to the teaching learning materials and Zoltan Dienes theory in teaching mathematics.

Ethical Issues

Niff (1992) says that doesn't reveal the real name of the people or place unless you have specific permission to do so, don't give participations fictitious names, those names may belong to other people somewhere. This above statement made me always conscious about the ethical issues. When the researcher came across some ethical dilemmas, he consulted my research guide.

The following were the ethical values that he developed while doing his research.

1. The researcher talked about the purpose of doing his research.
2. The researcher respected the dignity, privacy and interest of participants.
3. The researcher talked with the mathematics teacher after consulting the head teacher only.
4. The researcher promised them to keep their responses confidential secret.

5. The researcher was always with the interest of respondents though they were not catching his plans.
6. The researcher was conscious about misrepresenting the socio-cultural contexts that may be harmful to the beliefs/faiths of certain persons and / or groups.
7. The researcher has cited the literatures that he referred during my study and references have been maintained.

Summary of the Chapter

In this chapter, the researcher has discussed various aspects of the study linked to the research methodology. The researcher has begun with the research design of the study and discussed process and reasons for pilot survey. Further, the researcher has discussed population, sampling techniques, sample design of the study, instrument, data collection procedures and techniques of data collection. It has mentioned its validity and its reliability by pilot test. Similarly, the researcher has presented data entry, analysis and interpretation procedures for the study.

CHAPTER IV

ANALYSIS AND INTERPRETATION

Analysis of data is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains.

Personal Information of Respondents

In this section the researcher had discussed about the sex, marital status, education, experience, age, and license, level of teachers and colleagues support during their teaching period which are found in the section I. General information and II. Educational history of the questionnaire. In both section the data were nominal and ordinal but in this section the researcher had presented the data in the descriptive ways.

There can be a relation between the marital status of the teachers and their experience of teaching. It was analyzed to know whether there is relationship between the teachers and their experiences. Table 4 describes the number of married and single teacher regarding with the experience of teaching. Table 4 reveals that 56 (93.3%) married teachers have more than two years experience but 26 (61.4%) single teachers have more than two years of teaching experience. The married teachers who had less than two years of teaching experience were only 4 (6.7%) while there were 56 (93.3%) having more than two years of teaching experience. In total there were 44 (42.3%) single teachers and 60 (57.7%) married teachers.

Table 2

Teaching Experience and Marital Status of Respondents

Teaching experience in years	Marital status			
	<i>Single</i>		<i>Married</i>	
	N	%	N	%
Less than two years (0-2)	17	38.6	4	6.7
More than two years (2 and above)	26	61.4	56	93.3
Total	44	100	60	100

The majority of married teachers (93.3%) had more experience than the single teachers. 56 (93.3%) teachers having more than two years teaching experience were married and 26 (61.4%) were single.

Teaching Experience and License

In the field of teaching there is another important requirement of teaching license without which a candidate cannot enter in the teaching field according to the rule of Nepal Government but in some private schools there were teachers without teaching license. Table 5 presents the number of teachers with teaching license and without teaching license with their percentage.

Table 3
Teaching Experience and License

Teaching experience in years	Teachers			
	<u>With license</u>		<u>Without license</u>	
	N	%	N	%
Less than two years (0-2)	1	1.8	20	43.5
More than two years (2 and above)	57	98.2	26	56.5
Total	58	100	46	100

From the Table 3, in the case of more than two years teaching experience, 57 (98.2%) teachers have license and 26 (56.5%) teachers do not have license. This data showed almost all teachers having license have more than two years teaching experience. In the case of less than two years teaching experience, 1 (1.8%) teachers have license and 20 (43.5%) teachers do not have license. In total 58 teachers have license but 46 teachers do not have license. The majority of teachers have license.

The majority of experienced teachers (more than two years) have license than the teachers having less than two years teaching experience. The Government of Nepal has made the rule that the teachers must have the license to teach in the school. Richard (2005) says that training involves understanding the basic concept and principles as a pre-requisite for applying them to teach and ability to demonstrate principles and practices in the classroom. Therefore, training is an important part to use teaching materials.

Age and Sex of Respondents

Since there can be a relationship between the age and sex of teachers, the number of teachers were categorized according to sex and age as shown in table 6.

Table 4

Age of Teachers by Sex

Age	Sex of teachers				
	<i>Male</i>		<i>Female</i>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
0-25	14	17.5	11	55	26
25-30	17	21.5	7	35	24
30-35	24	30	0	0	24
35-40	14	17.5	2	10	16
40-45	12	15	0	0	12
45- above	3	3.7	0	0	3
Total	84	100	20	100	104
Mean	31.83		26		30.71
SD	7.074		4.69		7.051

In total 84 (80.7%) were male teachers while 20(19.2%) were female teachers. The age of the female teachers were less than 40 years but the male teachers were up to 53 years. The majority of male teachers were also 45 years. The mean age of male teachers was 31.83. The mean age of female teachers was 26. The mean difference age of the male and female was 5.83 years; it was not so much different. In the case of female teachers, the number decreased as the age increased but in the situation is

opposite in the case of male teachers. In the age group 35-40, 40-45 and 45 and above, the number of male teachers were significantly high than the female teacher. The modal class of male was 30-35 but the female was 0-25. It showed that the maximum number 24 (30%) of male teachers falls in 30-35 age group and the maximum number 11 (55%) of female falls in 0-25 age group.

Educational Qualification of the Respondents

There can be a relation between the knowledge of teaching learning materials and teacher's education background. The education background means the teachers who were from the Education faculty have education degree and the teachers who were from other than education faculty have non education degree.

Table 5

Number of Teachers by Educational Background.

Qualification	Teachers			
	<u>Education degree</u>		<u>Non Education degree</u>	
	N	%	N	%
Intermediate	3	8.3	11	15.7
Bachleor	20	58.8	42	60
Master degree	11	32.4	17	24.3
Total	34	100	70	100

From the table 5, there were more or less equal percentage of teachers having Bachelor degree in education and non education background. In total, 42 (40.40 %) of teachers have Bachelor degree (non education degree) and 20 (19.20 %) have Bachelor degree in education and it means that the less teachers have education background. 11 (15.7 %) teachers have Intermediate Certificate and only 3 (8.3 %) teachers have the I.Ed certificate that means they are from education background. The

number of teachers having master degree was more from education faculty than others. The majority of teachers had non education degree. In total, 34(32.6%) teachers have education background and 70 (67.3%) teachers do not have education background.

School Related Information

The researcher explored the condition of budget for materials in the school, 32 (30.80 %) schools having a system to keep the budget for materials. It showed the situation of materials in the school. If schools do not have budget for materials then obviously teachers use the teaching learning materials poorly even though they have an idea to use the teaching learning materials. In total there were 12 (11.50 %) schools have maths lab and rest of schools have no maths lab. It shows that the teaching learning materials were not found sufficiently in the school. If the school has less material then the teachers also use less teaching materials in the classroom. The following table shows the number of teacher in accordance to the status of the budget and math lab in the school.

Table 6

Record of Math Lab and Budget in the School.

Budget	Math lab				Total
	<i>Available</i>		<i>Not available</i>		
	N	%	N	%	
Allocated	6	50	26	28.3	32
Not allocated	6	50	66	71.7	72
Total	12	100	92	100	104

Note: Math Lab is a room where mathematics teaching learning materials are found and practice.

Among the maths lab available school, 6 (50%) teachers had accepted that in their school the budget was allocated but 6 (50%) teachers had accepted that in their school the budget was not allocated. Though some school had maths lab they did not allocate budget for the teaching learning materials. Among the schools where maths lab were not found, 26 (28.3%) teachers had accepted that the schools allocated the budget for the teaching learning materials but not had maths lab and 66 (71.7%) teachers accepted that the schools did not allocated budget for the teaching learning materials. The majority of schools had not allocated budget for the teaching learning materials that is why teaching learning materials were less in the school.

12 teachers had accepted that their schools had maths lab and 92 teachers had accepted that their schools had no maths lab. Similarly 32 teachers who had accepted that their schools had allocated the budget for the teaching learning materials but 72 teachers said that their schools had not allocated the budget for the teaching learning materials.

The majority of schools had no maths lab and not allocated the budget for the teaching learning materials. It showed that even the teachers having the idea to use the teaching learning materials could not use the teaching learning materials in the classroom.

The researcher again wanted to find the condition of the schools' support to the teachers to use the teaching learning materials according to their level of teaching and sex of the teachers.

Table 7

Number of Teachers Reporting Support from the School by Level.

School Support	Level of teachers				
	<i>Lower Secondary</i>		<i>Secondary</i>		<i>Total</i>
	N	%	N	%	
Administrative	11	22	13	24.1	24
Economic	8	16	18	33.3	26
Managing	10	20	9	16.7	19
Motivation	21	42	14	25.9	35
Total	50	100	54	100	104

From the table 7, 11 (22%) lower secondary teachers and 13 (24.1%) secondary teachers informed that they got the administrative support from the school. The majority of secondary teachers 18 (33.3%) had got the economic support in comparison with lower secondary teachers. In the case of motivation, 21 (42%) lower secondary teachers and 14 (25.9%) secondary teachers had got the motivation from the school. It means the majority of lower secondary teachers were motivated by the school. The majority of lower Secondary teachers had not got the enough economic support than the Secondary teachers but the majority of lower Secondary teachers had got the motivation of teaching learning materials by the schools.

Table 8

Number of Teachers Reporting Support from the School by Sex.

School support	Sex				Total
	<i>Male</i>		<i>Female</i>		
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
Administrative	20	23.8	4	20	24
Economic	19	22.6	7	35	26
Managing	16	19.1	3	15	19
Motivation	29	34.5	6	30	35
Total	84	100	20	100	104

From Table 8, 20 (23.8%) male teachers had got the administrative support while 4 (20%) female teachers had got the administrative support. It means both the sex had got more or less equal administrative support. 19 (22.6%) male teachers and 7 (35%) female teachers got the economic support from the school. In the case of managing and motivation, the male teachers had got more support than the female teachers.

Attitude of Teachers Using Teaching Learning Materials

The likert scale table mentioned below which had discussed about the attitude of teachers on the use of teaching materials. The attitude of teachers was derived from the question related to the training, salary, teaching methods; views related to teaching materials, novice and experience teachers. The attitude of teachers was mentioned in part III. Salary and Practice section in Q.N 11, its data is parametric and having ordinal scale.

Table 9

Likert Table Showing the Attitude of Teachers

<i>Statements</i>	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>	<i>Mean</i>	<i>Std. Deviation</i>
a.A valid and reliable instrument can be developed to measure varying degree of teaching.	2	9	9	63	21	3.88	.896
b.Most administrators do not know enough about the teaching to rate their faculty members fairly.	2	7	20	49	26	3.87	.935
c.Salary schedules based on education and experience only encourage mediocre (average) teaching.	1	7	13	41	42	4.12	.938
d.Do you agree that the teaching materials enhance the students to learn the mathematics easily?			3	23	78	4.72	.511
e.We can teach mathematics to the students through games.	9	6	8	51	30	3.84	1.167
f.The training is important to teach mathematics in the classroom.	1	2	2	38	61	4.50	.724

g.The inexperience teachers have fewer skills than experience teachers.	2	8	11	41	42	4.09	.996
h.Let me think about an aspect of my teaching in a new way after one year.	2	3	9	58	32	4.11	.823
i. Most of the students in my class can learn what I am supposed to teach them.		3	11	72	18	4.01	.631
j.By trying different methods, I can significantly affect my student's achievement levels.		3	10	60	31	4.14	.703
k.I deal a great feel of satisfaction when students will learn what I am supposed to teach them.		1	4	32	67	4.59	.617
l.The trained teachers used teaching materials more than untrained teachers.	2	1	11	39	51	4.31	.848
m. Most administrators know enough about the teaching to rate their faculty members fairly.	12	27	26	28	11	2.99	1.195
n. Salary schedules based on education and experience only do not encourage mediocre (average) teaching.	11	41	28	22	2	2.64	.994

o. The trained teachers used teaching materials less than untrained teachers.	31	33	18	19	3	2.33	1.170
Total	75	151	183	636	515	58.14	
Combined Mean	5	10.06	12.2	42.4	34.34	3.875	

From the table 9, the researcher had mentioned two statements having negative (Q.N. m, n and o) and positive value (Q.N.a to l) to find out the attitude of teachers. The overall mean is 3.875 which mean the majority of the teachers have accepted their answer with agree and strongly. It showed that the teachers have positive attitude towards the use of teaching learning materials. In all the positive statement the mean value was greater than 3.5, it means the majority of teachers agree and strongly agree in the given positive statement. Similarly in all the negative statement the mean value was less than 3, it means the majority of teachers disagree and strongly disagree in the negative statement. Majority of teachers gave the positive and suitable answers of the given statements. Among them the researcher had explained some statements which were given below:

The majority of teachers agrees and strongly agrees that most of the administrators do not know enough about the teaching to rate their faculty fairly because the mean value this statement was 3. It means the majority of teachers were not satisfied with the administrators and mathematics can teach through the games. The majority of teachers agree that the teaching materials enhance the students to learn the mathematics easily and the majority of teachers know the importance of teaching materials.

From the table 9, it was clear that the majority of teachers accepted that the training is important to teach mathematics in the classroom which gave that the

inexperience teachers have fewer skills than the experience teachers. Majority of teachers thought that they need to think new way of teaching and presentation and updated method in every new session. They also believed that most of the students in their class can learn what they supposed to teach them. The majority of teachers were satisfied when the students were understood what they supposed to teach.

Teaching Experience and Use of Teaching Learning Materials

The researcher had first found that the use of teaching learning materials by experience of teaching. The teachers' experience was categorized as more than two years and less than two years. The researcher had supposed that the experienced teachers must have more than two years teaching experience in the school and non experienced teachers were counted as less than two years of teaching experience in the school.

The researcher had tried to find out the use of teaching learning materials by the experienced and non experienced teachers. Most of the researcher believed that the experienced teachers had used the teaching learning materials than the non experienced teachers. While teaching mensuration chapter what type of teaching learning materials used by the teachers having less than two years teaching experience and the teachers having more than two years teaching experience. The teaching learning materials mean solid materials, paper made materials, stick and potato to make net of prism and pyramid and multimedia. In table 10 the number and percentage of teachers mentioned to use the teaching learning materials. The table 10 shows the relation between the use of teaching learning materials and experience of teaching.

Table 10

Number of Teachers in Using Teaching Materials by their Experience

Materials used in mensuration	Teaching experience				
	<i>Less than two years</i>		<i>More than two years</i>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
solid figures	14	66.66	28	33.73	42
paper made materials	4	19.04	28	33.73	32
sticks and potato	1	4.76	8	9.63	9
Multimedia	2	9.52	3	3.61	5
all of above	0	0	16	19.27	16
Total	21	100	83	100	104

The number of non experienced teachers who had used the solid materials was 14 (66.66%). It showed that the less number of inexperienced teachers had the idea of paper made materials, net and multimedia. Comparatively the experienced teachers had used the paper made materials, net and multimedia more than the non experienced teachers. This shows that the experienced teachers had more knowledge of teaching materials than the non experienced teachers so the schools have given facility to the experience teachers to do work in the school as the permanent teachers. The experienced teachers can give the concept and application of mathematics in the classroom so that the students can learn the mathematics easily.

There can be a relationship between teaching experience and use of folding papers in the class room. The researcher had believed that if the teachers have used

the folding paper in the classroom then the students can understand easily what was supposed to teach by the teachers.

Table 11

Number of Teachers Using Folding Paper by their Experience

Teaching experience in years	Experience on making folding papers.				
	<i>Experienced</i>		<i>Not Experienced</i>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
less than two years(0-2)	9	11.3	12	50	21
more than two years (2 and above)	71	88.7	12	50	83
Total	80	100	24	100	104

In total 80 teachers experienced to make the folding papers but 24 teachers could not use it. Table 11 clearly gives the information about the experience on making folding papers. The majority of teachers 12 (50%) having less than two years teaching experience had not experienced on making folding papers. The majority of teachers 71 (88.7%) having more than two years teaching experience had experience on making folding papers. In total, 80 teachers had experience on making folding papers. Due to the experience of teaching, majority of experienced teachers had more knowledge to make the paper made materials by folding papers than the non-experienced teachers.

The presence of teachers with long years of teaching experience in schools has much relationship with students' learning outcomes. They claimed that as major input into the school system and the hub of the educational system, teachers are a force to reckon with in schools in terms of effective teaching and better learning outcomes.

(Management, 2008). The researcher had also found that the experience teachers have more knowledge to use the teaching learning materials which was shown by the table 12.

Table 12

Teachers Experience of Using Net by Match Stick.

Teaching experience in years	Use of match stick				
	<u>Can use</u>		<u>Cannot use</u>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
less than two years(0-2)	6	8.3	15	46.8	21
more than two years (2 and above)	66	91.7	17	53.2	83
Total	72	100	32	100	104

In total 72 teachers used match stick to make net but 32 teachers did not used it. From the table 14, 6 (8.3%) teachers having less than two years teaching experience could use the match stick to teach the prism and pyramid but 15 (46.8%) teachers could not use the match stick. This shows that most of the teachers having less than two years teaching experience had no idea to use the match stick in mathematics. 66 (91.7%) teachers having more than two years teaching experience could use the match stick to teach the prism and pyramid but 17 (53.2%) teachers could not use the match stick. In total the majority of teachers have used match stick.

The experienced teachers had more idea to make prism and pyramid with the help of net of match stick but the less number of non experienced teachers have the knowledge about the net.

The researcher had found that there were less number (5) of non experienced teachers had seen the Geo Board and more number (56) of experience teachers had seen the Geo Board. It means that the concept of teaching materials was found more in experienced teachers. The researcher was not cleared about the Geo board by the above data so again the researcher drew another data which is mentioned in the table 13.

Table 13

Number of Teachers Use Geo Board by their Experience

Teaching experience in years	Use of Geo Board while teaching transformation				
	<u>Use</u>		<u>Not use</u>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
less than two years(0-2)	2	4.4	19	32.2	21
more than two years (2 and above)	43	95.6	40	67.8	83
Total	45	100	59	100	104

In total 45 teachers used the Geo- board but 59 teachers did not used it. From the table 13, in the case of use of Geo board while teaching transformation, 2 (4.4%) non experienced teachers had used the Geo board while 43 (95.6%) experienced teachers had used the Geo board. Almost all teachers who use Geo Board had more than two years of teaching experience. In the case of no use of Geo board, 19 (32.2%) non experienced teachers had not used the Geo board and 40 (67.8%) experienced teachers had not used the Geo board.

The use of Geo Board in the classroom while teaching transformation, more than 50% experience teachers had used but very less number of non experienced teachers had used the Geo Board. It shows that the non experienced teachers had less idea to use the Geo Board. In most of the school there were not sufficient teaching learning materials which creates the problems to use the Geo board even though they the idea of using Geo board.

The researcher had asked the question about the salary by giving option in the form of statement which is mentioned below:

Table 14

Teachers by Experience and their Salary.

Teaching experience in years	Ability to meet monthly living expenses						
	<u>Can save</u>		<u>Generally adequate</u>		<u>Meets only a small fraction</u>		<u>Total</u>
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	
less than two years (0-2)	0	0	9	18	12	28.5	21
more than two years (2 and above)	12	100	41	82	30	71.4	83
Total	12	100	50	100	42	100	104

The majority of teachers can't save their salary, 0% non experienced teachers can save their salary and 12 (100%) experienced teachers can save the salary; it means that 12 experienced teachers out of 83 can save the salary. Rest of all the teachers used their salary to meet only a small fraction and generally adequate their expenses.

The salary of teachers in the school was not satisfactory because most of the teachers said that their salary was generally adequate and meet the small fraction of their expenses.

There can be a relation between level of teachers and experience of teachers. In general, the lower secondary teachers were younger than secondary level teachers in the context of Nepal but the experience of teachers according to level may be different or more or less equal. It can be observed in table 15.

Table 15

Level of Teachers and their Experience

Teaching experience in years	Level of the teacher either lower secondary or secondary				
	<i>Lower secondary</i>		<i>Secondary</i>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
less than two years (0-2)	17	34	4	7.4	21
more than two years (2 and above)	33	66	50	92.6	83
Total	50	100	54	100	104

From the table 15, it was clear that there were 50 lower secondary mathematics teachers and 54 Secondary mathematics teachers in the study area. In the lower Secondary level 17 (34 %) were less than two years experience and 33 (66%) were experienced teachers. In Secondary level, 4 (7.4%) teachers had less than two years teaching experienced and 50 (92.6%) teachers had more than two years teaching experience. It showed that majority of Secondary teachers had the teaching experience more than two years. Comparatively there was equal number of lower

secondary and secondary level teachers. The majority of Secondary level teachers have more than two years teaching experience than lower secondary level.

Academic Background of Respondent and Use of Teaching Learning Materials

In the teaching field, the teachers must know the idea of use of teaching learning materials then only the students can get real knowledge about the mathematics. The researcher had divided the teachers in two group (Education and Non Education) and categories to find the knowledge about the teaching learning materials in algebra. It was cleared from the table.

Table 16

Academic Background of Respondent and Use of Teaching Learning Materials in Algebra.

Materials used in algebra	Academic Background of Respondent				
	<i>Non Education</i>		<i>Education</i>		<i>Total</i>
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
Blackboard	51	75	9	27.3	60
Algebraic tiles	1	1.5	2	6.1	3
Algebraic blocks	2	2.9	0	0	2
All above	14	20.6	22	66.6	36
Total	68	100	33	100	101

From Table 16, 51 (75%) teachers having non education background had used blackboard more than the teachers 9 (27.3%) having education background.

Algebraic tiles were used by both the teachers in equal proportion. The non

education background teachers 14 (20.6%) only used all the materials while teachers having education background 22 (66.6%) used all the materials.

Comparatively the teachers who have education background used almost all materials than the teachers who have non education background. Therefore the teachers who have education background had more knowledge about the teaching learning materials and the students can learn the content with the help of the teaching learning materials.

Table 17 shows the situation of the part time teachers in different private as well as public schools and in which age group fall more part time teachers.

Table 17

Teachers Work Status According to Private and Public School.

Age of the teachers	Part time teachers		
	<i>Public</i>	<i>Private</i>	<i>Total</i>
20-25	0	5	5
25-30	1	10	11
30-35	3	9	12
35-40	0	6	6
40 and above	0	8	8
Total	4	38	42

The researcher had found that 42 teachers who were teaching in two or more than two school. 4 (9.5%) teachers had done the part time work in public school but in private school, 38 (91.5%) teachers had worked as part time teachers. The majority of teachers 11 (26.1%) aged group 25-35 had worked as a part time teacher in more than one school. The teachers 8 (21.1%) having aged group 40 and above had worked in private school as a part time teachers. The aged group 20-25, 35-40 and 40 and above teachers have not worked in public school as part time teachers.

The majority of the part time teachers worked in the private schools and it means that the teachers in private schools have less time to make the teaching learning materials and more work load so they did not used the teaching learning materials as much as the content need.

Relationship between Attitude and Personal Characteristics

The researcher assessed the research hypothesis with the help of statistical measures like t-test, Spearman and Pearson correlation coefficient test. In this section, the dependent variable were attitude and teaching approaches and the independent variables were as sex, experience, training, education, salary, age and level of teachers. Correlation test was only test the relationship between the dependent variable and independent variables. t- test was applied for the hypothesis. That means whether the null hypothesis was accepted or rejected. The following are the statistical hypothesis to be tested by correlation coefficient test:

Correlation Test between Attitude and Personal Characteristics

The researcher tried to find the relationship between attitude towards the use of teaching learning materials and Personal characteristics of teachers (education, experience and age of teachers). The relationship was tested at 0.05 level of significant. Teachers of long years of teaching experience always have better ways of

teaching, better strategies or methods to apply at any given situation and better ways of bringing the subject matter being taught to students. According to them, this would inevitably lead to better students' learning outcomes in schools. (Management, 2008)

It is expected that the teachers having the education background have the idea of teaching learning materials rather than the teachers having non education background this is why the government has given more priority to the teachers who have education background. Amedeker (2005) as cited by Ololube (2007) Inadequate teacher preparation programmes cause the majority of teachers' inability to demonstrate adequate knowledge and understanding of the structure, function and development of their disciplines. Therefore, an effective teacher education programme is a prerequisite for a reliable education system which lends confidence to both teachers and students when learning is coordinated effectively and professionally.

Table 18 reveals the relationship between the attitude of teachers towards the use of teaching learning materials and personal characteristics.

1. Null Hypothesis: Education of teachers is not correlated with the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Education of teachers is correlated with the attitude towards the use of teaching learning materials.

2. Null Hypothesis: Experience of teachers is not correlated with the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Experience of teachers is correlated with the attitude towards the use of teaching learning materials.

3. Null Hypothesis: Age of teachers is not related to the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Age of teachers is related to the attitude towards the use of teaching learning materials.

4. Null Hypothesis: Salary of teachers is not related to the attitude towards the use of teaching learning materials.

Alternative Hypothesis: Salary of teachers is related to the attitude towards the use of teaching learning materials.

Table 18

Correlation between Attitude and Personal Characteristic of Teachers.

Personal Characteristics	Attitude of the teachers		Sig. Value
	N	Correlation Coefficient(r)	
1. Education	104	0.11	.23
2. Experience	104	0.231*	.018
3. Age	104	0.155	.116
4. Salary	104	-0.231*	.018

The table 18 shows that the correlation between Education of teachers and their Attitude towards teaching learning materials was found to be 0.11. This correlation coefficient is found to be insignificant at 0.05 level. So the null hypothesis is accepted and the alternative hypothesis was rejected at 0.05 levels. This shows that Education is not significantly related to attitudes of teachers in use of teaching learning materials.

The table 18 shows that the correlation between experience of teachers and their attitude towards teaching learning materials was found to be 0.231. This correlation coefficient is found to be significant at 0.05 levels. So the null hypothesis

is rejected and the alternative hypothesis was supported at 0.05 levels. This shows that experience is significantly related to attitudes of teachers in use of teaching learning materials.

The table 18 shows that the correlation between Age of teachers and their Attitude towards teaching learning materials was found to be 0.155. This correlation coefficient is found to be insignificant at 0.05 levels. So the null hypothesis is accepted and the alternative hypothesis was rejected at 0.05 levels. This shows that Age is not significantly related to attitudes of teachers in use of teaching learning materials.

The table 18 shows that the correlation between Salary of teachers and their attitude towards teaching learning materials was found to be - 0.231. This correlation coefficient is found to be significant at 0.05 levels. So the null hypothesis is rejected and the alternative hypothesis was supported at 0.05 levels. This shows that Salary is negatively related to attitudes of teachers in use of teaching learning materials.

The researcher again wanted to find out the correlation between the educations of teachers with their teaching approaches. The researcher thought that the teaching approaches of the teachers depend upon the education level of the teachers. There can be the relation between them; it was cleared in table 19.

Table 19 shows the relationship between the teaching approaches and education of teachers. There was a significant relation between the education of teachers and whole class grouping method. There was a negative relation between them. There was a significant relation between the ability or achievement grouping and education of the teachers at 0.01 level of significant. In the case of education and mixed ability grouping, there was a positive relation between them at 0.05 level of

significance. Similarly, in the case of education and individualized instruction, the insignificant relation was there between them.

Table 19

Correlation between the Teaching Approaches and Education of the Teachers.

	Education of the respondent	Whole class grouping	Ability or achievement grouping.	Mixed ability grouping.
Whole class grouping	-.254**			
Ability or achievement grouping.	.216*	.138		
Mixed ability grouping.	.289**	-.244*	.429**	
Individualized instruction.	.028	-.052	.142	.398**

**Correlation is significant at the 0.01 level (2-tailed).

**Correlation is significant at the 0.05 level (2-tailed).

Attitude Difference between Male and Female

The researcher tried to find the relationship between the sex and attitude of the teachers towards the use of teaching learning materials. Sex was categorized as 1 for

male and 2 for female and the attitude was divided into five groups. The mean attitude had parametric data so the researcher used the t- test to find the significance difference between the mean male and mean female to the attitude of the teachers.

The researcher had measured the t value at 5% level of significance for 102 df.

The table 20 reveals the mean age of female was 1.3663 and the male teachers was 1.5649 which was significantly different. The mean age of male was more than the female. So, it can be further tested by t-test.

Null hypothesis (H_0): $\mu_1 = \mu_2$ i.e. there is no significant difference between attitudes scores and male and female teachers.

Alternative hypothesis (H_1): $\mu_1 \neq \mu_2$ i.e. there is significant difference between attitudes scores and male and female teachers.

Table 20

t-test to Compare Mean Attitude Scores between the Male and Female Teachers.

<i>Sex</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>t</i>	<i>Sig. Value</i>
Male	84	1.5649	0.29912	2.536	0.013
Female	20	1.3663	0.14333		

Table value of t at 5% level of significance for 102 d f is 2.536.

The calculated value of t is 2.536. This t-test is found to be significant at 0.05 level so the null hypothesis is rejected that is there was a significant difference in mean attitude scores between the male and female teachers.

It is also supported by Neupane (2001)'s research on "Mathematics achievement of primary school children of various ethnic groups in Nepal" for PhD with the sample of 250 boys and 250 girls from ethnic groups and found that the boys were better than the girls in mathematics. It also proved that the female teachers have

negative attitude towards the teaching materials. Females had a more negative attitude towards mathematics while males had a more positive one. In middle school, females had a negative attitude towards mathematics even that underrepresented females had the worst attitudes towards mathematics. These negative attitudes were based in part on the parents' beliefs that males were better mathematics learners and it was more important for males to learn mathematics (Shelton, 2007). Bhatta (2005) reported that the female student's average score in maths was 33.46 and male students were 40.02. This also shows that the knowledge of male students more than the female students this gives the female teachers has less knowledge than the male teachers.

Teaching Level (Lower and Secondary) and Attitude of the Teachers

The level of teachers means their teaching level in school either lower secondary level or secondary level. In the context of Nepal, the government has made rule for lower secondary level the minimum qualification is certificate level and for secondary level is Bachelor degree. It shows that the teaching level of teachers is different but this different level also gives the difference attitude towards the use of teaching learning materials or not.

Table 21 reveals the mean age of lower secondary level teachers was 3.8440 and secondary teachers were 3.9037 which was more or less equal. Again, it can be further tested by t-test.

Null hypothesis (H_0): $\mu_1 = \mu_2$ i.e. there is no significant difference attitude scores and secondary and lower secondary

Alternative hypothesis (H_1): $\mu_1 \neq \mu_2$ i.e. there is significant difference between attitude scores and secondary and lower secondary.

Table 21

t-test to Compare mean Attitude Scores between Secondary and Lower Secondary Teachers.

<i>Level</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>t</i>	<i>Sig. Value</i>
Lower secondary	50	3.8440	0.37558	-	0.362
Secondary	54	3.9037	0.28687	0.915	

Table value of *t* at 5% level of significance for 102 df is 0.915.

The calculated value of *t* is -0.915. This *t*-test is found to be insignificant at 0.05 level so the null hypothesis is accepted that is there was no significant difference in mean attitude scores between teaching level of the teachers.

Summary of the Chapter

In this chapter, the researcher has divided the chapter into three parts and began with the personal information of the respondents and information related to the schools and different tests were done between the different variables. The researcher applied correlation test between the Education, Experience, Age and Salary with the attitude of the teachers towards the use of teaching learning materials, *t*-test between the sex of teachers and their attitude towards the use of teaching learning materials, *t*-test between the level of teachers and attitude towards the teaching learning materials. This shows that there is a positive and negative negligible relationship between teachers and their attitude towards the use of teaching learning materials.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND FUTURE DIRECTIONS

This chapter discussed with the significant findings of this study. The findings of his research are listed in different sections. The sub topics are based on the conclusion of the findings. The researcher has concluded the entire research's findings of the study in some paragraph. And it also presents some significance aspects too.

Summary

This study is about the use of teaching materials in the mathematics classroom. The objective of this study was to investigate the relationship between teacher's attitude and use of teaching learning materials in the mathematics classroom. For the purpose, teachers test questions were made on the basis of lower secondary/secondary mathematics syllabuses of materials. The use of teaching learning materials in the mathematics classroom is related to teachers' attitude, education, age, experience, sex, salary and level. The researcher adopted the questionnaire for the sample teachers who are from the study area. In the questionnaire the researcher also included the four parts. In the first part, the general information of teachers such as gender, age a caste, home address, permanent address, marital status and number of family members. In the second part, Educational history such as highest academic level, years of teaching experience, teaching level and teaching license. The third part is salary and private practice and the fourth part is mathematics content.

All the lower secondary and secondary mathematics teachers in the schools under the three resource centers from Bajrabahari Higher Secondary School,

Phulchoki Higher Secondary School, Thaiba and Kitini Higher Secondary School, Godawori were considered as population of the study. Survey method was used in this study. Cluster sampling and random sampling were used to determine the sample for the study. Consideration of formula developed by Creative Research Centre (William godden,2004) , for sample size selection was found 104 respondents from 54 schools out of 64 sample school.

A questionnaire was made and pilot test was conducted. From its results, the reliability and validity was tested and found that teachers' questionnaire was reliable as well as valid. Teacher's questionnaire was used as instruments for collecting primary data. 15 statements of teachers questionnaire was prepared with Likert scale of 5 points scoring. After defining the variables e.g. educational qualification, gender, age, salary, the data were collected, coded and edited manually and entered into the computer using statistical package excel (2007). The data was analyzed using statistical package of social sciences (SPSS) with cross tabs, correlation coefficients and t-test.

Findings and Discussion

On the basis of analysis and interpretation of data, the researcher now intends to present the main findings of the study. The presentation of the findings in this section is organized as per the research questions.

The researcher had discussed about the first and the second research questions. The situation of the teaching materials and problems and opportunities of using the teaching materials in the classroom were discussed. There were 30.8% schools having a system to keep the budget for materials and 69.2% schools have no system to keep budget. It showed that the situation of materials in majority school was poor. If schools have no budget for materials then obviously teachers use the

teaching learning materials poorly even though they have an idea to use the teaching learning materials. In total 11.5% schools had maths lab and rest of schools had no maths lab. In most of the school they did not have the idea of maths lab and the use of teaching materials in the classroom. It was also difficult to find out the new teaching materials in mathematics. In total there were 76.9% teachers had the idea to make teaching materials by folding papers but still 23.1% teachers had no idea to make it. It means that the majority of teachers had the idea to make teaching materials by folding papers. There were 44 (42.3 %) teachers single and 60 (57.7 %) teachers married. It showed that the majority of teachers were married. In this study area, the researcher had found that the majority of experience teachers that is there were 82 (78.8%) experienced teachers. 21 (20.2 %) teachers had license. It shows that in this area the number of experienced teachers was more but majority of them had no license. The minimum age of the teachers was 20 and maximum age was 53. The mean age of the teachers was 30.71. The mean age was 30.71 which is more energetic due to this the teachers have curiosity towards the teaching materials and handling of the student's problems. The model age group of male teachers was 30-35 and age group of female teachers was 0-25.

From this research, the researcher had found following results according to the third and the fourth research questions and hypothesis which were mentioned in chapter I. Here the researcher had mentioned the relation between the characteristic (sex, experience, training, salary, education, age and level of teacher) and different influencing factors (use of teaching materials, attitude of teachers and teaching approaches).

The majority of experienced teachers had license than the teachers having less than two years teaching experienced. The teachers having license had the idea of the

materials used in classroom rather than the teachers having no license. So the Government of Nepal had made the rule that the teachers must have the license to teach in the school. Richard (2005) says that training involves understanding the basic concept and principles as a pre-requisite for applying them to teach and ability to demonstrate principles and practices in the classroom. Therefore, training is an important part to use teaching materials.

The majority of lower Secondary teachers had not got enough economic support than the Secondary teachers but the majority of lower Secondary teachers had got the motivation of teaching learning materials by the schools. The experienced teachers had used the paper made materials, net and multimedia more than the non experienced teachers. Comparatively there was equal number of lower secondary and secondary level teachers. In Secondary level there were majority of experienced teachers than lower secondary level. This shows that the experienced teachers had more knowledge of teaching materials than the non experienced teachers so the schools had given facility to the experience teachers to do work in the school as the permanent teachers.

Management (2008) also found, “The presence of teachers with long years of teaching experience in schools has much relationship with students’ learning outcomes. They claimed that as major input into the school system and the hub of the educational system, teachers are a force to reckon with in schools in terms of effective teaching and better learning outcomes”. The experienced teachers can give the concept and application of mathematics in the classroom so that the students can learn the mathematics easily.

The research had shown that the non experienced teachers have less idea to use the Geo Board. In most of the school there were not sufficient teaching learning

materials which created the problems to use the Geo board even though they had the idea of using Geo board and the majority of experienced teachers had more knowledge to make the paper made materials by folding papers than the inexperienced teachers.

The majority of teachers agreed that the teaching materials enhance the students to learn the mathematics easily and the majority of teachers know the importance of teaching materials. It is also supported by the research , Sowell (1989 as cited in Allen,2007) said that the results showed that mathematics achievement is increased through the long-term use of concrete instructional materials and that students' attitudes toward mathematics are improved when they have instruction with concrete materials provided by teachers knowledgeable about their use (p. 498). According to Diene concrete materials should be used to support early learning of mathematical concepts and early activities for any given concept should be carefully structured and concepts must be established (constructed) before children are expected to use them (Dienes theory in teaching, 2005).

The majority of teachers accepted that the training is an important to teach mathematics in the classroom which gave that the inexperienced teachers have fewer skills than the experienced teachers. Wilson (1990) says, “Novice teachers, themselves the products of traditional mathematics classrooms, need to revisit and extend their own mathematical understandings. They need opportunities to examine and challenge their assumptions about the teacher's role, as well as to develop pedagogical content knowledge. And they need opportunities to see and experiment with practices designed to help students learn”. The research has shown that the majority of teachers thought that they need to think new way of teaching and presentation and updated method in every new session. They also believed that most

of the students in their class can learn what they supposed to teach them. The majority of teachers were satisfied when the students were understood what they supposed to teach. The salary of teachers in the school was not satisfactory because most of the teachers said that their salary was generally adequate and meet the small fraction of their expenses.

The teachers who had education background used almost all materials than the teachers who had non education background. Therefore the teachers who had education background had the more knowledge about the teaching learning materials and the students can learn the content with the help of the teaching learning materials. The use of teaching learning materials in the classroom is very effective and interesting. (McClung, 1998) states that using manipulative aids and devices make the classroom a more interesting and engaging place for both teachers and students. (as cited in Allen, 2007). Sowell (1989) said that Manipulative usage can also improve students' attitude toward mathematics and give instruction that uses concrete materials to help students retain information and increase scores on test (as cited in Allen, 2007).

The majority of the part time teachers worked in the private schools it means that the teachers in private schools had less time to make the teaching learning materials and more work load so they were not used the teaching learning materials as much as the content need. Learning is an active, social process in which students construct new ideas or concepts based on their current knowledge. The student selects the information, forms hypothesis and then integrates this new material into his/her own existing knowledge and mental constructs. This is a continual process. Bruner's stage of learning, one of them is Enactive- in which children need to experience the

concrete (manipulating objects in their hands, touching a real dog) in order to understand

The researcher believed that the teachers have to make the positive attitude to use the concrete materials. To use the teaching learning materials, education of teachers, and experience of teaching, age and salary of the teachers were the important factors. Are they having a relation with the attitude of teachers towards the use of teaching learning materials? The researcher has found the following result:

The researcher had found the Correlation test of the attitude of the teachers towards the use of teaching learning materials with Education, Experience, Age and Salary respectively and the findings are:

The correlation tested with 0.05 level of significant and found that there was no relationship between the attitude towards the use of teaching learning materials and education of teachers. It was the opposite relation shown by the research so it again needs a further research. The research has found that there was statistically significant difference of experience of teachers and attitude towards the use of teaching materials or the attitude towards the use of teaching materials has a relation with experience of teachers. There was statistically insignificant difference of age of teachers and attitude towards the use of teaching materials or the attitude towards the use of teaching materials has no relation with age of teachers. It means that the age of the teachers don't affect the attitude of the teachers to use the teaching learning materials in the classroom. The attitude towards the use of teaching materials has negative correlation with salary of teachers. The teachers who were not satisfied with their salary did not use their full effort to use teaching learning materials in the classroom.

The researcher used the t-test to find the difference in attitude in term of male and female, attitude in term of lower secondary and secondary mathematics teachers. The mean score of male (1.5649) was more than the mean score of female (1.3663) and also there was a significant difference in mean attitude scores between the male and female teachers. In case of level of teacher with attitude score, the mean score of lower secondary teachers (3.8440) was less than the mean score of secondary teachers (3.9037) and also there was no significant difference in mean attitude scores between the lower secondary and secondary teachers.

Xiao, Yu & Yan (2009) Scores of male students' beliefs on the dimensions of knowledge structure and learning style are slightly higher than those of female students', but on the dimensions of learning ability and knowledge stability there is no statistically significant difference. Females had a more negative attitude towards mathematics while males had a more positive one. In middle school females had negative attitude towards mathematics even that underrepresented females had the worst attitudes towards mathematics. These negative attitudes were based in part on the parents' beliefs that males were better mathematics learners and it was more important for males to learn mathematics (Shelton, 2007). The research reveal that the attitude towards the use of teaching materials has no significant difference with level of teachers by using t-test.

Conclusion

The teachers having concept of teaching learning materials and not having concept of teaching learning materials have not so friendly with the teaching learning materials. Most of the teachers are unknown about the Geo-board and most of the school had not math lab. The trained and the experienced teachers had no opportunity to use the teaching learning materials in the classroom because the school

had not supported the teachers sufficiently to use the teaching learning materials in mathematics.

The average age of male teachers are more to compare with the female teachers. It showed that there were very young female teachers to compare with the male teachers. In the Secondary level, almost all the teachers were male. The schools can make an environment for the female teachers to work in Secondary level also.

The result of the study indicated that most of the teachers were well aware having positive attitude towards the use of teaching learning materials and they also focused that use of teaching learning materials help to invest the interest of the learners, teaching can be more enjoyable, achievable etc. In some school there are trained and experience teachers but there is lack of materials which are not supported by the school even though they can use the zero cost materials in the classroom. The untrained and inexperienced teachers used less zero cost materials so they need to be trained. The majority of teachers can make the folding paper to teach the mensuration chapter, it shows that in this study area the majority of teachers are known about the paper folding even though the training is needed for the inexperience and untrained teachers to use the teaching learning materials effectively.

Majority of teachers thought that they need to think new way of teaching and presentation and updated method in every new session. They also believed that most of the students in their class can learn what they supposed to teach them. The majority of teachers were satisfied when the students were understood what they supposed to teach.

Implications

It is important for schools and educational institute, policy makers and the school founders and principal. The researcher had found the problems to use the

teaching learning materials in the classroom. Availability of teaching learning materials, attitude of teachers towards the use of teaching learning materials, teacher's teaching experience and support of the school and sex of teachers are the main factors for using teaching learning materials. Even though there was some lacking in finding of the research, it can be solve in further research.

Implication for School

The genuine and effective changes that are based on the empirical research always yield positive impact. Therefore, the outcomes or research work certainly and necessarily have some implications. The finding of the present research is "Use of Teaching Learning Materials in mathematics classroom". This research will also have some implications on teaching and learning of the mathematics. Some of the important implications are as follows:

1. The environment can make the experienced and trained teachers stay on job as a long term basis because they can use the teaching learning materials effectively in the class.
2. The maths lab and budget are needed to use the teaching learning materials in the school then the teachers can use teaching learning materials effectively.
3. The trained and experienced teachers have not used the teaching materials in the classroom due to the insufficient teaching materials in the school. It can be thought by the school principal and founders and make the teaching materials sufficient in the school. The students can learn the mathematics with the clear concept if the teachers use the teaching learning materials in the classroom.
4. The research has shown that the inexperienced teachers have less idea to use the teaching learning materials which cause the students to be victimized to learn the mathematics with clear concept. To reduce this problem, the school

can manage the in-service training for the inexperienced teachers. Also the experienced and trained teachers and inexperienced and untrained teachers can discuss to each other about the production and use of teaching learning materials in the classroom.

Implication for Further Research

This research can be a guide by arousing interest in conducting further research in the same area or related areas. Thus after analyzing the finding and conclusion of this study, the following implications to further research has been made.

1. Research on a larger scale is needed to see if the finding of this research can be generalized to all the country.
2. Similar study can be done in primary level, lower secondary level, and secondary level and college levels.
3. This research indicates that the teachers are not friendly to use the teaching learning materials.
4. Perception of school administrator towards the use of teaching learning materials.

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APENDIX-I

Questionnaire for the teachers

Dear Sir/ Madam

I am going to conduct a survey research on “Understanding of use of teaching learning materials in the mathematics classroom”. The survey intends to find out the information about the use of teaching learning materials in the school and what problems and opportunities are faced by the teachers.

I. General Information

1. Name of the teacher:
2. Sex:
3. Age:
4. Caste :.....
5. Home Address:
6. Permanent Address:
7. Marital status:
8. Number of Family members:

II. Educational History:

Indicate the highest academic level you completed.(e.g.

SLC,B.SC,I.ED,B.ED,M.SC,MA,MED)

.....

2. Years of teaching experiences :.....
3. Years of teaching experience at present school :.....
4. Teaching level: Lower secondary Secondary

5. Teaching licence: Yes No

III. Salary and Private practice:

1. Which of the following statements most accurately describes your ability to meet your monthly living expenses from your government salary?
 - a. I can save from my salary.
 - b. My salary is generally adequate to meet my expenses
 - c. My salary meets only a small fraction of my expenses.
2. How is the quality of teaching at your school?

<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>

3. Except this school are you teaching in other school?

Yes No
4. If you have worked, what type of school?

Public Private
5. How many period do you take in a day.(In numbers)
6. In present school is there math lab?

Yes No
7. In your school is there any support to use the teaching materials in the classroom? Yes No.
8. What type of support have you got from the school?
 - a. Administrative Support b Economic Support
 - c. Managing Support d. Motivation from principal.

9. Have you got colleagues support to use the teaching materials in the classroom?

Yes No.

10. In your school is there any system to keep the annual budget for the use of mathematics materials?

Yes No

11. The following statements represent opinions and your agreement or disagreement will be determined on the basis of your particular convictions.

Kindly check your position on the scale as the statement first impresses you.

Indicate what you believe, rather than what you think you should believe.

[SA= Strongly Agree, A= Agree, NE= Neutral, DA= Disagree and SD= Strongly disagree]

<i>Statement</i>	<i>Q.N</i>	<i>SA</i>	<i>A</i>	<i>NE</i>	<i>DA</i>	<i>SD</i>
a. A valid and reliable instrument can be developed to measure varying degree of teaching.						
b. Most administrators do not know enough about the teaching to rate their faculty members fairly.						
c. Salary schedules based on education and experience only encourage mediocre (average) teaching.						
d. Do you agree that the teaching materials enhance the students to learn the mathematics						

easily.

e. We can teach mathematics to the students through games.

f. The training is important to teach mathematics in the classroom.

g. The inexperienced teachers have fewer skills than experienced teachers.

h. I think about an aspect of my teaching in a new way after one year.

i. Most of the students in my class can learn what I am supposed to teach them.

j. By trying different methods, I can significantly affect my students' achievement levels.

k. I feel a great sense of satisfaction when students will learn what I am supposed to teach them.

l. The trained teachers used teaching materials more than untrained teachers.

m. Most administrators know enough about the teaching to rate their faculty members fairly.

n. Salary schedules based on education and experience only do not encourage mediocre

(average) teaching.

o. The trained teachers used teaching materials less than untrained teachers.

p. We cannot teach mathematics to the students through games.

12. How will you start the lesson in the class room?

- a. Brainstorming.
- b. Jokes.
- c. By writing the important formulae.
- d. Checking homework.

13. When teaching your target math class, how often do you use the following approaches to group students for instruction? Mark (X) each item.

	Rarely or Never	A few times a month	A few times in a week	Every day
a. Whole class grouping(i.e., all students are taught the same thing at the same time)				
b. Ability or achievement grouping (e.g., the most proficient students are in one group , the next most proficient students are in second group and the rest are in third group)				
c. Mixed ability grouping (e.g., students are grouped according to interest/ genere, cooperative -learning groups.)				
d. Individualized instruction (e.g., students work individually on learning assignments specifically tailored to their achievement or interest.)				

IV. Mathematics content

14. On an average how many hours a day did you spend to make teaching materials?

hrs

15. While teaching menstruation (Prism, Pyramid, Cone and Cylinder) , What type of materials have you used.

a. Solid Figures b. Paper made materials

c. Net of figure made with sticks and potato.

d. Multimedia e. all of above

16. Do you have idea to make materials by folding papers?

Yes No.

17. Can you make the net of different prism and pyramid with the help of match stick?

Yes. No.

18. Have you seen Geo Board?

Yes No.

19. Have you used Geo Board while teaching transformation?

Yes No

20. The following chapter can be taught with the help of Geo-board, if yes then tick mark.

a. Line and geometrical shape.

b. Theorem related to triangle, quadrilateral and circle.

c. Algebra(simplify)

d. Arithmetic.

e. Trigonometric

21. While teaching $3x+2=11$, which materials have you used. $3x + 2 = 11$

- a. Blackboard and chalk.
- b. Algebraic tiles.
- c. Algebraic blocks(Chart papers)
- d. All above.

The End