

**EFFECTIVENESS OF MULTIMEDIA IN TEACHING LEARNING
MATHEMATICS**

**A
THESIS
BY
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This thesis entitled "**Effectiveness of Multimedia in Teaching Learning Mathematics**" submitted by **Mr. Rajaram Simkhada** in partial fulfillment of the requirements for the Master's Degree in Education has been approved.

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This is to certify that **Mr. Rajaram Simkhada** has completed his M.Ed.

Thesis entitled "**Effectiveness of Multimedia in Teaching Learning Mathematics**"
under my supervision during the period prescribed by the rules and regulation of
Tribhuvan University, Kirtipur, Kathmandu, Nepal. I recommend and forward his
thesis to the Department of Mathematics Education to organize final viva- voice.

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Ms. Sarala Luitel

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Declaration

This thesis contains no material which has accepted for the award of other degree in any institutions. To the best of knowledge and belief this thesis contains no material previously published by any authors except due acknowledgement has been made.

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Rajaram Simkhada

Dedication

To my father **Mr. Man Bahadur Simkhada**, mother **Mrs. Binda Simkhada**

Who developed a great span of their life under very much

Difficult circumstance to make me what

I am now.

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.....

Rajaram Simkhada

Abstract

The study entitled "Effectiveness of Multimedia in Teaching Learning Mathematics" was focused to compare the achievement of student taught with using multimedia and without using multimedia.

A pretest-posttest of quasi-experiment research design was used to compare the achievement of two groups experiment and control. The researcher chose 20 students of grade IX in Shree Baraha Kalika Secondary School as an experimental groups and 20 students of Shree Kalika Secondary School as control group. After completion of the target chapter researcher collected the data from mathematics achievement test and set of questionnaire related to five point likert scale. The mathematics achievement test was administered to both group and mean score was calculated from the sample of control groups. The difference in mean achievement was tested using t-test for determining statistical different between them. A part from quantitative outcomes the researcher observed the student regularity interaction, cooperation and readiness for learning.

The result indicated that there was a significant difference between the average achievement score of experimental and control groups on post-test. This finding illustrated that the students in the experimental group performed better when using multimedia then control group with the traditional teaching method. Additionally, a set of questionnaire related to likert scale was used to expose the students view on multimedia in learning this questionnaire was administered to only experimental group. The result show of questionnaire showed that student gave positive feedback or view about using multimedia in teaching learning.

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Abbreviations

ICT:	Information and Communication Technology.
IT:	Information Technology.
SSRP:	School Sector Reform Plan.
SSDP:	School Sector Development Plan.
CDC:	Curriculum Development Center.
GON:	Government of Nepal.
NCTM:	National Council Teachers Mathematics.
SMC:	School Management Committee.
MOE:	Ministry of Education.
S.D.:	Standard Deviation
DOE:	District of Education
NCED:	National Center for Educational Development

Chapter I

INTRODUCTION

Background of the Study

Mathematics is an important subject for science and technological careers but many students still have difficulties and failures in mathematics. Mathematics is part of science. It has the four fundamental operation of addition, subtraction, multiplication and division. In secondary level mathematics education is very useful to develop the creative thinking and self-confident habit of students and it also helps to develop the problems solving habit. Mathematics is correlated with other subject like physics, chemistry, biology, history, economic, psychology etc. In secondary level students learning the mathematics with interest it will be must use full to learning other subjects.

Mathematics with its special feature and looks has wider application in daily life and fields of the study. For the example: banking, marketing, agricultural fields, shopping, architecture fields, business and post office also. Mathematic lays the foundation for the study of all other subject. It is too early for secondary students to decided about the profession. Mathematics as a main subject would make the choice of professional vary narrow. Mathematics also scope for many professional carriers through competitive examination. Therefore, mathematics is a compulsory subject at a secondary schools level. "Mathematics should be taught a compulsory basic to all pupils as a part of general education during first ten years of schooling" (Indian education commission, 1964-66).

Multimedia allows teachers to integrate text, graphics, animation, and other media into one package to present comprehensive information for their students to

achieve specified course outcomes. Multimedia permits the demonstration of complicated processes in a highly interactive, animated fashion and that instructional material can be interconnected with other related topics in a more natural and intuitive way (Crosby & Stelovsky, 1995).

Multimedia-based instruction can be efficient and effective for three reasons (Issa, Cox, & Killingsworth, 1999): (1) it is self-paced learning: the individualized pace of the learning allows students to break down the group instructional setting, which often inhibits some people's natural progression (West & Crook, 1992); (2) it includes video/audio production: enhancing a learner's interaction with the course material through less bridging effort between the learner and the information being processed; and (3) it provides autonomy in the learning process: self-regulated instruction shifts the sense of responsibility from the instructor to the student. Bartlett and Strong (2003) stated that, besides potential advantages to students, multimedia formats may offer benefits to instructors teaching multi-section courses because this type of format ensures uniformity in the lecture content across these actions.

Audio-visual aids play a vital role in teaching Mathematics. Those teaching aids which make the use of two of our senses hearing and seeing are the audio-visual aids in teaching and learning process. Dutch humanist Erasmus (1466-1536) has spoken the importance and use of audio-visual aids (Regmi, 2014). He said that the use of picture in learning process helps to help to the increase mental growth and make learning long lasting. This thought influenced the philosopher Comenius. Comenius included 150 pictures related to human life in his book "The world of sense objects".

The last ten years have seen a re-evaluation of the teaching and learning interaction for all school subjects. Ten years ago, it was still generally accepted that "teaching was telling, learning was listening, and knowledge was facts" (Lainer,

1992). This view of teaching or learning exchange is being replaced by a new pedagogy, i.e., use multimedia in teaching which recognizes the students, own activities role in the learning process and views the teacher as a facilitator of this process (Ware, 1992).

Different kinds of technologies exist both in business and educational sectors. Most of the technologies found in educational domain fall into the category of information and communicative technology (ICT). The computer is the starting point of ICT. Multimedia projector also makes the use of computer. The projector that can display pictures, animations, videos, Movies etc. is called multimedia projector. The power of multimedia projector lies in fact that is multisensory, stimulating the many senses of the audience. It is also interactive enabling the users of the application to control the content and flow of information. This has introduced important changes in the educational system and impact the way we communicate information to the learners (Neo and Neo, 2002).

Multimedia projector finds its use in different sectors. It has been also used in scientific research, business, different seminars, meetings, workshops, trainings etc. It has been also used in crime control sector, nowadays multimedia projector is being used in some international universities for teaching learning process. But it is rarely seen. In the international level some schools are somewhat starting the use of multimedia projector. But their use of frequency is seen very low. In Nepal, multimedia projector is being used at some secondary schools and some colleges only.

Constructivists and other cognitive theorists believe that meaningful learning depends upon use of teaching materials effectively that can motivate the learners in the teaching process. It is believed that how to teach a difficult task for the teachers.

The old chalk talk methods are criticized and have been replaced by newer methods and materials on teaching. So we should identify with new educational technology.

In Nepal, several attempts have been made in order to enhance the usefulness and appropriateness of the curriculum, instructional materials, text books, teachers guides etc. Teacher training packages are also conducted for the development of efficiency of teachers. In spite of these efforts, significant improvements are not seen in secondary math. So, it is needed to suggest a new technology of teaching math.

Math is difficult due to the lack of using suitable for teaching. Though, teachers are teaching mathematics in secondary level without teaching materials. In these cases, students are unable to understand the different aspects of math and contents them and it hinders the intellectual reasoning capacity of the students. With the aim of overcoming the learning problem of math. Different teaching materials materials which is at the stage of rise in the education. It can display videos, animations etc. which are interesting for learners. It can also make the use of online and offline with the help of the computer and internet. Therefore, the research intended to use and examine the effectiveness of multimedia projector in math and secondary level (Grade IX).

Mathematics evidently can be defined as the science of numbers, quantity and space of which arithmetic, algebra, trigonometry and geometry are branches [Oxford Advanced Learners Dictionary of Current English]. So, mathematics serves as a bedrock for other science subjects and at the same time, strengthens and sharpens the intellectual skills of students. Mathematics is a very important subject. Remarked “mathematics is the backbone of knowledge” Ale (1981). It is also described as the pivot of all civilizations and technological development. These descriptions point the important position accorded to mathematics as a key factor in the development of any

nation. The Nepalis educational system is geared towards rapid technological growth of the nation. And in view of this, the New National Policy of Education stipulates that mathematics should be one of the core subjects taught at all levels of secondary and primary schools, since the importance of mathematics cannot be over emphasized in the area of science and technology. This is why mathematics is a compulsory subject for all primary and secondary schools in many countries of the world.

Statement of the Problem

Nepal is facing a remarkable problem in learning mathematics in school education due huge number of student weak in mathematics. There may be so many factors which impact in mathematics learning. Among them teaching method and strategy is one of the most influences factors in student's achievement of Mathematics.

A review of literature indices that multimedia as teaching materials has positive impact on students achievement in learning mathematics at secondary level. It also believed that knowledge skill and understanding of students can enhanced with the use of multimedia for mathematic teaching. But few number of researcher research on effectiveness of multimedia in teaching mathematics on secondary level. So its study on the effectiveness of multimedia on mathematics achievement has to be conducted to see how it can be beneficial to improve the educational system in Nepal. And also this study concern's about the effectiveness of multimedia using's on some topic of grade IX. Mathematics there fore, this research has been initiated and addressing the following statement:

- Does students get better achievement while teaching using multimedia ?

- How does student express their view's towards the learning by using multimedia.

Objective of the Study

The general objective of this study is to find out the effectiveness of use multimedia in teaching and learning mathematics on secondary level. The specific objective are following:

- To compare the student's achievement in mathematics teaching using multimedia and without using multimedia.
- To elicit student's perception in learning mathematics using multimedia.

Rational of The Study

Mathematics is an essential part of school curriculum so every student should study school education i.e. grade one to ten in Nepal. It has been teach for all students as a compulsory subject at school level as well as optional subject. Students need to construct their own understanding of each mathematical concept. So that the primary rose of teaching is not to lecture, explain, to transfer mathematical knowledge but to create situations for the students that will helps to make necessary metal construction. Therefore, this study would be helpful for teachers, curriculum palnner, policy makers, researchers, students etc. Further, the result of this study will help in following way :

- This study suggest the math teacher to adopt the effective teaching materials in teaching math.
- It also help to find out the effectiveness of using multimedia in teaching mathematics.
- Creating the classroom environment more interesting.

- This study help the educational policy maker and curriculum developer to select the effectiveness educational technology for classroom activities.
- This study help to find the importance of using multimedia while teaching learning in secondary level.

Delimitation of the Study

Followings are the delimitations of the study:

- This study delimit within the geographical boundary of JwalamukhiRural-municipality in Dhading district only.
- The sample of this study is Grade IX students of Barahakalika Secondary School and kalika secondary school only.
- The study was limited topics i.e. set, profit and loss algebra, and statistics.
- In multimedia tools specially I used ,projector,laptop related topic video only.
- The study conducted with one experimental and one control groups each consisting of 20 students.
- Primary data was collected by using multiple choice items and attitude scale.
- The study conducted for only one month in that school where one period was of 45 minutes.

Research Hypothesis of the Study

Hypothesis of the study refers to a predication about what the researcher expect to find (Creswell, 2014). Thus, it is stated in the form of expected relationship between variables. Two types of hypothesis, research hypothesis and statistical hypothesis used in this study.

Research Hypothesis

The use of multimedia provides effective results in terms of student's achievement in mathematics compare to traditional teaching approach.

Statistical Hypothesis

The formulation of null and alternative Hypothesis were:

H₀: There is no significant difference between the student's achievements of experimental group and control group. i.e. $\mu_1 = \mu_2$ (Null hypothesis).

H₁: There is significant difference between the student's achievements of experimental group and control group. i.e. $\mu_1 \neq \mu_2$ (Alternative hypothesis).

Where,

μ_1 = mean of scores of experimental group.

μ_2 = mean of scores of control group.

Definitions of the Related Key Terms Used in this Study

Achievement. In this research, achievement means scores obtained by the students on the achievement test prepared by the researcher.

Control Group. A group of student's to whom subject teacher teaches the same units using without multimedia.

Dependent variables. The achievement of student's and perception towards using multimedia are considered as dependent variables in this study.

Experimental Group. A group of student's to whom researcher teaches the units using multimedia.

Independent variable. in this study the use of multimedia are consider as an independent variable.

Multimedia. Multimedia is refer to text, graphics, animation, audio and video in this study where I had been used related topic video only.

Perception. It is the attitude or view of student's towards using multimedia in this research study.

Public School. public school are those which receive the government grant for the salary of teacher and other purpose.

Without multimedia. without multimedia refer to daily use materials and mathematic text book prescribed CDC.

Chapter II

REVIEW OF RELATED LITERATURE

A literature review is compact written summary of journal articles, books and the other document that portrays the past and current state of information on research topic which is going to be studied (Cerswell, 2014). It helps researchers to find out the gap in knowledge and adds validity and significance of the research. So this chapter encompasses the empirical review, theoretical framework and conceptual framework.

Empirical Literature

Regmi, (2014) did a research on "A study on the use of Effectiveness of Multimedia Projector in Secondary Science Teaching" with the aim to find out the effectiveness of using multimedia projector in science teaching at grade X students as well as to compare the achievement of the students in teaching science. Teacher with multimedia projector and without using multimedia projector. Thirty students of Kaski district were selected by using purposive sampling method and the experiment was conducted for one week duration. The statistical test between the mean score obtained by control and experimental group shows that the performance of students taught with the use of multimedia projectors was significantly improved when compared with the performance of student taught without use of multimedia projector.

Karki, (2010) did a research on the topic "A study on the effectiveness of instructional materials in teaching geometry at grade X" with the aim to find the effectiveness of instructional materials in teaching geometry at grade X from Bhaktapur district. From one school 40 students from grade X had selected for sample of the study. He found that the mean achievement score of students taught with using different instructional materials is higher than the mean score achievement score of

students taught without using different instructional materials. Therefore, geometry teaching by the using different instructional materials causes better achievement than the teaching without using instructional materials.

Yadav, (2042) did research work on "A study on the use of audio-visual aids in the instruction of mathematics in the primary school of Dhanusha district." He concluded that the trained teacher used teaching aid more frequently than the untrained ones and more than 80% schools lacked the essential teaching aids such as geo board, geometric and cubic.

Bhandari, (2015) did a research on "Effectiveness of geo-gebra-assisted instruction in mathematics at secondary level." With objective to find the effectiveness of GeoGebra assisted instruction on the students' achievement in reflection and rotation at secondary level. The researcher chooses nine grade twenty five students as an experimental group and twenty three students as a control group, after one week of experiment research gathered data. Also five point Likert type scale was applied for fostering students' motivation. This research shows that the students in the experimental group performed significantly better than the students in control group and the students who were taught by GeoGebra-assisted instruction were more motivation towards the convectional study.

Shrestha (2015) research on the topic "Status of ICT use in teaching/learning mathematics", with objective to investigate the use of ICT in mathematics teaching and learning. The researcher was observation and interview three mathematics teachers and twenty students from the class seven, eight, nine and ten consider as the sample of the study. This study had based on case study. This research shows that school was a lack of relevant educational technology tools. And also school not to use

the educational technology tools in mathematics teaching and learning, but these tools were sometimes used for other purpose.

Safdar, Yousuf, Parveen and Behlol (2011) conducted the study on "Effectiveness of ICT in teaching and learning mathematics at secondary level", with the purpose of this study was to determine the effectiveness of ICT as compared to the traditional method of teaching in the subject of mathematics at grade nine in Pakistan. In this study, students of sample school were divided into two equal groups i.e. experimental and control, each has thirty students. The students of experimental group were exposed to the teaching though ICT, whereas the students of control group were taught thought traditional method of teaching in the subject of mathematics. This study shows that ICT was found effective as compared to traditional method of teaching in mathematics at secondary level.

Pancauch, (1998),conducted a research entitled in "Multimedia in lectures and the word wide web".He had selected online and offline students for this study.He had used notes and movables pictures like videos and animations for this study.He concluded that technology can enable important changes in the curriculum. He also found that only old notes projected on the screen, does not increases the achievements of the students but he also found that movable picture, videos animations etc.are effective in teaching process.

Williams, (2000)carried a research on "The use of multimedia material in teaching chines as a second language and pedagogical implications". In this study he examined that effectiveness of multimedia material in teaching second language grammar comprehension among the beginners and intermediate level Chinese learners. The study focal issue of the study was to determine text alone, text with picture and text with dynamic video clip which is the most effective in aiding

grammar acquisitions in both short term and long time. Analysis of collected data yields three main findings. First, the learner who received text video materials outperformed those who received the text picture and the learners who received text picture materials outperformed those who received text only. The results demonstrated that multimedia materials can help second language learners in grammar and comprehension. This study showed that text picture and text video are more effective than text video material was more effective than text pictures.

Obaid, (2001) conducted a study entitled as “A program using multimedia bags to develop the necessary competence of the mathematics head teacher in high schools”. This study aims to identify the effectiveness of a program using multimedia bags to develop some necessary educational competencies whose number is 41 educational competencies of the mathematics head teacher in the high school in the Arab Republic of Egypt. The experiment has been conducted on one experimental group consisting of 30 resident mathematics head teacher. The academic achievement test has been conducted on the students before and after the test. The study results showed significant statistical differences between pre and post tests in favor of post test.

Ibrahim (2003) conducted a study which aims to “Using multimedia technology to present computer basics subject in a way that leads to the availability of adequate skills and information related to the computer domain”. To this end, the two groups of study were selected randomly from the second year students, Art Education division, Faculty of Specific Education, with a number of 15 students for the experimental group and 15 students for the control group. A pre-test was conducted to both groups regarding the variable of study. Then, the proposed and prepared computer program of multimedia technology was prepared and taught to the

experimental group. The control group students studied the same curriculum in a traditional method during the period between 28/2/ 2003 and 17/3/2003, after that the post-test has been conducted. The delayed academic achievement test has been conducted on 7/4/2003. The study results showed significant statistical differences at the significance level of 0.01 between the average grade of the experimental group in the post application and the delayed post academic achievement test.

Da'lij (2008) conducted a study entitled as “The effect of using Mathematics software produced locally on second grade intermediate female students’ academic achievement in Riyadh”. The study aims to identify the effect of using multimedia software produced locally on second grade intermediate female students’ academic achievement in mathematics. The study sample consisted of 70 female students divided equally into two experimental groups studying by the locally produced software and a control group studying the traditional method. The study revealed no statistically-significant differences at the significance level of 0.05 between the experimental and control groups.

Bukaliya, (2012) in a report on “Factors militating against the introduction of computer education in secondary schools” in Zimbabwe with the adoption of descriptive survey design stated that among the 50 secondary schools of particular district, only 12 are offering computer education in their schools and of these only 4 are offering computer studies as an examinable subject at ordinary level. From that result lack of the budgets, negative attitude towards computer, teacher skills and qualification, no refreshment training for teacher, phobia of computer and not support from the stockholders for implementation of computer education in schools are the main challenges for implementation of computer education in Zimbabwe schools.

According to above reviews of literature indicates that mathematical course taught by using multimedia is more effective than traditional method of instruction. In this research, researches using experimental and control group. But number of researches research on effectiveness of using multimedia in mathematics topic. So, this study concerned about the effectiveness of using multimedia particularly related to set, profit and loss at grade IX.

Theoretical Literature

This study is based on Vygotsky's social constructivist perspectives, because knowledge is actively constructed by students while they are making construction and analyzing figures instead of knowledge being passively received and accepted. The ZPD, in the learning of mathematics, the more students were able to assist their peers with information and manner of constructing diagram and the more capable students were able to fill in gaps in their peers knowledge or explanations they have missed. The peers then gain a different insight and develop a different manner of understanding mathematics concepts. In addition, when working in groups due to the differing ZPD of each student, they may have differing view. Therefore through interaction with peers they can achieve shared understanding. However, in such a situation, there must be a balance in terms of the insights and ideas contributed by each group member, it is important to have shared views and justifications of opinions to reach mutual understanding. This enables all student to participate in critical thinking skills because one's cognitive development becomes apparent when new views and ideas are taken into the current cognitive state.

Vygotsky's findings suggest methodological procedures for the classroom. "In Vygotskian perspective, the ideal role of the teacher is that of providing scaffolding (collaborative dialogue) to assist students on tasks within their zones of proximal

development." During scaffolding, the first step is to build interest and engage the learner. Once the learner is actively participating, the given task should be simplified by breaking it into smaller subtasks. During this task, the teacher needs to keep the learner focused, while concentrating on the most important ideas of the assignment. One of the integral steps in scaffolding consists of keeping the learner from becoming frustrated. The final task associated with scaffolding involves the teacher modeling possible ways of completing tasks, which the learner can then imitate and eventually independentize.

Vygotsky recommended a social context where in a more competent learner would be paired with a less competent one, so that the former can elevate the latter's competence. This social context promotes sustained achievement and cognitive growth for less competent students." Accordingly, students need to work together to construct their learning, teach each other so to speak, in a socio-cultural environment. In-class opportunities for collaboration on difficult problem-solving tasks will offer support to students who are struggling with the material. By interacting with more capable students who continue to mediate transactions between the struggling students and the content, all students will benefit.

The ZPD is described as the variance between one's mental age and the level one might attain in problem solving with guidance. Scaffolding refers to the guidance provided for one to reach the ZPD (Vygotsky, 1998). In this study the multimedia tool basically acts as the primary scaffold in assisting and guiding the students to reach their ZPD. The student were required to work in pairs to construct diagrams and make observations based on their constructions. Students formed their own interpretations through shared understanding with the guidance of the multimedia tool where they were able to explore and visualize on their own. On top of that, the teacher and peers

also played a part in the scaffolding process. Social interaction between peers gave the students opportunities to guide one another and reach a level of shared understanding. Here the higher ability students play a big role in helping the lower ability students to reach their ZPD. The higher ability students also benefit through the new ideas and views of their peers.

In sum, Vygotsky's findings suggests that the curriculum should generally challenge and stretch learner's competence. The curriculum should provide many opportunities to apply previous skills, knowledge, and experiences, with "authentic activities connected to real-life environment since children learn much through interaction, curricula should be designed to emphasize interaction between learners and learning tasks.

Conceptual Framework of the Study

A conceptual framework is the representation, either graphically or narrative from of the main concepts or variable and the relationship of the independent variable with dependent variable. The researcher have prepared conceptual framework of the study as follows:

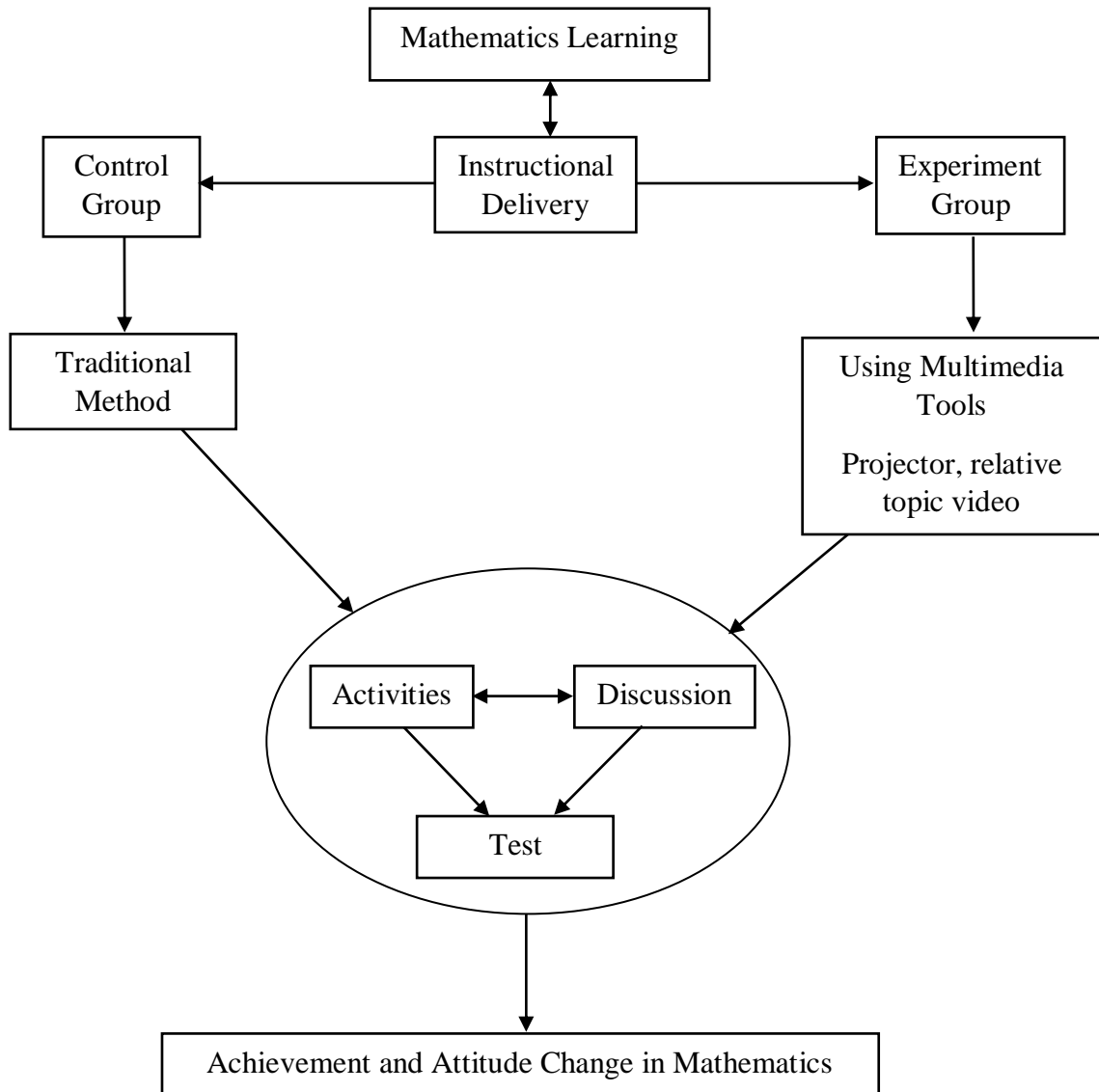


Figure 1: Conceptual Framework

Conceptual framework stems from the theoretical framework and concentrate usually on one section of the theoretical framework which become the basis of our study. The later consist of theories or issues in which our study embedded whereas the framework describes the aspect that we select from the theoretical framework to become the basis of our inquiry.

This framework shows that the plan of research. This connect the objective, theory and methodology of study. In this frame there were the activity of teacher and students with the using the multimedia tools. For the period of experiment researcher

first prepare the teaching episode. Then researcher teach in classroom of experiment group and control group superlatively.

This research framework base compare, mathematics learning achievement, teaching using multimedia and traditional method. The both method using multimedia and traditional method include the teaching cycle; activities, discussion and test. The researcher encourage students are actively participate in the classroom activity. The problem related to topic is solve by discussion and student are encourage to solve the problem themselves the researcher encouraged to solve the problem by using multimedia. By using the multimedia tools are made very active and all the students made participate in learning activity by their own interest. The researcher teacher guides the activities and discussion with provide definition, explanations and presentation. For control group using traditional method and for using experimental group using multimedia tools, after then in this teaching cycle, instructor and students together interact each, other with collaborative dialogue.

By the above process all the activity of the experimental period was dependent. By the above process data had been collected and the tabulate the data then found the result by using the statistical tools. Then calculate the result of the study and analyze the result by the score. After all this activity the finding and research question was matches.

Chapter III

METHODS AND PROCEDURES

Methodology is a powerful means for carrying out any investigation successfully. Methods refer to techniques and procedures used in process of data gathering. The aim of methodology in Kaplan's word; the describe and analyze these methods, throwing light on their limitations and resources, clarifying their pre-suppositions and consequences, relating their potentialities to the twilight zone at the frontier of knowledge. It is to venture generalizations from the success of particular techniques suggesting new application and to unfold the specific bearing of logical and metaphysical principles on concrete problems, suggesting new formulations Kalpan, (1973).

This chapter is describe the design, plan and procedure of study. The present research would focus on "Effectiveness of using multimedia in teaching learning mathematics at grade IX. This chapter explains overall research methods and process of this research which includes research design, sample and sampling process, data collection tools, reliability and validity of tools, data collection procedure and data analysis procedure.

Research Design

Research design is the design of path about how does the research was conduct. It is detail path of the investigation. Thus, Research design comprises the overall strategy followed in collecting and analyzing data (Gay et al, 2012).

To meet the objectives of the study, the researcher used quasi experimental design According to gay et. al (2012) in experimental research the researcher manipulates at least one independent variable, controls other relevant variables and

observes the effect on one or more dependent variables. It involves a comparison of two group like experimental and control group.

Among the various design, pre-test and Post-test design of quasi-experimental preferred most in this study because this design is often used in classroom experiments when experimental and control group are naturally assembled groups as intact classes. To fulfill the objectives of this research, two groups of student were formed from homogeneous as possible as by selecting school of similar status and focusing same cognitive structure of students.

In this design, E1 and E2 represented the pretest and post-test for experimental group and C1 and C2 represent the pre- test and post-test for control group. Both groups were given the same achievement test (Pre-test) before treatment. Pre-test has used to assess similarities between groups, after pre-test, the experimental group of students had been taught by regularly using multimedia known as treatment. But the control group of students has been. Taught by regularly using traditional method known as treatment there traditional method also includes teaching without using multimedia. At the end of the experimentation time, achievement test (Post-test) have been conducted to both group and their score were compared and analyzed and scale of students view on multimedia has been conducted only experimental group and their view were analyzed.

The paradigm of the present study is as follows:

Table 1: Design of the Study

S.N.	Group	Pre-test	Treatment	Posttest
1	Control	C ₁	Teaching without multimedia	C ₂
2	Experimental	E ₁	Teaching with multimedia	E ₂

Where,

C₁= Pre-test given to the control group student's

E₁=Pre-test given to the experimental group student's

C₂= Post-test given to the control group student's

E₂=Post-test given to the experimental group student's

Population, Sample and Sampling Strategy

In this research work, Dhading district was selected as a research area.

Students of class IX of Dhading District have been considered as population. The purposive sampling would be used to select the school for the research. The coin toss method would used to select school for experimental and control groups. Students of class IX have been preferred as sample for the study. Particularly 20 students of Shree Barahakalika secondary school and 20 students of Shree Kalika secondary school were sample of this study. These two group of students were formed homogeneous as possible as by selecting school of similar status and pre-test has used to access similarities between groups.

Table 2: Name of the Select Public School and Sample Size

S.N.	Name of school	Address	Sample Size
1.	Baraha Kalika Secondary School	Jwalamukhi Rural Municipality-4 Dhading	20
2.	Kalika Secondary School	Jwalamukhi Rural Municipality-4 Dhading	20

Variables

Variables are key ideas that researcher seek to collect information on to address to purpose of their study. A concept which can take on different quantitative values is call a variable. Also variable is a characteristic or attribute of an individual or an organization that researcher can measure or observe and varies among individuals or organizations studied (Creswell,2012).

Different variables used in educational research. An independent variable is an attribute or characteristic that influences or affects an outcome or dependent variable. A dependent variable is an attribute or characteristic that is depend on or influenced by the independent variable (Creswell,2012). It means if one variable depends upon or is a consequence of the other variable, it is termed as a dependent variable, and the variable that is antecedent to the dependent variable is termed as an independent variable. Variable that are not related to the purpose of the study, but may affect the dependent variable are termed as extraneous variables. The variables in this study were classified as:

Independent Variables: In this study, using multimedia tools i.e. related topic video, is known as independent variables.

Dependent variable: In this study, student's achievement and view of student are considered as dependent variable.

Extraneous variable: Selection of school instructor/teacher, subject matter, group experimental time, test scoring, school environment, students labor, home environment are extraneous variable in this study.

Some Major Affecting Variables Control in Experiment

- **Selection of school:** Such two schools were select in sample which is similar in status like socio-economic facilities result of students.
- **Instructor/teacher:** Researcher himself taught for experimental and control group
- **Subject matter:** In experimental period the chapter set, profit and loss, factorization and statistics taught for both group.
- **Test:** Same test paper had conducted for both groups before and after the time of experimentation.
- **Scoring:** Researcher himself given the score of students in test paper appeared by the students.
- **Experimental time;** Researcher had provided equal time to both groups.

Some Uncontrollable Affecting Variables in the Experiment

- **Students labor;** Students may labor more or less than expected by the researcher and self study of the students may affect in the result of research which is out of control.

- **Student's home environment;** Students home environment has great effect on student's behavior and attitude but cannot be controlled by the researcher.

Experimental Stages

Experimental stage was categorized into three stages in this study, which as follow.

Pre-Experimental Stage: In the pre experimental stage the researcher developed the test item ad questionnaire. And test item included the objective questions. the questionnaire related to five point linker scale was bade upon the students view about using multimedia after develop test items, mathematics achievement test items were piloted on the group of students that are not included in sample pre-test and post-test . And analyzed the result of pilot test and select the parallel question for pre-test and post-test item of mathematics achievement. After selected test item of mathematics achievement test, pre-test was administered among the students of experimental and control groups for the purpose of to make group homogeneous.

Experimental Stage: In this stage researcher himself was taught for the experimental and control group regularly three week the experimental group of student was taught by using multimedia but the control group of students was taught by using traditional method in the experimental process, teaching episode was developed for experimental group see teaching episode in appendix D and also the observation of students in both groups was done regularly for the time of experimentation.

Post –experimental Stage: In post-experimental stage, the post test was administered among both groups. The post-test consisted 30 objective question. Also a set of questionnaire was administered only on experimental groups. It consisted 10 statements related to student view about using multimedia. After collecting the students answer and response the data was analyzed.

Validity and Reliability of Tools

To ensure the good quality of the test, validity was more important, what it mean that the test must have the test items which truly assess the skill and abilities as indicated by given learning outcomes. Validity of the achievement test questionnaire was established by the help of subject teacher, expert and supervisor.

Reliability of test was very important of this study. for this purpose, every test items were piloted and reliability was checked before it was administered in this study the mathematics achievement test piloted involving 15 student of grade IX in Shree Baraha Kalka Secondary School, Jwalamukhi- 4 dhading the response of the student was analyzed. employing the split-half method of reliability of the test was determined the test found to have $r = 0.94$. It indicate that the mathematics achievement test was highly reliable. The final selection of the test items was prepared then the researcher used for pre-test and also use post test by making parallel forms of questions just like pre-test question.

Data Collection Tools

To success the research work within time, research tool would be necessary and appropriate for particular research work. the researcher of this was used the following data collection tools.

Achievement Test. The achievement test was developed by the researcher himself with help of pilot test. Pilot test was administered at BasantaKalika Secondary School Jwalamukhi 4, Dhading. The pre-achievement test (pre-test) was used to determine the achievement level of students in both groups. This test consists 20 objective question. The tool was used as pre-test for group comparable. This was administered before the experimentation process. At the end of experimental time post-achievement

test (post-test) was administered for the purpose of this study. Post-test was included same question of pre-test with same weight.

Questionnaires. The questionnaire related to five print liekrt scale was used to analyzed the student view on using multimedia in teaching class. In this study , the set of questionnaire contains 10 statements using likert scale of ‘1-Strongly disagree, 2- Disagree, 3- undecided, 4- agree and 5- strongly agree’ for positive statement and for negative statement the scoring process was reversed.

Observation. Observation of classroom during the teaching by multimedia were used to examine the students interactions and how they worked together. I observed the every students during experiment time their behavior and checked out their interest, emotion, enjoyment and difficulty after the experiment with both group. The observation added the students views about multimedia .

Source of Data

There are mainly two sources of data collection: they are explained briefly as follows:

This study is based on experimental design in order to curry out study, the following source of data were adopted,

- **Primary source** The primary source only based on test items and questionnaires. The questionnaire was related to likert scale.
- **Secondary source** The Secondary sources based on articles journals previous research related for analyzing data.

Data Collection Procedure

For my research work, first, I prepared a set of tools for my research work then I went to the field and got permission from the principal and subject teachers and took permission for experimentation. After select sample school, the achievement test (pre-test) was administered to IX grade students of school in the sample. In the examination, there were 20 students of Shree Barahakalika secondary school, which is known as experimental group and 20 students of Shree Kalika secondary school, which is known as control group. Then after I distribute the students in different two groups for the purpose of quantitative study i.e., controlled group and experimental group with the help of tossing coin. A pre-test administered to determine the proficiency level of students in the selected topic before treatment. Both groups taught the same lesson by the researcher with the help of respective math teacher. The control groups were taught by using traditional method and experimental groups by using interactive multimedia tools. I have used experimental research for one month..

Each group was taught only 45 min in a day during one month with teaching episode. At the end of every teaching learning session of the selected lessons the students of experimental and controlled group were administered the same standardized achievement test i.e., post-test. The result obtained from pre-test and post-test of both groups were compared and analyzed with the help of statistical devices then determine the relative effectiveness of the use of interactive multimedia tools in math teaching of the selected teaching lessons at secondary level grade IX. Finally, The set of questionnaire was administered for purpose of analyzing the students view on multimedia in learning mathematics.

Data Analysis Procedures

Data analysis procedure based upon the data collection tools and techniques. Collected data was analyzed by using different statistical technique, which were mean, variance and standard deviation. Mean variance and standard deviation were calculated for both groups with their obtained marks in pre- test and post-test. The score was tested 0.05 level of significance value by applying t-test for comparison of both results. Additionally, for analyze the student view about multimedia, the questionnaire related to five point likert scale was used only the student of experimental group. And students response was calculating mean, standard deviation and percentage by assigned 1 for strongly disagree, 2 for disagree, 3 for undecided, 4 for agree and 5 for strongly agree for all positive statement and for negative statement the scoring process was reversed. Finally, data was analyzed and interpreted.

Chapter IV

ANALYSIS AND INTERPRETATION

In this chapter, the collected data from the raw score of the student of pretest and post test of the two groups, control and experiment. The collected data and its interpretation are followed in a systematic manner. The major function of this discussion is to interpret the result of the study. The collected data were analyzed under the following heading.

Analysis of Pre-test Results

Score of the pretest of students of the experimental and control group have given in Appendix-B together with statistical calculation of mean, standard, deviation and variance. The t-test analysis for the comparison of the mean achievements scores of pretest has been summarized in following table.

Table 3: Comparison of Experimental and Control Groups on Pre-test Scores

Group	N	Mean	Standard deviation	Variance	Calculated t-value
Experimental	20	9.6	3.28	10.75	-1.008
Control	20	10.6	3.41	11.62	

The above table shows us details that, mean variance, and standard deviation of pre-test score of experimental and control groups 9.6, 10.75, 3.28 and 10.65, 11.62 and 3.41 respectively. The calculated t-value was found to be -1.008 which was less than the tabulated t-value at 0.05 for two tail test is 1.64. This value shows that $-1.008 < 1.64$. So H_0 was accepted. The mean score of both group were found to be nearly equal. It means both groups were equivalent or homogenous before treatment.

Analysis of Post-test Result

The post-test was administered to both experimental and control group after the treatment was given. The post-test score of experimental and control groups have been presented in Appendix-C. The calculation of mean, standard deviation and variance has also been made to calculate t-values as mentioned in Appendix. The summary of the t-test analysis for the comparison of mean score of experimental and control groups on post-test been given in table.

Table 4: Comparison of Experimental and Control Groups on Pre-test Scores

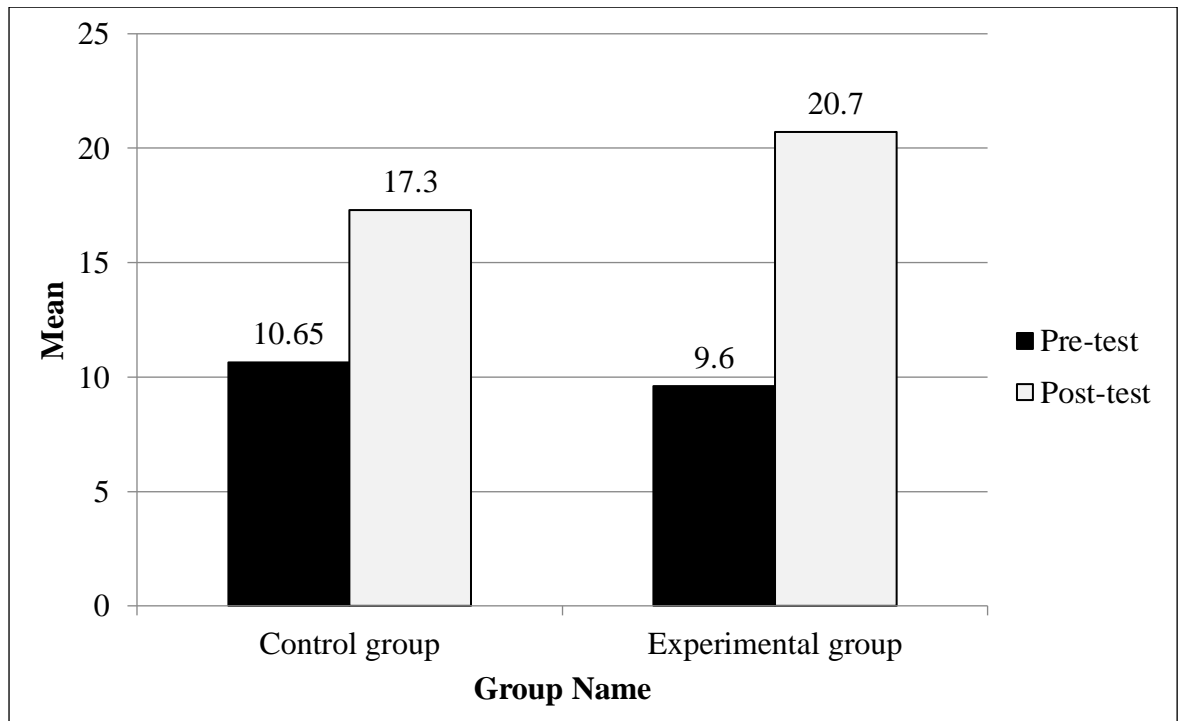
Group	N	Mean	Standard deviation	Variance	Calculated t-value
Experimental	20	20.7	4	16	2.61
Control	20	17.3	4.22	17.80	

The above table 4 indicates the both mean and standard deviation of both groups are different. The mean score experimental group was 20.7 and mean score control group was 17.3 and standard deviation are 4 and 4.22 respectively. The result shows that the mean score of experimental group was more than control group. The result showed calculated t-value was 2.61 but tabulated value values of t was 1.64 at 0.05 level of significance. Therefore that result determined to not be equal achievement levels at the conclusion of the study. Here, $2.61 > 1.64$ so that H_0 was rejected. It is conclude that the average achievement of the students at mathematics of experimental group is higher than the average achievement of students of mathematics of control group on post test. Therefore, the result showed that using multimedia tools in teaching of mathematics is more effective than traditional way of teaching mathematics.

Analysis of Mean Score of Control and Experimental Group

The analysis has been held to compare the mean score of both control and experimental group in which the score is taken from the raw score of pre-test and post-test.

Figure 2: Comparison of Mean of Pre-test and Post-test



The above diagram represents the comparison of average score of the test, the pre-test and post-test of both control and experimental group. The full marks of 20 of pre-test and post test full marks of 30 to create the bar graph presentation.

The mean score of the pre-test of control group and experimental group are 10.65 and 9.65 respectively. And the mean score of the post test of control and experimental group are 17.3 and 20.7 respectively. Thus, total average of the pre-test and post-test of the both group is 10.65 and 9.6 respectively. Hence, the mean of the score of the post-test is greater and thus, the student who have been taught through the

use multimedia tools are use more effective rather than the teaching and learning mathematics in traditional method.

Result of Student's Perception towards Multimedia Tools in the Learning

Mathematics

The students perception was identified through a set of attitude scale consists of ten items. The attitude scale was distributed to the experimental group only to know their perception based on their experience using the multimedia tools. The result gained from the attitude scale show positive results (see Appendix to identify the perception of students towards multimedia tools, were analyzed by following ways.

Table 5: Whole Mean Value of Each Items and Items Statistical Significant

Item No.	Mean	Agree%	Undecided	Disagree	Conclusion
1	4.1	75	15	10	Positive
2	3.8	60	25	15	Positive
3	4	70	20	10	Positive
4	4.35	80	15	5	Positive
5	4.2	75	15	10	Positive
6	4.4	80	15	5	Positive
7	4.05	75	15	10	Positive
8	3.75	60	25	15	Positive
9	3.8	65	25	10	Positive
10	4.35	80	15	5	Positive
Overall	4.08	72%	18.5	9.5	Positive

The mean score of the statement. I like to use multimedia tools is 4.1 and about 75% of the students agreed with the statement and 10% of students disagreed with the statement and about 15% of the student have shown their undecided views. It shows that student are favour with the statement. I like to use multimedia tool.

The mean score of statement multimedia tool helps to learn mathematics concepts' is 3.8 and about 60% of student agreed with the statement and 15% of students disagreed with the statement and 25% of the students have shown their undecided views. It is shows that students are favour with the statement multimedia tools helps to learn mathematics concepts.

The mean score of statement. I feel confident when the activities do by multimedia tool is 4 and about 70% of student agreed with the statement and 10% of student disagreed with the statement and about 20% student have shown their undecided views. It shows that student are favour with the statement. I feel confident when the activities do by multimedia tools.

The mean score of the statement I learnt a lot about mathematics when using multimedia tool is 4.35 and about 805 of the students agreed with the statement and 5% of students disagreed with the statement and about 15% of student have shown their undecided views. It is shows that student are highly positive attitude with the statement. I learnt a lot about mathematics when using multimedia tool

The mean score of the statement I can think creatively and critically when using multimedia tool is 4.2 and about 75% of students agreed with the statement and 5% of student disagreed with the statement and about 15% of student have shown their undecided views. It is shows that students are favour with the statement.

The mean score of the statement 'multimedia can help to increase my achievement in mathematics is 4.4 and about 80% of student agreed with the statement and 15% of student have been shown their undecided views. It shows that student are highly positive favour with the statement multimedia can help to increase my achievement in mathematics.

The mean score of the statement 'I am happy if the teacher use the multimedia tool in teaching mathematics is 4.05 and 75% of student agreed with the statement and 10% of students disagreed with the statement and 15% show their undecided views. It shows that student are highly positive favour with the statement.

The mean score of the statement 'It is important that I use multimedia tools in my learning' is 3.75 and 60% of student agreed with the statement and 34% of student disagreed with the statement and 25% of student have shown their undecided views. That means student are positive with the statement.

The mean score of the statement 'I am excited when asked to explore the multimedia tools is 3.8 and about 65% of students agreed with the statement and 10% of students are disagreed with the statement and about 35% of the student have shown their undecided views. This shows that positive view of the students with the statement.

The mean score of the statement 'I think multimedia tool are essential component for teaching is 4.35 and 80% of student agreed with the statement and 5% of students disagreed with the statement and 15 of students show their undecided view of the statement. This shows that student are high favour of the statement. I am excited when asked to explore the multimedia tool.

The above table shows, the study found that the items in attitude score that had lowest mean was 3.55 and highest mean score was 4.55 and overall mean score is 3.99. It shows that overall students agreed with positive statement about multimedia tools. Students also found that multi-media tools. Students also found that multimedia tool can also give a good impression of their learning in mathematics class. From the results, it can be concluded that the using of multimedia tools can increase students interest, confidence and their motivation in learning mathematics.

In the observation of experimental class, the student of experimental group performed better using multimedia than the control group that uses the traditional method. Students gave positive response about the multimedia in learning. According to student, using multimedia for teaching, class was very interesting. It makes active in teaching learning themselves in class as well as enjoyable.

Chapter V

FINDINGS, CONCLUSION AND RECOMMENDATIONS

After analyzing and interpreting the data the research interpreted the summary, finding and recommendations for the further study. The first section of this chapter contains summary and finding of the study, the second section draw conclusion of the study and third section present recommendation for the further study.

Summary

The purpose of this study was to investigate the effects of two instructional strategies on student achievement in mathematics teaching by using multimedia tools and teaching by traditional way.

- The control group was taught by traditional method.
- The experimental group was taught by using multimedia tools.

This research was based on pre-test, post-test on quasi-experimental equivalent group design with the sample of two schools. Among the two schools, Baraha Kanika Secondary School was for experimental and Kalika secondary school for control group. The researcher was adopt pretest beginning of the experiment and collect pretest score of both experimental and control groups. A two sample t-test was used to analyze the pretest score at the 0.05 level of significance by the analysis. There was no significant difference in achievement of both the group at the beginning of the study. the total number of experimental group were 20 and control group was 20.

After pretest experimental period was run. In this period researcher was developed the episode and regular taught by using, multimedia tool. A pretest

equivalent set of question was given for the post test at the end of the experimental period. A two sample t-test was used to analyze the post-test score. At the 0.05 level of significance there difference in achievement level at the conclusion of the study. This result in the null hypothesis being rejected and alternate hypothesis being accepted for the analysis of the result the researcher also used mean, standard deviation variance was also used.

In this study, the teaching and learning of mathematics using multimedia tool has been effective. This was shown through the improve scored of the student in the experimental group. The result highlighted that students in the experimental group performed better using multimedia tool than the control group that use the traditional learning method. In addition students in the experimental group better in the post-test compared to the control group. The student's perception was identified through a set attitude scale consists of ten items. The attitude scale was distributed to the experimental group only to know their perception based on their experience using the multimedia tool. The result gained from the attitude scale show positive result.

Findings of the Study

There were found the following results as the major study from the existing statistical analysis of collected data and interpretation.

- Analysis of average mean scores and percentage of the scores obtained by the student of the experimental group and the control group in pre-test showed that two groups were equivalent or homogenous before the treatment.
- There was no significant different between the average achievement

- By the post test result the student in experimental group were high mean score than the student's in control group.
- Comparison between pre-test and post-test mean score of total experiment group students, which was taught with using multimedia tool showed that post test achievement was significantly better than pretest.
- The student's perception on learning process of mathematics was highly positive with the use of multimedia tools than the traditional way.
- The result shows that multimedia makes mathematics class interesting and enjoyable.

Conclusion

The analysis of the data did indicate a significant difference in achievement levels of experimental and control group, however in examining the post test mean score of the experimental and control group. the mean score of the experimental group was higher than the mean score of control group. There was no significant difference between experimental group and control group students in pre-test results. Thus, the performance of both group in mathematics was same before the treatment. There was significant difference in post test mean score of students in mathematics taught with using multimedia tools and non using multimedia tools. Thus, the study reveals that the use of multimedia tool in teaching and learning mathematics is more effective at secondary level. From this study, it was concluded that the use of multimedia tools help the student to understand mathematics in better way and consequently students perform better in achievement over traditional method. Students generally gave positive feedback or view about the multimedia in mathematics learning. In addition, multimedia was essential and important for the teaching and its make class interesting and enjoyable.

Recommendations

From the finding of this study, the researcher suggests the following recommendations for the better improvement in mathematics teaching and learning process.

- The secondary school, math teachers should use multimedia projector in math teaching to get better achievement in math.
- Math teacher should be given training in using multimedia projector and computer that could foster the potentiality of math concepts and create interest in teaching learning mathematics.
- At least one multimedia projector should be managed in each and every secondary school which helps the students to learn better.
- Teacher should upgrade their knowledge and skill of using computer to minimize challenges when they occur inside the classroom through different training and math related seminar programs.
- Teacher should read about audio visual pedagogy innovation in teaching and changing in method to meet the need of 21st century learner.
- The government should increase the number of technician in the field of ICT based education implementation. In addition curriculum planners should encourage the use of audio-visual materials by including them in the educational syllabus of all levels of education.

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Appendices

Appendix A

Pre-test and post test objective questions

Class : IX

Subject: C. Mathematics

;**xL pQ/df /]hf lrGx (✓) nufpg'xf];\ .**

1. olb $A = \{1, 2, 3, 4, 5, 6\} / B = \{2, 4, 6, 8\}$ eP $A \cap B$ sltxf]nf <
i) $\{1, 2, 3\}$ ii) $\{2, 4\}$ iii) $\{2, 4, 6\}$ iv) $\{4, 5, 6\}$
2. olb $U = \{a, e, i, o, u\} / A = \{a, i, o\}$ eP \overline{A} s'g xf]nf <
i) $\{e, u\}$ ii) $\{a, i\}$ iii) $\{e, i, o\}$ iv) $\{a, o\}$
3. olb A / B 'O{ ;d"xx? x'g\ hxfF n $(A \cap B) = \emptyset$ 5 eg] n $(A \cup B)$ slt x'G5 <
i) $n(A) + n(B) - n(A \cap B)$ ii) $n(A) + n(B)$
iii) $n(A) + n(B) + n(A \cap B)$ iv) $n_0(A) + n_0(B)$
4. 100 hgfsf] ;d"xdf ul/Psf] ;a}{lf0fdf 20 hgf ul0ftdf plQ0f{ 30 hgf lj1fgdf
plQ0f{ / 10 hgf b'j}df ePsf] kfOof] eg{ b'j}df cg'IQ0f{ eP xf]nfg\ <
i) 60 ii) 50 iii) 40 iv) 30
5. olb $n(U) = 10, n(A \cup B) = 6$ eP $n(\overline{(A \cup B)})$ slt x'G5
i) 5 ii) 3 iii) 2 iv) 4
6. s'g} ;fdgfsf] gfkmf(P),lj=d"= (S.P.) / qm=d"= (CP) ePgfkmf, lj=d"= / qm=d"=
sf] ;DaGw s'g xf] <
i) $SP = CP - P$ ii) $P = SP + CP$
iii) $P = SP - CP$ iv) $CP = P + SP$

7. Ps af]/f rfdnsf] c+lst d"No ?=2000 5 o;df ?=400 5'6 lbOof] eg] 5'6kl5sf] d"No kQ fnufp .
- i) 1400 ii) 1500 iii) 1600 iv) 1700
8. Ps ef8f] vfg]t]nsf] 5'6kl5sf] d"No ?= 1400 5 olb 5'6 /sd ?=250 ePc+lst d"No slt xf]nf<
- i) 1350 ii) 1450 iii) 1600 iv) 1650
9. 1800 sf] landf 9% 5'6 lbFbf slt /sd ltg' {knf{<
- i) 90 ii) 100 iii) 110 iv) 115
10. s'g} j:t'sf] c+lst d"No ?=500 5 . o; d"Nodf10% 5'6 lbFbf o;sf] jf:tljs d"No slt x'G5 <
- i) 405 ii) 450 iii) 460 iv) 470
11. (a-b)²sf] u'0fg v08 slt xf]nf<
- i) 405 ii) 450 iii) 460 iv) 470
12. a² + ab + b² nfO{ k"Of{ agfpg slt hf]8\g'knf{ <
- i) 2ab ii) ab iii) -ab iv) 3ab
13. x³-27 nfO{ v08s/0f ubf{ u'0fgv08 slt slt xf]nf<
- i) (x-3) (x²-3x+6) ii) (x+3) (x²-3x+9)
- iii) (x-3) (x²+3x+9) iv) (x+3) (x²+3x+9)
14. x² + 7x + 12 nfO{ v08Ls/0f ubf{
- i) (x+3) (x-4) ii) (x-3) (x+4)
- iii) (x-3) (x-4) iv) (x+3) (x+4)
15. a²-b²-ax-bx nfO{ v08Ls/0f ubf{
- i) (a+b) (a-b-x) ii) (a-b) (a-b+x)
- iii) (a+b) (a-b+x) iv) (a+b) (a+b+x)

16. s'g] tYof^a\ssf] m/fzL(x) / af/Daf/tf (f) eP cf};tdfg(\bar{X}) slt xf]nf<
- i) $\frac{\sum x}{N}$ ii) $\frac{\sum fx}{N}$ iii) $\frac{\sum fn}{N}$ iv) $\frac{\sum N}{x}$
17. 4, 6, 8, 10, 12 sf dWos slt xf]nf<
- i) 8 ii) 10 iii) 12 iv) 4
18. 7 cf]6f kb ePsf] tYof+ssf] dlWosf kg]{ :yfg slt xf]nf<
- i) 3.5 ii) 4 iii) 5 iv) 5.5
19. 3, 5, 7, 9, 11 sf] dlWosf slt x'G5 <
- i) 3 ii) 5 iii) 7 iv) 11
20. ;a]eGbf a9L k6s bf]xf]l/Psf] dfgnfO{ s] elgG5 <
- i) dWos ii) dlWosf iii) lj:tf/ iv)l/t
21. olb $U = \{x: x = 1 \text{ b}\} \cup 20$;Ddsf 3gfTds k"Of{ ;+Vofx?} $A = \{x: 6 < x < 20$ / $B = x: x < 8$ eP $A \cap B$ slt x'G5 <
- i) $\{x: 1 < x < 20$ ii) $\{x: 6 < x < 8$ iii) $\{x: 9 < x < 20$ iv) \emptyset
22. olb $n(A) = 40$, $n(B) = 60$ / $n(A \cup B) = 80$ eg] $n_0(A)$ slt xf]nf
- i) 20 ii) 30 iii) 40 iv) 43
23. Pp6f ;d'bfodf ul/Psf] ;j]{lf0fdf 43% n] bz} dg k/fpg] 79% n] ltxf/ dg k/fpg] / 20% n] b'j} rf8 dg k/fpg] kfOof] eg], b'j} rf8 dg gk/fpg] slt k|ltzt xf]nfg\ <
- i) 20% ii) 45% iii) 10% iv) 5%
24. ?=100 df lsg]sf] Pp6f snd ?=90 df a]Rbf slt k|ltzt 3f6f x'G5 <
- i) 30% ii) 25% iii) 20% iv) 10%
25. 450 df lsg]sf] ;fdfg 30% gfkmdf a]Rbf sltdf a]Rg'knf{ <
- i) 485 ii) 585 iii) 600 iv) 685

26. Pp6f v]nf}gfsf] c+lst d"No ?=100 5 . olb o;nfO{ ?=80 df a]lrof] eg] 5'6sf]
b/ kQ fnufpg'xf];\ .
i) 20% ii) 25% iii) 30% iv) 35%
27. cleJo~hsx²+3x+2nfO{ v08Ls/0f ubf{ slt x'G5 <
i) (x+1) (x+2) ii) (x+2) (x-1) iii) (x+3) (x-1) iv) (x-1) (x-2)
28. x⁴-43x² + 9nfO{ v08Ls/0f ubf{ u'0fgv08 slt xf]nf<
i) (x²-7x-3) ii) (x²+7x+3) iii) (x²+4x-3) iv) (x²+4x+3)
29. $\bar{X} = 23$ eP K sf] dfg slt xf]nf<
10, 17, 19, 27, 29, 33,k
i) 24 ii) 25 iii) 26 iv) 28
30. 100, 120, $\frac{5x+10}{4}$, 160, 180 a9\bf] qmddf 5g\ . olb o;sf] 140 xf] eg] x sf] dfg
slt xf]nf<
i) 105 ii) 110 iii) 115 iv) 120

Appendix B

Pre-test Score of Students in Experimental and Control Groups

Pre-test			
S.N.	Experimental	S.N.	Control group score
1.	10	1.	15
2.	9	2.	13
3.	10	3.	14
4.	7	4.	8
5.	8	5.	7
6.	5	6.	9
7.	11	7.	13
8.	13	8.	8
9.	7	9.	5
10.	12	10.	11
11.	14	11.	14
12.	6	12.	10
13.	5	13.	7
14.	10	14.	8
15.	8	15.	12
16.	9	16.	14
17.	13	17.	13
18.	10	18.	10
19.	14	19.	9
20.	11	20.	13
N=20	Mean = 9.6 S.D. = 3.28 Variance = 10.75	N=20	Mean = 10.6 S.D. = 3.41 Variance = 11.62

Appendix C

Post-test Score of Students in Experimental and Control Groups

Post-test			
S.N.	Experimental group score	S.N.	Control group score
1.	20	1.	22
2.	19	2.	17
3.	21	3.	19
4.	18	4.	14
5.	19	5.	10
6.	15	6.	12
7.	22	7.	10
8.	24	8.	19
9.	20	9.	13
10.	21	10.	15
11.	28	11.	21
12.	18	12.	20
13.	13	13.	18
14.	21	14.	19
15.	20	15.	20
16.	19	16.	24
17.	25	17.	22
18.	23	18.	15
19.	26	19.	16
20.	22	20.	20
N=20	Mean = 20.7 S.D. = 4 Variance = 16	N=20	Mean = 17.3 S.D. = 4.22 Variance = 17.8

Appendix D

Teaching episode -1

Sub: com. Math

Time:45 min

Unit : 1

Topic: set

Class: IX

School: Baraha Kalika Secondary School

Objectives: In the completion of this lesson the students will able to:

- I) Find the relationship between two sets by using ven diagram.
- II) To solve the verbal problem using cardinal number related set operation.

Instructional materials: Audio-video of set, formula chart

Activities

- First researcher was written the topic on white board and then he was motivated the students by asking some questions related to previous class lesson “set”.
- The researcher was explained in short about the set definition and example types of set , set operation cardinal numbers related formula .
- The researcher showed the educational videos of the topic set with help of multimedia projector.
- If the students were not clear, the researcher would again shows this video and discuss with students where necessary.
- At last the researcher was summarized the whole lesson.

Teaching episode 2

Sub: Com Math

Time : 45 min

Unit: 2

Topic: Profit and loss

Class : IX

Obj: After the completion of this lesson , student should be able to :

- to know the basic concepts of profit and loss
- to solve the problem related with profit and loss

Instructional materials: laptop , projector educational video

Activities

- By recognizing the previous knowledge of students about the new knowledge, the researcher was briefly explained about the lesson.
- After that researcher was clarified about profit and loss then researcher discussed the formula about the related topic.
- Then he showed the video of the topic profit and loss.
- If the student were not clear he would again show these video and discussed with student where necessary.
- If student want copy the some major point researcher resume the video.
- At last researcher summarized and clarified the whole lesson shortly.

Episode 3

Sub: Com. Math

Unit: 7

Topic: Algebraic expression

Class: IX

Objectives: After the end of this topic, the student should be able to

- To solve the $a^4 + a^2b^2 + b^4$ related Algebraic problem

Instructional material: Laptop, Multimedia projector

Task,

- The researcher explained brief about the lesion like $a^2 - b^2$, $(a + b)^2$, $(a - b)^2$, $a^2 + b^2$
- Researcher show the rider relate $a^4 + a^2b^2 + b^4$.
- He showed the example of this kind of problem on the video.
- If student were not clear, he would again show the video as white board if student necessary.
- At last summarized the lesson and give some problem for homework to related this lesson.

Teaching episode 4

Subject; C. Mathematics

Time: 45 min

Topic: Mean

Class; IX

Obj: After the end of this lesson, student will able to

- Define the meaning of mean
- Solve the mean related problem

Activities

- Firstly researcher remained the previous class and discuss the meaning of mean.
- Researcher will be cleared the mean by different kind of example like student age, student marks etc.
- After then researcher summarized the definition of mean i.e. total sum of thing divided by total number of thing. Mean is denoted by \bar{X} and denoted by $\bar{X} = \frac{\sum N}{N}$
- Researcher show video class from laptop.

Appendix: E

Scaling and Total Perception Score of Experimental Group Students towards each Statements

SN	Items	SA	A	VD	D	SD	Total	Mean	Result
1.	I like to use multimedia tools	11	4	3	1	1	82	4.1	Positive
2.	Multimedia tools is help to learn mathematics concepts.	9	3	5	2	1	77	3.8	Positive
3.	I feel confident when the activities by using multimedia tools.	9	5	4	1	1	30	4	Positive
4.	I learnt a lot about mathematics when using multimedia tools.	12	4	3	1	0	87	4.35	Positive
5.	I think creativity and critically when using multimedia tools.	12	3	3	1	1	84	4.2	Positive
6.	Multimedia tools can help to increase my achievement in mathematics.	14	2	3	0	1	88	4.4	Positive
7.	I am happy if the teacher use the multimedia tools in teaching mathematics.	11	4	3	1	1	81	4.05	Positive

8.	It is important that I use multimedia in my learning.	7	5	5	2	1	75	3.75	Positive
9.	I am excited when asked to expose the multimedia tools.	6	7	5	1	1	76	3.8	Positive
10	I think multimedia tools are essential important for teaching.	13	3	3	0	1	87	4.35	Positive
Overall Mean								4.08	

Where

	Total no. of Respondents			Percentage of Respondents		
	Agree	Undecided	Disagree	Agree %	Undecided %	Undecided %
1.	15	3	2	75	15	10
2.	12	5	3	60	25	15
3.	14	4	2	70	20	10
4.	16	3	1	80	15	5
5.	15	3	2	75	15	10
6	16	3	1	80	15	5
7.	15	3	2	75	15	20
8.	12	5	3	60	25	15
9.	13	5	2	65	25	10
10.	16	3	1	80	15	5
Overall Average Percentage				72%	18.5%	9.5%