EFFECTIVENESS OF DIGITAL MEDIA IN LEARNING CIRCLE AT GRADE TEN

A

THESIS

BY

BIDHAN MAGAR

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN MATHEMATICS EDUCATION

SUBMITTED

TO

DEPARTMENT OF MATHEMATICS EDUCATION

CENTRAL DEPARTMENT OF EDUCATION

UNIVERSITY CAMPUS, KRITIPUR

TRIBHUVAN UNIVERSITY

KATHMANDU, NEPAL

2023

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date: .....

Letter of Certificate

This is to certify that **Mr. Bidhan Magar,** a student of academic year 2075/076 with Exam Roll No. 7528174, T.U. Regd. No. 9-3-28-156-2018 and Thesis No. 1785 has been completed this thesis for the period prescribed by the rules and regulations of Tribhuvan University, Nepal. The thesis entitled **"Effectiveness of Digital Media in Learning Circle at Grade Ten"** has been prepared based on the result of his investigation conducting the period. I hereby, recommended and forward that her thesis be submitted for the evaluation as the partial requirement to as award the Degree of Masters of Education.

Date: ……..

Mr. Abatar Subedi

Head of Department

Phone No.: 977-1-4331337 / 4333229, Fax No.: 4334955, E-mail : foe@tucded.edu.np, Website : tucded.edu.np

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date: .....

Letter of Approval

This thesis entitled **"Effectiveness of Digital Media in Learning Circle at Grade Ten"** submitted by **Mr. Bidhan Magar** in partial fulfillment of the requirements for the Master's Degree in Education has been approved.

Viva-Voce Committee	**Signature**
Mr. Abatar Subedi (Chairman)	……..
Prof. Dr.Bishnu Prasad Dhungana (External)	…….
Mr. Krishna Prashad Bhatt (Member)	……..

Date:

Phone No.: 977-1-4331337 / 4333229, Fax No.: 4334955, E-mail : foe@tucded.edu.np, Website : tucded.edu.np

त्रिभुवन विश्वविद्यालय
शिक्षा शास्त्र केन्द्रीय विभाग
गणित शिक्षा विभाग

विश्वविद्यालय क्याम्पस
कीर्तिपुर, काठमाडौं, नेपाल

UNIVERSITY CAMPUS
Kirtipur, Kathmandu, Nepal

TRIBHUVAN UNIVERSITY
CENTRAL DEPARTMENT OF EDUCATION
DEPARTMENT OF MATHEMATICS EDUCATION

पत्र संख्या:-
Ref.

मिति:
Date: .....

Recommendation for Acceptance

This is to certify that **Mr. Bidhan Magar** has completed his M.Ed. Thesis entitled **"Effectiveness of Digital Media in Learning Circle at Grade Ten"** 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.

Date: ……..…….

Mr. Krishna Prashad Bhatt

(Supervisor)

Phone No.: 977-1-4331337 / 4333229, Fax No.: 4334955, E-mail : foe@tucded.edu.np, Website : tucded.edu.np

Copyright

By

Bidhan Magar

Defense Date: 2080/……

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.

.

Date: …….

Bidhan Magar

Dedication

Honestly dedicated

To

My parents

Mame Bahadur Magar and Manju Kumari Magar

Who provided me a great oppertunity

Acknowledgment

My achievement in my thesis was made possible by several people. First and foremost, I want to thank my thesis supervisor, Mr. Krishna Prashad Bhatta sir, for helping me choose a study topic and advising me on how to plan, carry out, and analyze my research. I would never have been able to complete my research successfully without his insightful suggestions, guidance, support, and inspiration.

I am very much indebted to Mr. Abatar Subedi, Head, Department of Mathematics Education, University Campus, Kritipur, who provided me the opportunity to write this thesis. I would also like to express my gratitude to Mr. Krishna Prashad Adhikari, for his valuable suggestions and guidelines about GeoGebra software and all my sincere gratitude also goes to all the respected teachers and professors of the Department of Mathematics Education for their valuable support and encouragement. Indeed I want to express my gratitude to prof. Dr. Bishnu Prasad Dhungana External observer, for his construction-related suggestion.

Finally, I offer a special note of appreciation to my family for the encouragement and support given throughout my academic life. So, I would like to thank you all for providing the guidelines and support you have done, in any way, for me.

…..…….

Bidhan Magar

Abstract

The purpose of this study, "Effectiveness of Digital Media in Learning Circle at Grade Ten," was to compare how well students in Grade Ten perform when taught using digital media versus traditional methods and to examine how students perceive using digital media in learning circles. To compare the performance of the experimental and control groups, a pre-test and post-test quasi-experimental research design was used.

For this study, two of Bhojpur, Shree Janajyoti Secondary School and Shree Prajatrantra Secondary School were selected as a sample where Shree Janajyoti Secondary School chosen as an experimental group and Prajatrantra Secondary School as a control group. There were 22 students in the experimental group and 27 in the control group. For the experiment, the students of the experimental group were taught by Digital Media (GeoGebra software and Power-point), and the control group was taught by the conventional method. After two weeks of daily taught experimental, the data was collected using an achievement test and a set of questions using a five-point Likert scale. A study of the quantitative data using a 2013 version of Microsoft Excel provided an independent sample t-test that computed Cohen's measure of effect.

The findings indicated that, when compared to traditional teaching strategies, digital media-based instruction had a significant impact on students' performance in circles. According to the study's findings, there was a big difference in the mean scores between these two groups. According to the study's findings, students in the experimental group outperformed those in the control group in learning. The experimental group's students showed positive engagement with the use of digital media. As a result, it was discovered that digital media had a significant impact on tenth-grade students' achievement.

Table of Contents

List of Tables

List of Figures

Chapter I

Introduction

Background of the Study

Technology is now a key component of both teaching and learning. Technology is useful in relation to its need to achieve a learning outcome in any content, but it is not the solution to a quality educational system. The purpose of this study was to determine how well digital media worked in learning groups for tenth graders. In the learning circle, students encounter numerous challenges. The use of digital media can help students because it can help them visualize, explore, and comprehend mathematical concepts and problems. According to Fluck (2010), Information, communication, and technology (ICT) should transform education rather than just be incorporated into current subjects. According to the transformative perspective of ICT in education, we must consider what new pedagogies and curricula are suitable for a new generation using new tools. According to Campoy (1992), teaching mathematics is improved by technology. Students' learning can be aided, and it can increase their understanding and proficiency in mathematics. Despite the fact that mathematics is a core subject in schools, students often struggle to comprehend its concepts. Now, thanks to a variety of software that can be used in classrooms to improve students' learning, technology has paved the way for students to gain more knowledge of some geometrical constructions and concepts.

One of the technological tools that is very beneficial for teaching and learning is digital media. Media that has been encoded in machine-readable formats is referred to as digital media. Digital media, such as software, digital images,

videos, web pages, websites, social media, digital data, digital audio, and E-books, can be created, viewed, shared, modified, and preserved on digital electronic devices. Digital media is content that has been digitally converted and can be transmitted over computer networks or the internet. Text, audio, video, and graphics can all be a part of this (Das, 2020). In other words, news from a newspaper, magazine, TV network, etc. that is presented on a website or blog can be included in this category. Analog to digital conversion is the foundation of the majority of digital media. When text was stored online rather than on paper as it had been in the past, the Internet began to expand. Soon after the text was entered into computers, images, then audio, and finally video appeared on the Internet. In just a few short years, digital media has advanced significantly to become what we know it to be today, and it is still expanding.

Nepal is a developing nation that, due to logistical and financial issues, is still lagging in the adoption of technology for teaching and learning in all fields. ICT was recently introduced to the school sector with the establishment of a computer lab and internet connectivity in the school as part of Nepal's plan for the development of the school sector. Additionally, all 77 district education offices and regional education directorates at the central level have launched websites and created digital learning materials for students in grades 2 through 6 in Nepali, mathematics, English, and science (SSDP, 2016–2023). Thus, the government of Nepal is practicing different programs to use technology in education. The curriculum development center also creates a digital platform for students and teachers where they can put different types of educational materials, such as curriculum, teachers' guides, audio-videos, books, etc. Thus, we can say that Nepal

also uses digital media for learning and teaching. Digital media may play a vital role in improving student achievement in Nepal.

Statement of the Problem

A number of geometric properties of the well-known shape of the circle can be demonstrated using the conventional Euclidean structure. Geometry, which is directly related to our problems in daily life and further study, is related to the circle. The mathematics curriculum at our school starts in the primary grades. The circle problem becomes more abstract as the level increases. Students in the learning circle encounter numerous challenges because teachers only employ conventional teaching techniques. I've personally dealt with this issue. I had some issues learning geometry when I was in school. I was unable to understand the geometrical concept because our respected sir only used the conventional method of instruction. I committed by rote to memory the definitions, axioms, and theorems of the circle during that time. Currently, my students are having a lot of trouble understanding the concept and theorems of the circle at the government school where I teach mathematics. I created this problem based on my experience, and I want to pursue studies in this area. I decided on "Effectiveness of Digit Media in Learning Circle at Grade Ten" as my research topic as a result. The study used GeoGebra to examine the learning circle in grade ten and examine its effectiveness.

Objectives of the Study

The main goal of this study is to examine the effectiveness of digital media for learning circles. This study was intended with the following specific objectives:

- To compare the achievement of students taught circle by using digital media and traditional approach in grade ten.

- To explain the student's perceptions about using digital media in the learning circle.

Hypothesis of the Study

The hypothesis of this study was as follows:

- H0: there is no significant difference between the achievement of students taught by using digital media and the traditional method of learning circle on the pre-test.
- H1: there is a significant difference between the achievement of students taught by using digital media and the traditional method of learning circle on the pre-test.
- H0: there is no significant difference between the achievement of students taught by using digital media and the traditional method of learning circle on post-test.
- H1: the Average achievement score of students taught by using digital media is greater than the traditional method of learning circle on post-test.

Research Questions

The following research questions were constructed to complete my objectives for this study.

- Is there a significant difference in the achievement of the students in the learning circle by using digital media and not using digital media?
- What are the perceptions of students in the teaching circle by using digital media?

Justification of the Study

As part of the research's introduction, the study's justification is included. It ought to specify who gains from the research as well as how the results would be beneficial to that particular audience.

The results of this study would be helpful to researchers in the field of mathematics education as they would contribute to the body of knowledge in this area. By demonstrating how GeoGebra can be used to enhance instruction, it will be helpful for math teachers at the school level. Additionally, since they learn about GeoGebra and use it to develop a deeper understanding of mathematical concepts, students should be the main beneficiaries of this study.

Therefore, GeoGebra may also be a very beneficial math teaching tool in the Nepalese context. As a result, this research is very important to all of our country's educators, students, academic institutions, and other experts in the same field. The main goal of incorporating GeoGebra into regular teaching and learning is to give students of various mathematical abilities and levels the chance to understand the concept better and to assist them in performing math by understanding.

Delimitations of the Study

This study is delimited in the following ways:

- Grade ten mathematics courses were the only subjects covered by this research.
- This study concentrated on the teaching circle.
- Two weeks were spent conducting this study.
- Two public schools in the Bhojpur district were the only ones included in this study.

Operational Definitions of Key Terms

The key terms of this study are defined below:

Digital Media. On digital electronics devices, digital media, such as software, digital videos, images, web pages, databases, digital audio, and E-books, can be created, viewed, modified, communicated with, and preserved.

Geometry. The area of mathematics called geometry is concerned with the characteristics and connections of solids, surfaces, curves, lines, angles, and points.

Circle. The circumference of a circle, which is a round plane figure, is made up of points that are equally spaced from a fixed point.

Information and Communications Technology (ICT). The use of any hardware or software that processes or transmits digital information and has a variety of general functions with options that can be programmed or specified by the user.

Effectiveness. It's a term used to describe a change in students' performance and attitude towards using GeoGebra to learn geometry.

Experiment group. The experiment group is a set of students who receive GeoGebra-based instruction.

Control group. A group of students receiving treatment either traditionally or without using GeoGebra is referred to as a control group.

Mathematical achievement. Mathematical achievement is the term used to describe mathematical abilities evaluated by test results.

Chapter II

Literature Review

From the beginning to the end of the research, the review of related literature is a crucial part of the process. The researcher can achieve their research objectives with the help and direction of a literature review. Its specific goal is to determine how novel the research problem is and to determine whether or not there is a gap in the body of work for the upcoming study (Creswell, 2012). In this case, the researcher went over the literature and arranged it according to an empirical and theoretical review.

Empirical Literature Review

The relevant article, journals, reports, and prior theses make up the empirical review. The following are some of the articles the researcher read that were related to digital media and information communication technology,

Pratima Nayak wrote a paper on “the use of technology in teaching and learning mathematics” and she asserted that technology offers a new method of learning and enhances mathematical learning. This means that technology can help students focus more on crucial mathematics by reducing the effort put into tedious calculations. Technology can represent mathematics in ways that aid students in understanding the subject.

Similarly, Rahman, Ghazali, & Ismail, (2003) describe the main goal of utilizing ICT in mathematics education and learning is to improve students' capacity for handling a wide range of challenging mathematical problems. Understanding the issue, coming up with a plan or solution using mathematical models and deductive or inductive analysis, putting the plan into action, and reviewing the results are all

steps in the problem-solving process. Communication and idea expression through symbols, tables, diagrams, and other mathematical illustrations, mathematical characters, curiosity, motivation, and interest in learning mathematics, as well as resiliency and confidence in applying mathematics to related problems, are skills necessary for these processes.

Yusof (2010) in his study entitled "The Development of Instructional Module of Hybrid Approach Using Collaborative and Metacognitive Strategy as an Alternative Approach to Help Improving Generic Skills Among Students in Malaysian Polytechnics," the module assisted students in creating a setting where they felt more valued and at ease, gave them the opportunity to participate in problem-solving, gave them a purposeful context for learning fundamental concepts, and most importantly assisted them in improving their generic skills.

According to the National Council of Teachers of Mathematics (NCTM), Regular access to technologies that support and advance mathematical sense-making, reasoning, problem-solving, and communication is required for both teachers and students. The potential of technology to deepen students' understanding, pique their interest, and improve their mathematical proficiency is maximized by effective teachers. Teachers can increase access to mathematics for all students by using technology strategically (NCTM, 2011).

Dogan (2011), regarding the use of dynamic geometry software and its impact on the proficiency of eight students in the area of triangles. The study was carried out at the Selcuk University in Konya, Turkey. A primary school's two eighth-grade classes were chosen as the experimental and control groups. Activities and practices involving dynamic software geometry and information on state objectives were included in the course. The activities that were carefully thought out

and built using dynamic software geometry demand that the students in this grade use it effectively during the teaching and learning process. The formal teaching and learning process was continued by the control group concurrently. Both groups were subjected to a post-test simultaneously after two weeks. There were inquiries on the post-test regarding the eighth grade's stated goals. Additionally, a recall test was administered to both groups a month after the application. The test and the groups were put up for comparison, if possible. According to the findings, dynamic software enhances students' academic performance and learning. Additionally, it has been seen to have a favorable effect on increasing student motivation.

Pannen, (2013) also write a paper on "The integration of ICT in the teaching and learning mathematics can be seen at two levels: ICT for learning mathematics, and a new strategy for teaching mathematics with ICT. When a teacher uses ICT for learning mathematics, s/he can still design the teaching in an old fashion way of face-to-face classical teaching, thus ICT is a more technological tool that can assist students to learn, to do drills and practices, to do exercises on certain concepts in mathematics." The most common ICT used in the teaching and learning of mathematics is mathematical software, such as GeoGebra, Maple, Mathematica, MathLab, Wolfram Alpha, Desmos graphing calculator, Microsoft Mathematics, etc., both free and paid software. Additionally, there are mathematical resources available online that can be downloaded by students or used directly by teachers to help teach and learn in their own time and space. As a result, the teaching and learning of mathematics can be designed differently and creatively with the help of mathematical software, enabling both students and teachers to benefit from ICT-enabled learning. Given the wealth of resources available to teachers and students for the teaching and learning of mathematics, it takes a certain level of skill on the

part of both parties to be able to choose and customise the resources to their respective teaching and learning processes.

Barreh's (2015), study entitled “Students Attitudes and Perceptions towards the Effectiveness of Mobile” Through the use of SMS and Facebook, learn what students think about the value of mobile learning. This study used quantitative research and a survey design to collect data from 105 respondents who were enrolled in the second-year "Internet Technology" course offered by the Department of Mathematics and Computer Science. Through a questionnaire with closed-ended questions and a five-point Likert scale, the research data was gathered. According to the research, SMS and mobile learning powered by Facebook may be used as supplemental tools to aid students in reaching their objectives.

Alfred (2017), had done research with the topic “The effect of integration of GeoGebra into the teaching of circle geometry on Grade 11 student’s achievement”. In this study, the impact of GeoGebra's incorporation into the circle geometry curriculum on students in Grade 11 was examined. For data collection, two instruments post-test and a questionnaire were used in this study's quasi-experimental, non-equivalent control group design to compare achievement. 47 students made up the sample size for the study, 25 of whom were in the control group and 22 of whom were in the experimental group. The joint theoretical framework for this study was comprised of the action, process, object, and schema (APOS) and Van Hiele theories. The results of this study revealed a significant difference between students who were taught using GeoGebra and those who were taught using the traditional teaching method. As a result, students who were taught using GeoGebra outperformed their peers who were taught using the traditional approach.

Sah (2017), conducted research on the topic “Teacher attitude of media in mathematics’’. This study set out to determine how community school and institutional school math teachers felt about using media to teach math and to compare those feelings. The Kathmandu district community and its institutional secondary schools made up the researcher's sample population for this study. By using the sample random sampling method, he selects 30 mathematics teachers from community schools and 30 mathematics teachers from institutional schools out of 152 and 781, respectively, and uses the purposive sampling technique to select 5/5 teachers for an interview. The information was gathered through interviews, a Likert-scale questionnaire, and observation. Z-test with 0.05 level of significance, mean, variance, standard deviation, and percentage were used to analyze the data. A mixed-methods design was used for the study. He came to the conclusion that both community and institutional school teachers had favorable attitudes towards using media in mathematics instruction and learning. From his observations, he concluded that while their approach to teaching is somewhat different from that of the traditional classroom, it is not entirely more contemporary. It was discovered that the institutional school teacher used media for instruction more frequently than the community schoolteacher. Additionally, he came to the conclusion that teachers' attitudes towards the use of media were viewed as more positive and motivating, which is encouraging for the teaching and learning of mathematics.

In the same way, Danai (2017), carried out a research entitled “effectiveness of information and communication technology (ICT) in teaching Geometry”. The aim of the study was to compare student achievement of students taught using ICT tools and without using ICT tools in order to determine the efficacy of ICT in teaching Geometry at the secondary level. The population was drawn from grade IX

students in private schools in the Kathmandu district during the 2073 academic year. Since the study was experimental, the researcher uses two comparable groups. He was taught for 30 days in two schools, one as a control group (using the conventional method of instruction) and the other as an experimental group (using ICT tools). The hypothesis was tested using a t-test with a 0.05 level of significance after the researcher administered the exam to both groups. He also displays the data in a pie chart and graph. The researcher discovered that through his research. The standard deviation of the experimental group was lower than that of the control group, and the pretest's mean was lower than that of the posttest. In ICT class, the students were more focused, motivated, and engaged on a regular basis. Students in class 9 who received instruction without the use of ICT tools had higher test scores than those who did. In the end, he came to the conclusion that teaching geometry is more effective when ICT tools are used.

In a similar vein Saud (2018), conducted research on the topic “Attitude of students and teachers of using audio-video aids in learning at secondary level in Surkhet district.” This study's objectives were to investigate how students and teachers felt about using audiovisual materials for instruction and learning as well as the difficulties associated with doing so. The primary sample population of the Surkhet district consisted of 100 students and 15 teachers, and the researcher used a survey research design. The sample population was chosen using a stratified random sampling procedure. Where data was gathered using a closed-ended questionnaire. At the 0.05 level of significance, the statistical tools mean, percentage, and chi-square tests were used. According to the results of his study, audio-video is used by both teachers and students to teach and learn. Both the teacher and the students agreed to use audio-video in the classroom because they had favourable views of it.

He added that teachers and students who are motivated to learn the material experience more comfortable, successful, and long-lasting teaching-learning. In the opinions of both students and teachers, audio-visual aids are extremely helpful and lead to higher achievement. I changed the classroom environment and encouraged greater motivation by using the audio-visual aids. His view is that audio-visual aids are crucial to transforming education and creating lasting learning.

Mulenga (2020) presents a dissertation entitled “Is COVID-19 the Gateway for Digital Learning in Mathematics Education?” There are many ways that digital learning has changed education. The study's goal is to provide an answer to the question of whether COVID-19 is the starting point for online mathematics education. This study investigates the use of various social media platforms by potential secondary school teachers in this regard. 102 aspiring secondary educators from Copperbelt University (CBU) provided the data. An approach called cluster analysis was used. Results showed that participants in cluster 2 had higher digital learning in mathematics scores than those in clusters 1 and 3. This is a blatant indication that aspiring teachers are more likely to demonstrate low skill levels in the use of mobile technology and the adoption of social media about mathematics pedagogy during the COVID-19 crisis if they are in clusters with low scores. The outcome displays various patterns. Overall findings, though, suggest that digital learning might be a good way to deal with the COVID-19 closure period.

Magar's (2021), study entitled “Effectiveness of GeoGebra in Learning Geometry at the Undergraduate Level” is conducted with the specific objectives; to compare the achievement of the students taught by using GeoGebra and conventional methods at the undergraduate level and to analyze the student’s engagement in the use of GeoGebra in learning geometry. The study was based on

the quasi-experimental research design on the theoretical basis of the Diffusion of Innovation Theory. The researcher chose two campuses of Kathmandu Valley, Mahendra Ratna Campus and Pashupati Multiple Campus as a sample where Mahendra Ratna Campus was chosen as an experimental group and Pashupati Multiple Campus as a control group. There were 17 students in the experimental group and 13 in the control group. For the experiment, the students of the experimental group were taught by GeoGebra software, and the control group was taught by the conventional method. The data were collected by achievement test, class observation, an interview by open questionnaire, and a Likert questionnaire. The data collected from the achievement test were analyzed through mean, variance, standard deviation, and t-test using Microsoft Excel 2013 whereas the data from the interview were analyzed by using a thematic approach. The researcher fought that the students in the experimental group performed better than the control group. Also, experimental group, students' engagement in the use of GeoGebra was positive. Therefore, GeoGebra was found to a very effective in student achievement in teaching Geometry at the undergraduate level.

Sapkota (2022) researched "Digital Pedagogy in Mathematics Education." This study's goals were "to compare the student's achievement taught by using digital pedagogy and conventional teaching method on teaching geometry at grade X" and "to identify the student's perception towards using digital pedagogy in teaching mathematics at grade X." The connectivity view of learning was the foundation for the study. To determine the efficacy of digital applications in teaching geometry at the secondary level, a pre-test and post-test quasi-experimental research design was used. The experiment was conducted on grade X students from two secondary schools in the Chitwan district, with 18 students from Prabhat

Secondary School serving as the experimental group and 24 students from Sajhapur Secondary School serving as the control group. The researcher used a post-test, a set of questionnaires with Likert five-point scales, a mathematical achievement test, and observation notes to gather data. He came to the conclusion that the experimental group's students outperformed the control group's students using the traditional teaching method. Additionally, the survey's findings indicate that students view digital applications for geometry education favorably.

Theoretical Literature Review

The theories that emerged in teaching and learning are the main subject of this discussion. The researcher applied Vygotsky's Constructivist theory to the students' cognitive development since the topic focused on the effectiveness of digital media in the learning circle. Constructivism is based in part on Vygotsky's theory. Zone of Proximal Development (ZPD), scaffolding or social interaction, and increased interpersonal knowledge are its three main tenets. The zone of proximal development, as defined by Vygotsky (1978), is the distance between the level of potential development as determined by problem-solving in collaboration with more cable peers and the level of actual development as determined by independent problem-solving. In addition, Vygotsky's concept of ZPD suggests scaffolding as an alternative method of instruction (Gredler, 1997). It alludes to the advice offered to help one make sermons for the ZPD. When a tutor (capable peer) guides a student to extend an existing schema into new cognitive territory by taking small steps that the student would not be able to take on their own, this is called scaffolding. The third theme promoted by Vygotsky is that process is the better way to learn from others. Someone who has more knowledge than the learner about a specific task, process, or concept is said to have more knowledge than them. Depending on the circumstance

and the material to be learned, more knowledgeable others may be a teacher, coach, older adult, peers with greater ability, a younger person with greater knowledge, etc.

The Zone of Proximal Development concept and Vygotsky's concept of scaffolding are closely related. The term "scaffolding" describes the temporary assistance provided to a child by a More Knowledgeable Other to enable the child to perform a task until the child is able to do so on their own. Changing the type and amount of support given to a child during a lesson is known as scaffolding. According to Vygotsky (1978), a child learns a lot of crucial information through social interaction with a knowledgeable tutor. The tutor might give the student verbal instructions or serve as an example of certain behaviors. This is referred to as cooperative or collaborative dialogue by Vygotsky.

According to Vygotsky, education should give kids experiences that fit into their ZPD in order to promote and advance their learning. Berk, Winsler, and (1995). In order to effectively develop skills and strategies, the child tries to comprehend the actions or instructions given by the tutor (often the parent or teacher). The child then internalizes the knowledge and uses it to direct or regulate their performance as well as interaction with peers. In the zone of proximal development, he recommends that teachers use cooperative learning activities in which less skilled children learn with the assistance of more skilled peers.

As a result of the ZPD, when learning the fundamentals of mathematics, the more capable students should be able to provide their less capable peers with information and ways to build knowledge, and the more capable students should be able to fill in the gaps in their peers' knowledge. The constructivist theory of social interaction for cognitive development is used in this study. Mathematical concepts can be hard for students to understand in general. This study will introduce the use

of digital media for a learning circle as a scaffold for improving students' mathematics achievement in grade ten.

Conceptual Framework of the Study

This section deals with the conceptual framework for the research. A conceptual framework in a study provides a theoretical foundation and structure for understanding and analyzing research questions and objectives. It outlines the key concepts, theories and relationships that guide the study and help explain the phenomena under investigation. By establishing a conceptual framework researchers can organize their thoughts, identify research gaps and develop hypotheses or propositions to be tested. It acts as the scaffolding for a study, helping researchers to organize their ideas, connect them to existing knowledge, and provide a logical structure for conducting research. The conceptual framework serves as a roadmap that guides the research process, identifies key variables and their relationships, and provides a theoretical foundation for the study. It helps researchers make informed decisions about data collection, analysis, and interpretation of the results. In this study, the use of Mathematical apps like GeoGebra and Powerpoint is the central point of the teaching circle. GeoGebra and Powerpoint presentations give a chance to internalize new knowledge and experience to each student.

Briefly, the whole study followed the following framework.

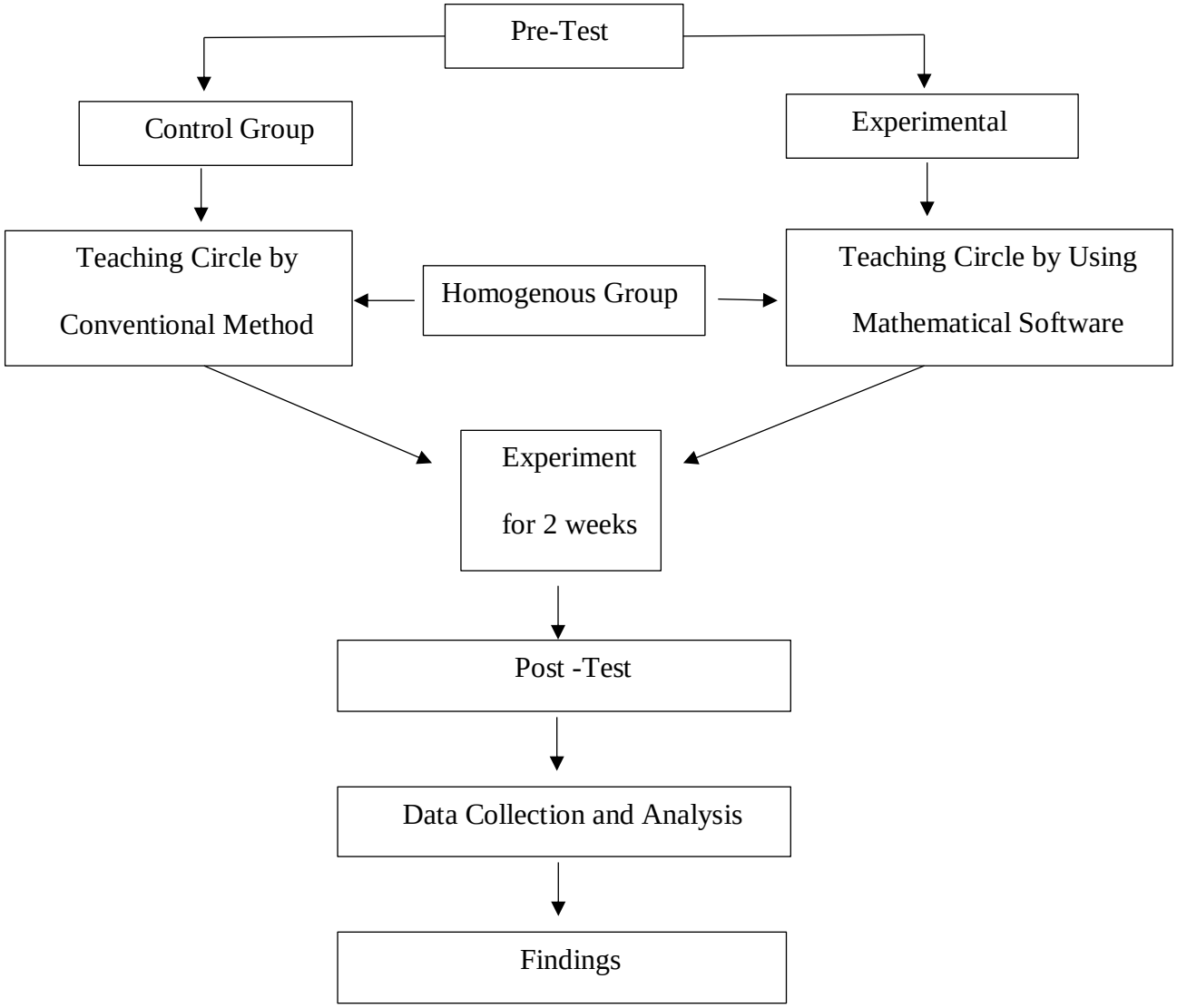


Figure 1: Conceptual Framework of the Study

Chapter III

METHODS AND PROCEDURES

The most important part of the research work is the methodology. So this chapter focused on research methodology. It becomes a path for systematically achieving the study's goals. Also, this chapter gives an overview of the study's findings based on the conceptual framework, as well as clear and practical guidance on how to handle the research questions to meet the objectives. Specifically, it described; the research design, the respondents of the study, the population sample, the determination of validity and reliability of the instrument, pilot testing, data collection tools, data collection and analysis procedure ethical considerations.

Research Design

The design of the research process is known as the research design. The complete blueprint for the whole study is the research design. In actuality, it is an accurate blueprint for how to do the experiment, test the hypothesis, and analyze it. Given the data that was obtained and a summary of the results, it is apparent that the study used a quantitative methodology.

The qualitative, quantitative, and mixed research designs are the three different categories. This study used a quantitative research approach. It is founded on a non-equivalent pre-test and post-test design. The impact of digital media in learning circles for students in grade ten was examined using this design. A test of academic achievement was given to both the experimental and control groups. For two weeks, the experimental group experienced an intervention in which they participated in learning circles using digital media, while the control group participated in learning circles using traditional methods. The researcher then

conducted a post-test using a five-point Likert scale to assess student opinions on the use of teaching circles and compare the effects of digital media. After the post-test for both groups, the perception of the experimental group had been collected to determine whether the usage of digital media in instruction had positive effects on the experimental group students. The table that follows displays many groups that are described in the methods indicated below.

Table 1: Design of the study

Groups	Pre-test	Treatment	Post-test
Experimental	P_1	T_1	P_3
Control	P_2	T_2	P_4

The experimental group, on the other hand, received treatment with digital media assistance while the control group did not. The pre-test for the experimental group and the control group, respectively, was represented by $\boldsymbol{P_1}$ and $\boldsymbol{P_2}$, and the post-test for the experimental group and the control group, respectively, by $\boldsymbol{P_3}$ and $\boldsymbol{P_4}$. The experimental group, on the other hand, received treatment with digital media help while the control group received without.

Research site

A research site is a location where research is done. Universities, hospitals, research facilities, and field research places are examples of common research locations. Since the researcher conducted the research using an experimental design. To experiment, a researcher selected two schools in the Hatuwagadhi, Bhojpur district: Shree Janajyoti Secondary School, Patlepani, and Shree Prajatrantra Secondary School, Homtang. This spot was picked by a researcher because of its familiar surroundings.

Population and Sample of the Study

In this study, students from two government schools in the district of Bhojpur were selected as research subjects. Since all tenth-grade students from both schools were selected as the sample, they were split into two groups: the experimental group and the control group. The study's sample consisted of two schools: the Shree JanaJyoti Secondary School in Hatuwagadhi Rural Municipality, and the Shree Prajatrantra Secondary School. Using a coin flip, Shree JanaJyoti Secondary School was chosen as the experimental site between the two schools, while Shree Prajatrantra Secondary School served as the control site. The sampling sizes for the experimental and control groups were 22 and 27, respectively. The following table displays a sample:

Table 2: Sample Composition

Groups	Number of students	No. of boys	No. of girls
Experimental Group	22	5	17
Control Group	27	12	15
Total	49	17	32

The Variable of the Study

The variable is a type of concept or characteristic that can take on different values or be divided into categories. Four variables define in this study as follows,

Dependent Variable. Other factors that are measured affect the variable. As a result of the experimental manipulation of the independent variables, changes in these variables are anticipated. Students' perceptions of using digital media in the

learning circle and their performance on achievement tests (post-test) are regarded as dependent variables in this study.

*Independent Variable***.** The variable you are trying to measure that is stable and unaffected by the other variables. It describes the aspect of an experiment that the researcher systematically modifies. Digital media usage during the learning circle is regarded as the independent variable in this study.

Extraneous Variable. It is necessary to control all other variables that could cause the dependent variable to change. Extraneous variables are the name for these additional variables. Teachers, achievement tests, instructional materials, intelligence, anxiety, the home environment, the school environment, and student labor are all regarded as unimportant variables in this study.

Control Variable. During an experiment, a control variable stays the same. Although it is not a component of an experiment, it is significant because it may have an impact on the outcome. Given that the researcher split the two public schools into an experiment and a control group. The same instruction was given to both groups on the same subject and material. The researcher chose two schools that were conveniently spaced apart from one another to control how the students from the two groups interacted. The researcher only used conventional teaching methods and limited the use of digital teaching tools in the control group. Similar to this, the experiment group only received digital materials while the researcher maintained control over the conventional teaching method.

Data Collection Tools

To finish this activity and this study on time, research tools are needed. A questionnaire, attitude scale, interview schedule, checklist, rating scale, and achievement exam are just a few of the tools or instruments that are available for

quantitative research. The researcher used an achievement test and a questionnaire with a five-point Likert scale, respectively, to achieve the first and second objectives. The researcher used an achievement test as a pre-test and post-test for both groups. To find out the students' opinions, the researcher used a questionnaire with a five-point Likert scale.

Achievement Test

Since the primary objective of the study was to compare student success between the experimental and control groups, the achievement test served as the primary research instrument. The researcher developed the pre- and post-tests. This test consists of twenty-five multiple-choice questions, each of which is worth one mark. A pre-test and a post-test were completed before and after the experiment, respectively. Both tests contained the same questions with the same marks. The experiment lasted for a total of two weeks. The pre-test and post-test questions can be found in Appendix F.

Questionnaires

The achievement test was used as the main research instrument because comparing student success between the experimental and control groups was the study's main goal. The pre- and post-tests were created by the researcher. There are 25 multiple-choice questions on this test, and each one is worth one mark. Prior to and following the experiment, pre- and post-tests were completed. The identical questions and marks were on both tests. Two weeks in total passed during the experiment. Appendix F contains the pre-test and post-test questions.

Observation

The use of digital media observation in the classroom allowed researchers to observe how the students interacted and worked together as they studied geometry. Throughout the experiment, the researcher observed each student's activity and evaluated each person's participation, feelings, enjoyment, and challenges with both groups later. The observation includes student opinions on using digital tools to teach circles.

Validity and Reliability of Tools

Reliability is the internal consistency of a test, whereas validity is compliance with external standards. According to Freeman (1965), a system's reliability is determined by how consistently it produces results after repeated testing. It was more crucial to ensure the test's high quality that the questions accurately assessed the skills and abilities suggested by the specified learning outcomes. With the assistance of the subject instructor, export, and supervisor, the validity of the test questionnaire's achievement was verified.

In this study, the test's reliability was important, so before administration, each test item was piloted and its reliability was assessed. In this study, 22 students in grade ten at Shree Janajyoti Secondary School Hatuwagadi-8, Bhojpur, participated in the piloting of the mathematics achievement test. Analysis was done on the student's responses. In this study, the reliability coefficient for total achievement was 0.64 and 0.66(See Appendix C and F), and expert opinion was used to establish the content validity of the achievement test items.

Data Collection Procedure

The researcher visited each sampling school for this purpose and returned with a letter of request, an achievement test, and other materials. To experiment, the researcher chose two secondary schools. The subject teacher and principal were then asked for permission to experiment by the researcher. By tossing the coin, the researcher divided the two groups of students at the schools into experimental and control groups, respectively. The researcher then took the pre-test from both groups. Digital media-assisted teaching techniques were used in the experimental group, while traditional methods were used in the control group. Following a two-week course of therapy for each group, the researcher administered a post-test to each group, using similar multiple-choice questions. Using Microsoft Excel 1013, the researcher compared the results of the post-test and pre-test using mean, standard deviation, and t-testing.

Following the treatment of the experiment group, the researcher interviewed students to find out how they felt about using digital media in the teaching and learning process. The students' perceptions of the usage of digital media in circle learning were evaluated using a five-point Likert scale in the questionnaire. The questionnaire was given to each student separately, and they were asked to mark one of the following options: strongly agree, agree, neutral, disagree, and strongly disagree. These responses indicated 5, 4, 3, 2, and 1 points, respectively. Following the gathering of survey responses, the student's responses were categorized to fit the statistical tests.

Data Analysis Procedure

Data collection and description were modeled around an interpretive phenomenological analysis framework as the first step in the data analysis process (Smith et al., 2012).

I used a t-test after the data collection process to analyze the results. In this study, I examined the standard deviation and mean achievement scores between the experimental group and the control group. I thus used the t-test to compare the educational achievements of the two groups. I calculated the t-test using Microsoft Excel 2013 as well.

In addition, the questionnaire related five points to analyze the student's view on digital media in the teaching circle. Only the students in the experimental group used the Likert scale. Then students' responses were calculated as mean, standard deviation, and percentage (Appendix O). Finally, the result was analyzed by using Microsoft Excel 2013 and interpreted it.

Ethical Consideration

The most important concept to understand when we are on the field is ethical consideration. Understanding ethical issues allows us to collect accurate data from our responders. To collect data from the responder, a researcher observes some ethical principles,

- The researcher first requested approval from the school administration.
- Then, the researcher informed the corresponding teacher and students about the research.
- The respondents had comfortable with the researcher.
- The answers provided by respondents were taken seriously by the researcher.

Chapter IV

ANALYSIS AND INTERPRETATION OF DATA

The structure and development of connections between the many concepts and themes are the topics of this chapter. The word “analysis” means breaking a whole into meaningful parts/components (Sharma, 2011). Data interpretation and analysis are the main topics of this chapter. The topic "Effectiveness of Digital Media in Learning Circles at Grade Ten" was the subject of an experimental study. The objectives of the study were ‘Comparing the achievement of students taught by using Digital Media and without Digital Media in the teaching circle’ and ‘Analyzing the student's view on Digital Media in the learning circle at the secondary level. For the study, a pre-test and post-test quasi-experimental design was chosen. The group was compared using a pre-test. The purpose of the study was initially achieved using the students' post-test achievement test. And questionnaires based on the Likert scale have been used for the study's second objective. To analyze the student's test results, Microsoft Office Excel 2013 was used. Additionally, the opinions of the students towards digital media were analyzed using Microsoft Office Excel 2013 for mean, standard deviation, and variance using a Likert scale analysis. The data are arranged, tabulated, analyzed, and interpreted as follows to achieve our objectives.

Comparison of Achievement of Students in the Pre-test

A researcher picked two government schools from Bhojpur to collect data from. Following the group divide, the same questions from the pre-test were presented to both groups. The results of the pre-test for each student in each group are shown in Appendix H. Here, I present the score's mean, standard deviation, variance, and t-value and explain the outcome.

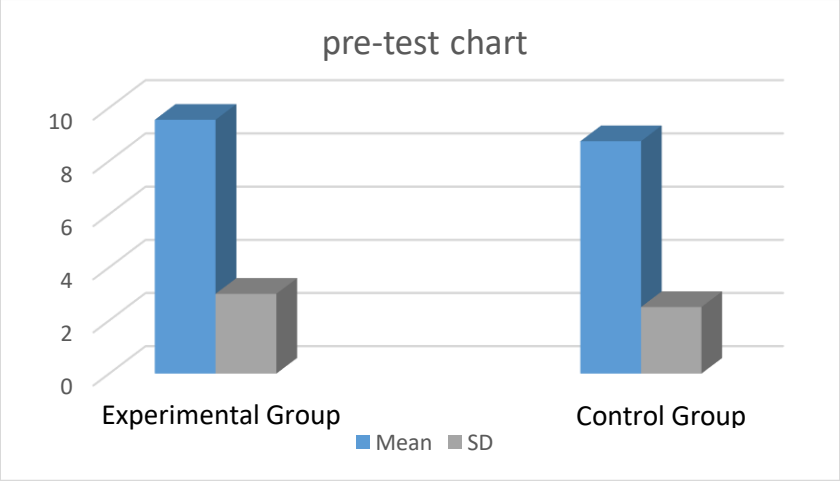


Figure 2: Student's achievement in the pre-test

The following diagram (Figure 2) shows the mean and standard deviation, scores attained by the students of each group on the achievement test (pre-test). For comparison, this diagram is more interesting. This demonstrates that there was no difference in the pre-test achievement scores between the experimental and control groups of students.

Table 3: Result of the pre-test

	Group	
	Experimental Group	Control Group
Sample	22	27
Mean	9.55	8.741
S.D.	3.004	2.51
Pooled Variance	2.74	
Calculated t-value	1.03	
Tabulated t-value	2.015	
Decision	There is no significant difference.	

The above table presents the mean and standard deviation of both groups on the pre-test. There were 22 students in the experimental group and 27 students in the control group. Here, the mean score of the experimental group was 9.55, and the control group was 8.741, thus the mean of both groups was closed. Also, the standard deviation of the experimental and control groups were 3.004 and 2.51 respectively. The researcher applied a t-test to test the hypothesis stated in chapter-1. The value of calculated t-value and tabulated t-value are 1.03 and 2.0415 (two-tailed tests at 0.05 confidence level) respectively. Thus, the null hypothesis is not rejected. Consequently, a significant difference did not exist between the mean achievement of students in both control and experimental groups on the pre-test

Comparison of Achievement of Students in the Post-test

After the experimental phase, the researcher conducted a post-test on the experimental group and the control group. During the experimental phase, a post-test was conducted after a two-week delay. The post-test scores of the experimental and control group students are shown in Appendix J, and Table 4 and Figure 3 below show a statistical calculation summary for both groups on the post-test.

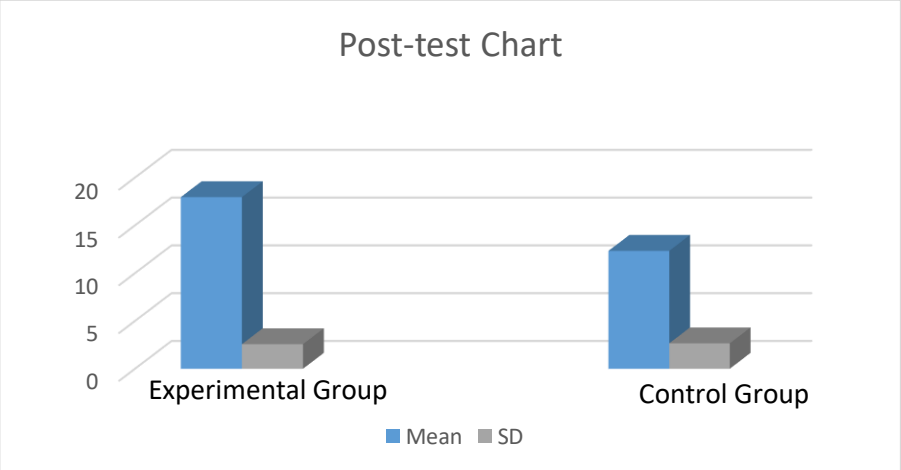


Figure 3: Student's achievement in post-test

The following diagram (Figure 3) shows the mean and standard deviation, scores attained by the students of each group on the achievement test (post-test). For comparison, this diagram is more interesting. This demonstrates that there was a difference in the post-test achievement scores between the experimental and control groups of students.

Table 4: Result of post-test

	Group	
	Experimental Group	Control Group
Sample	22	27
Mean	17.955	12.33
S.D.	2.57	2.66
Pooled Variance	9.03	
Calculated t-value	2.163	
Tabulated t-value	1.681	
Decision	There is significant difference.	

The mean, standard deviation, and variance for both groups on the post-test are displayed in the table. There were 22 in the experimental group and 27 students in the control group. Here, the mean score of the experimental group was 17.955 and the control group was 12.33, thus the mean of both groups was not so close. Also, the standard deviation of the experimental and control group were 2.57 and 2.66 respectively. The researcher applied a t-test for pooled sample variance to test the hypothesis stated in Chapter I. The value of the calculated t-value and tabulated t-

value are 2.163 and 1.681 (one-tailed test at 0.05 confidence level). Thus, the null hypothesis is rejected. Consequently, the alternative hypothesis is accepted and thereby concluding that the mean achievement of students of the experimental group is higher than the control group on the post-test.

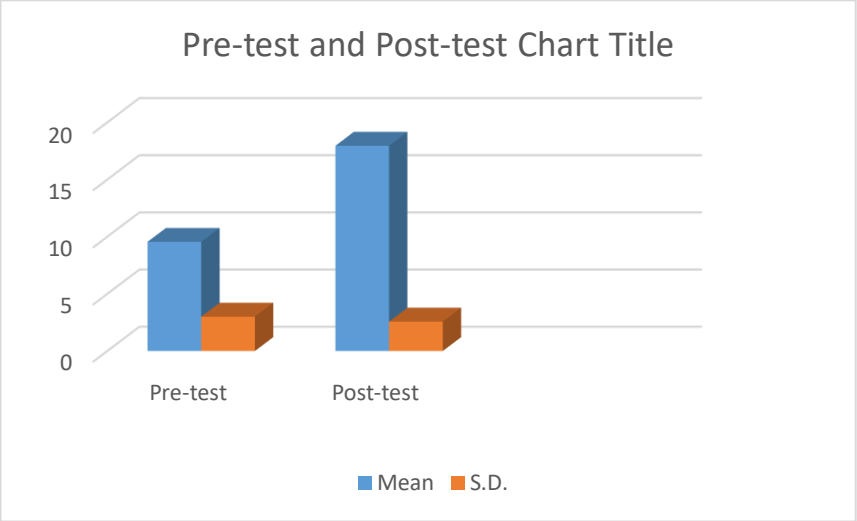


Figure 4: Student's achievement of pre-test and post-test in experimental group

The students in the experimental group's mean and standard deviation are displayed in the diagram below (Figure 4). This shows that the scores of the experimental group of students differed in both the pre-test and post-test.

Table 5: Comparison of mean achievement of pre-test and post-test

Experimental Group	Mean	S.D.
Pre-test	9.55	3.004
Post-test	17.955	2.57

The above table showed the mean and standard deviation of the experimental group according to the pre-test and post-test. Here the experimental group obtained a mean score was 9.55 on the pre-test while obtained a mean score was 17.955 on the post-test. This indicated that the students achieved a higher mean score in the post-test in comparison to the pre-test. The standard deviation of the experimental group on the pre-test and post-test were 3.004 and 2.57 respectively.

Result of Student's Perceptions in Learning Circle by Using Digital Media

The fifteen items made up a questionnaire about students' perceptions that was developed using a five-point Likert scale. Only the experimental group received the questionnaire, which was intended to find out what they thought about using digital media in learning circles. The outcome is determined by a statistical formula. Table 6 below displays the findings about the student's perceptions.

Table 6: The perceptions of students about using digital media in a learning circle

S.N	Items	Mean	S.D
1.	I enjoy using digital tools in mathematics.	4.05	0.58
2.	I used digital tools to understand a lot of circle concepts.	3.364	1.1
3.	I was excited when using digital media.	4.091	1.11
4.	I didn't first enjoy using digital media in the teaching circle.	2.591	1.01
5.	Using digital tools makes geometry class boring.	2.364	0.902
6.	I gained a lot from the interactions between the teacher and student's when they used digital tools.	3.82	0.7
7.	I am better able to understand the concept of a circle because of digital tools.	3.91	0.61
8.	I believe that using digital tools is important while teaching mathematics.	4.05	0.899
9.	I consider creativity and critical thought when using digital tools.	3.32	1.32
10.	I'm pleased if the teacher uses digital tools to teach mathematics.	4.182	0.96
11.	I was satisfied with the use of digital tools.	4	0.76
12.	Digital tools encourage to me participate in class activities.	3.455	0.86
13.	Digital tools can help to increase my achievement in mathematics.	4.23	0.69
14.	I was successful in making stronger connections between my prior knowledge and the new knowledge.	3.955	1.05
15.	I like to use digital media in mathematics.	3.82	1.14

According to Table 6, the item "Digital tools can help to increase my achievement in mathematics" had a mean of 4.23 and a standard deviation of 0.69. In

contrast, the item "Using digital tools makes geometry class boring" and its standard deviation of 0.902 obtained the lowest mean of 2.364. The mean values for other components were nearly the highest.

According to Table 6's data, the vast majority of students had positive opinions on using digital media in learning circles. It can be noticed that more respondents think that learning through digital media could generally result in better learning experiences. The majority of respondents agreed and strongly agreed with the mean of 4.23 for item 13, but for the negative item 5 the majority of respondents disagreed and strongly disagreed with the mean of 2.364. They believed that using digital tools is important while teaching mathematics and were able to better able to understand the concept of the circle because of digital tools. It can be concluded that the using of Digital media tools can increase students' confidence, interest, understanding level, creativity, skill, thinking capacity and motivation in learning mathematics.

Students responded well to the given item as a result. They are confident in their ability to comprehend the concept of a circle, solve circle-related issues, and prove theorems using digital tools like GeoGebra and PowerPoint. The findings of this study show a statistically significant difference between the experimental and control groups' post-test average accomplishment scores. These results imply that the use of digital media in the teaching and learning process is very beneficial. Additionally, the emergence of technological tools like PowerPoint and GeoGebra has raised student achievement in the learning circle. Overall, the results above demonstrate that using digital media during instruction is more effective than not using it.

CHAPTER V

FINDINGS, CONCLUSION, AND IMPLICATION

This chapter focuses on drawing facts and conclusions from the topic in the previous chapter. It has some implications for future study as well as the field of education, in addition to its results and conclusions.

Findings of the Study

The effectiveness of digital media in teaching circles at grades X was determined by accepting or rejecting the significance of the null hypothesis that was created for the study. A questionnaire based on a Likert scale was created to assess student opinions on the use of digital media in teaching circles at grades X. The results of the study also demonstrate how the use of digital media can produce dynamic environments for learning mathematics where students actively participate. The major findings of the study were;

- In the pre-test, there was no statistically significant difference between the average performance of the experimental group of students and the control group of students.
- In the post-test, there was a statistically significant difference between the average performance of the experimental group of students and the control group of students.
- Experimental group members performed on average better than control group members.
- According to the findings, digital media has a positive impact on learning and achievement among students.
- According to the findings, the majority of students see the use of digital media in learning circles strongly.

- The conclusion is that digital media increases interest and enjoyment in the classroom.
- The conclusion is that using digital media in teaching circles to impart knowledge is more efficient than using traditional methods.

Conclusions

The purpose of the study, "Effectiveness of Digital Media in Learning Circle at Grade Ten," was to determine whether using digital media in learning circles results in better student achievement and perceptions of the medium than using traditional methods. The study's design was quasi-experimental. The goal of this study was to determine the value of digital media in learning circles for tenth grade students. After two weeks of instruction at Shree Janajyoti Secondary School using GeoGebra and PowerPoint software, the control group received the same instruction at Shree Prajatrantra Secondary School using the traditional method. I compile data using five-point Likert scales and tests of mathematical proficiency. According to Chapter 1, there were two hypotheses created for this study. The same questionnaire was used for both groups' pre-testing prior to the experiment. Pre-test results revealed that there was no discernible difference between the two groups' mean scores. A post-test with the same question was administered to both groups at the conclusion of the experimental phase. The outcome demonstrated that students who were taught GeoGebra and PowerPoint performed better on the Student Achievement Test in Circle post-test than on the pre-test. Also, this research is one of the most valuable in mathematics teaching. Digital media has a big part to play in the improvement of mathematics education outcomes. In this study, the achievement of the experimental group was better than that of the control group. Students have positive opinions on the use of digital media in the classroom. The use of digital media helped students

visualize and understand the circle concept, theorems, and experimental proof. Additionally, the use of digital media improved overall student achievement, engagement, and motivation. Students are actively engaged in classroom discussion and problem-solving using digital tools. The student's ZPD has been affected by digital media, and their level of understanding is increasing. Students' hidden talents were made visible because of digital media. Using digital media in the teaching circle is the best strategy for teaching geometry for better construction and better understanding than the traditional approach.

Implications of the Study

This study was limited to the effectiveness of digital media in teaching circles at grade ten only. It focused on students' achievement in limited topics. It was done in a small sample size. Many areas are remaining for research related to digital media.

Mathematics is a technical subject. In Nepal, it has been a required subject for students in grades 1 through X. The age of digital media is the twenty-first century. Digital media should be used as a teaching tool. This study will therefore be helpful for mathematics educators, educational institutions, researchers, curriculum designers, and policymakers.

Based on the findings of this study, the study recommends further implications as follows:

- To test the effectiveness of Digital Media at the Basic Level of Schools in Nepal.
- To find the effectiveness of digital software in teaching mathematics at the School level

Reference

Alfred, C. (2017). *The effect of integration of GeoGebra into the teaching of circle geometry on Grade 11 student's achievement*. South Africa.

Barreh, K.A. (2015). Student's attitudes and perceptions towards the effectiveness of mobile learning in University of Djibouti. *International Journal of Education and Research,* 3,601-612.

Berk, L., & Winsler, A. (1995). *Scaffolding children's learning: Vygotsky and early childhood learning.* Washington, DC: National Association for Education of Young Children.

Campoy, R. (1992). The role of technology in the school reform movement. *Educational Technology*, 32(8), 17-22.

Creswell, J. W. (2009). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research*. (6th edition).Boston: Pearson.

Danai, Y. (2017). *Effectiveness of information communication and technology (ICT) in teaching Geometry.* Kirtipur, Kathmandu.

Das, A. (2020). Impact of Digital Media on Society. *International Journal of Creative Research Thought*. Volume (8), 2320-28820.

Dogan, M. (2011). *The role of dynamic geometry software in the process of learning: geogebra example about triangles.* Retrieved January 30, 2015

Fluck, A. (2010). From Integration to Transform. In A. McDougall, J. Murnane, A. Jones & N. Reynolds (Eds.), *Researching IT in Education Theory, Practice and Future Direction*. London and New York: Routledge.

Freeman, F.S. (1965). *Psychological testing* (3rd Ed.). New Delhi: Oxford and IBH Publishing co. Ltd.

Leong, K.E. (2013). Impact of geometer's Sketchpad on student's achievement in graph functions. *The Malaysian Online Journal of Educational Technology*, 1(2), 19-31.

Magar, B. (2021). *Effectiveness of GeoGebra in learning Gemetry at Undergraduate Level*. Kathmandu: Kritipur.

Ministry of Education, (2016- 2023). *School Sector Development Plan*. Kathmandu: Author.

Mulenga, E.M (2020*). Is COVID-19 the gateway for digital learning in mathematics education, research article,* University of Valladolid, Spain.

Nayak, P. *Role of technology in teaching and learning mathematics*.

NCTM. (2000). *Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Pannen, P. (2013). *Integrating Technology in Teaching and Learning Mathematics.* Ministry of education and culture, Indonesia.page (1-15).

Rahman, S.A., Ghazali, M., Ismail, Z. (2003) Integrating ICT in Mathematics Teaching Methods Course: How Has ICT Changed Student Teachers' Perception about Problem Solving. *Proceedings of the International*

Conference: *The Decidable and the Undecidable in Mathematics Education*. Brno, Czech Republic.

Sah, S. K. (2017). *Teachers attitude of media in teaching mathematics.* Unpublished Master's Thesis, Department of Mathematics Education T.U. Kirtipur, Kathmandu.

Sanders, C. V. (1998). Geometric constructions: visualizing and understanding geometry. *Mathematics Teacher*. 91(7), 554-556.

Sapkota, S. (2022). *Digital Pedagogy in Mathematics Education*. Kritipur Nepal.

Saud, D. B. (2018). *Attitude of students and teachers of using audio-video aids in learning on secondary level at Surkhet district.* Kirtipur, Kathmandu.

Serin.H. (2018). Perspective on teaching geometry. *Journal of Education and Training*, Volume (5).

Sharma, L. N. (2011). *Qualitative research*. Kathmandu, Nepal: Paluwa Prakashan Pvt. Ltd.

Smith, J.A.; Flowers, P. and Larkin, M. (2012). *Interpretive Phenomenological Analysis: Theory, Method and Research*. Sage: London.

Timilsena, T. R. (2017). *Attitude of teachers of ICT in teaching mathematics.* Kirtipur, Kathmandu.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press

Yusof, Y. (2010). *The Development of Instructional Module of Hybrid Approach Using Collaborative and Metacognitive Strategy as an Alternative Approach to Help Improving Generic Skills among Students in Malaysian Polytechnics*.

Appendix A

Effectiveness of Digital Media in Learning Circle at Grade Ten

Date:

Respected Sir

…….School, Bhojpur

I am from the Central Department of Mathematics Education, T.U. Kritipur to conduct research on " Effectiveness of Digital Media in Learning Circle at Grade Ten", which is for the practical fulfillment of the requirements for the degree of Master of Education. To complete this research, Researcher has planned to include this school in research work for two weeks. Also, the researcher has prepared some questionnaire which is going to present to students in grade ten. The researcher is very thankful for your valuable co-operation. This program is only for the research purpose.

The researcher has attached the tools along with this letter.

Researcher

Bidhan Magar

Appendix B

Experimental Group																		
	Upper 27%							Lower 27%										
Q.N/S.N	1	2	3	4	5	6	Total	17	18	19	20	21	22	Total	Grand Total	P(%)	D	Remark
Q1	1	1	1	1	0	1	5	1	1	0	1	0	1	4	9	86.363636	0.166666667	Reject
Q2	1	1	1	1	1	1	6	0	0	1	1	1	0	3	9	68.181818	0.5	Accept
Q3	1	1	1	0	1	1	5	1	1	1	0	0	0	3	8	68.181818	0.333333333	Accept
Q4	1	1	1	1	1	1	6	0	0	1	1	1	0	3	9	72.727273	0.5	Accept
Q5	1	1	1	1	1	1	6	1	1	1	1	0	1	5	11	81.818182	0.166666667	Reject
Q6	1	1	1	1	1	1	6	1	1	0	0	1	1	4	10	72.727273	0.333333333	Accept
Q7	1	1	0	1	1	1	5	1	0	1	1	1	0	4	5	68.181818	0.166666667	Reject
Q8	1	1	1	1	1	1	6	1	1	0	0	0	1	3	4	77.272727	0.5	Accept
Q9	1	1	1	0	1	1	5	0	0	0	1	1	0	2	3	68.181818	0.5	Accept
Q10	1	1	1	1	1	1	6	1	1	0	0	1	1	4	10	72.727273	0.333333333	Accept
Q11	1	1	1	1	1	1	6	1	1	1	1	0	0	4	10	77.272727	0.333333333	Accept
Q12	1	1	1	1	1	1	6	1	0	1	1	1	1	5	11	86.363636	0.166666667	Reject
Q13	1	1	1	1	1	0	5	1	1	0	0	0	0	2	7	68.181818	0.5	Accept

Q14	1	0	0	1	0	0	2	1	1	0	0	1	0	3	5	31.818182	-0.166666667	Reject
Q15	1	1	1	1	1	1	6	0	1	1	1	0	0	3	9	86.363636	0.5	Accept
Q16	1	1	1	1	0	0	4	1	1	1	0	1	1	5	9	54.545455	-0.166666667	Reject
Q17	1	1	1	1	1	0	5	0	1	1	0	0	1	3	8	63.636364	0.333333333	Accept
Q18	1	1	1	1	1	1	6	1	1	1	1	1	0	5	11	86.363636	0.166666667	Reject
Q19	0	0	1	1	0	0	2	0	0	1	0	1	1	3	5	45.454545	-0.166666667	Reject
Q20	1	1	1	1	1	1	6	0	1	1	1	0	0	3	9	72.727273	0.5	Accept
Q21	1	1	0	1	1	1	5	0	0	0	1	1	1	3	8	72.727273	0.333333333	Accept
Q22	1	1	1	0	1	1	5	1	1	1	0	0	1	4	9	72.727273	0.166666667	Reject
Q23	1	1	1	1	1	0	5	1	0	0	1	1	1	4	9	77.272727	0.166666667	Reject
Q24	1	1	0	0	1	1	4	1	1	1	1	1	1	6	10	86.363636	-0.333333333	Reject
Q25	1	1	1	0	0	1	4	0	0	0	1	1	1	3	7	77.272727	0.166666667	Reject
Wright Ans.	24	23	21	20	20	19		16	16	15	15	15	14					
Even T	12	11	10	10	10	10		9	9	8	6	9	7					
Odd T	12	12	11	10	10	9		7	7	7	9	6	7					

Appendix C

Computation of Reliability Coefficient of Experimental Group

S.N.	Odd item (X)	Even item (Y)	X^2	Y^2	XY
1	12	12	144	144	144
2	12	11	144	121	132
3	11	10	121	100	110
4	10	10	100	100	100
5	10	10	100	100	100
6	9	10	81	100	90
7	7	9	49	81	63
8	7	9	49	81	63
9	7	8	49	64	56
10	9	6	81	36	54
11	6	9	36	81	54
12	7	7	49	49	49
	$\sum X = 107$	$\sum Y = 111$	$\sum X^2 = 1003$	$\sum Y^2 = 1057$	$\sum XY = 1015$

$$\text{Correlation Coefficient}\left(r_{XY}\right) = \frac{N\sum XY - \sum X.\sum Y}{\sqrt{N\sum X^2 - \left(\sum X\right)^2}\sqrt{N\sum Y^2 - \left(\sum Y\right)^2}}$$

$$= \frac{12\times1015 - 107\times111}{\sqrt{12\times1003 - (107)^2}\sqrt{12\times1057 - (111)^2}}$$

$$= \frac{12180 - 11877}{24.23\times19.053}$$

$$= \frac{303}{461.54}$$

$$= 0.66$$

Appendix D

Control Group																				
	Upper 27%								Lower 27%								Grand Total	P(%)	D	Remark
Q.N /S.N	1	2	3	4	5	6	7	Total	21	22	23	24	25	26	27	Total				
Q1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	14.815	-0.14	Reject
Q2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.111	0	Reject
Q3	1	1	0	0	0	0	0	2	0	0	1	1	0	0	0	2	4	18.519	0	Reject
Q4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	3.7037	-0.14	Reject
Q5	1	1	1	1	1	1	1	7	0	0	0	0	1	0	1	2	9	77.778	0.714	Accept
Q6	1	1	1	1	1	0	1	6	1	1	1	1	0	1	1	6	12	77.778	0	Reject
Q7	1	1	1	1	1	1	0	6	0	1	0	0	1	1	1	4	10	70.37	0.286	Reject
Q8	1	1	1	1	1	1	1	7	1	1	0	0	0	1	0	3	10	74.074	0.571	Accept
Q9	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	2	3	22.222	-0.14	Reject
Q10	1	1	1	1	1	1	1	7	1	0	1	0	1	0	1	4	11	70.37	0.429	Accept
Q11	1	1	1	1	1	1	0	6	1	0	0	0	1	0	1	3	9	59.259	0.429	Accept
Q12	1	1	1	0	0	1	1	5	1	1	1	0	0	1	1	5	10	74.074	0	Reject
Q13	1	1	1	1	1	1	1	7	0	1	0	0	1	1	0	3	10	70.37	0.571	Accept

Q14	0	0	0	0	0	1	1	2	0	0	0	0	0	0	1	1	3	22.222	0.143	Reject
Q15	1	1	1	1	1	0	0	5	1	0	1	1	0	1	1	5	10	66.667	0	Reject
Q16	1	1	0	0	0	0	0	2	0	1	1	0	0	0	0	2	4	33.333	0	Reject
Q17	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	2	18.519	0	Reject
Q18	1	1	1	1	1	1	1	7	0	0	0	0	1	1	0	2	9	66.667	0.714	Accept
Q19	1	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	2	18.519	0.286	Reject
Q20	1	1	1	1	1	1	0	6	1	0	1	1	1	0	0	4	10	66.667	0.286	Reject
Q21	1	1	1	1	1	1	1	7	1	1	0	1	1	0	0	4	11	70.37	0.429	Accept
Q22	1	1	1	1	1	0	0	5	0	1	1	0	1	0	0	3	8	66.667	0.286	Reject
Q23	1	1	0	1	0	1	1	5	1	1	0	1	0	0	0	3	8	59.259	0.286	Reject
Q24	1	1	1	1	1	1	1	7	0	0	1	1	0	1	0	3	10	51.852	0.571	Accept
Q25	1	1	1	1	1	1	1	7	0	0	1	1	0	1	0	3	10	48.148	0.571	Accept
Total	20	18	15	15	14	14	14		10	10	10	10	10	9	8					
Even T	9	9	8	7	7	7	7		5	5	7	3	5	5	4					
Odd T	11	9	7	8	7	7	7		5	5	3	7	5	4	4					

Appendix E

Computation of Reliability Coefficient of Control Group

S.N.	Odd item (X)	Even item (Y)	X^2	Y^2	XY
1	11	9	121	81	99
2	9	9	81	81	81
3	7	8	49	64	56
4	8	7	64	49	56
5	7	7	49	49	49
6	7	7	49	49	49
7	7	7	49	49	49
8	5	5	25	25	25
9	5	5	25	25	25
10	3	7	9	49	21
11	7	3	49	9	21
12	5	5	25	25	25
13	4	5	16	25	20
14	4	4	16	16	16
	$\sum X = 89$	$\sum Y = 88$	$\sum X^2 = 627$	$\sum Y^2 = 596$	$\sum XY = 592$

$$\text{Correlation Coefficient}\left(r_{XY}\right) = \frac{N\sum XY - \sum X.\sum Y}{\sqrt{N\sum X^2 - \left(\sum X\right)^2}\sqrt{N\sum Y^2 - \left(\sum Y\right)^2}}$$

$$= \frac{14\times592 - 89\times88}{\sqrt{14\times627 - (89)^2}\sqrt{14\times596 - (88)^2}}$$

$$= \frac{8288 - 7832}{29.275\times24.495}$$

$$= \frac{456}{717.09}$$

$$= 0.64$$

Appendix F

Multiple-choice Items for Pre-Test and Post-Test

Com: Compulsory Mathematics Full Marks: 25

Class: X Time: 25 min

Tick the best answer to the following questions. (25 ×1=25)

1. Which ICT app can be used to visualize the relationship between the circumference and the radius of a circle?

   a) GeoGebra

   b) Microsoft Excel

   c) Paint

   d) Adobe Photoshop

2. Which ICT app allows you to apply formulas to get a circle's area?

   a) Paint

   b) Microsoft Excel

   c) GeoGebra

   d) Adobe Photoshop

3. What form is the sun most frequently represented by?

   a) Square

   b) Triangle

   c) Circle

   d) Rectangle

4. In a computer drawing program, what tools are normally used to draw a perfect circle?

   a) Brush tool

   b) Pencil tool

c) Circle tools

d) Eraser tool

5. What is the circumference of a circle with a radius of 5 cm?

   a) 31.4cm ^{2}

   b) 32 cm

   c) 32 cm ^{2}

   d) 31.4 cm

6. What is the diameter of a circle whose circumference is 44 m?

   a) 14 cm

   b) 14 m

   c) 7 cm

   d) 7 m

7. What is the formula for the circumference of the circle?

   a) $C = \pi r$

   b) $C = 2\pi d$

   c) $C = 2\pi r$

   d) $C = \pi r^2$

8. What is the formula to calculate the area of a circle?

   a)$A = \pi r^2$

   b) $A = \pi r$

   c) $A = \pi d^2$

   d) $A = 2\pi r$

9. Which ICT app allows you to create 3D animations of circles and their properties?

   a) Microsoft Excel

   b) Paint

c) Adobe Photoshop

d) GeoGebra

10. Two circles are congruent if they have the same:

a) Area

b) Diameter

c) Radius

d) All of the above

11. The longest chord in a circle is called the:

a) Radius

b) Diameter

c) Scant

d) Circumference

12. The relationship between the radius and diameter of a circle is:

a) Radius = $2 \times$Diameter

b) Radius = $\frac{1}{2}$ Diameter

c) Radius = $3 \times$ Diameter

d) Radius = Diameter

13. The ratio of the circumference of a circle to its diameter is:

a) π

b) 2π

c) 4π

d) 3π

14. A circle is divided into 360 equal parts called:

a) Degree

b) Arcs

c) Diameter

d) Radius

15. The distance around a circle is also known as its:

a) Radius

b) Diameter

c) Circumference

d) Arc

16. If two circles are congruent, then their radii are:

a) Unequal

b) Equal

c) Double

d) Triple

17. If the center angle of the circle is 80^0 then which is correct value of inscribed angle?

a) 60^0

b) 40^0

c) 160^0

d) 360^0

18. The distance from the center of a circle to any point on the circumference is called:

a) Chord

b) Arc

c) Radius

d) Diameter

19. What is the value of π (pi) equal to?

a) 3.5

b) 3.16

c) 3.15

d) 3.1415

20. What is a circle's diameter if its area is $9\pi\ m^2$?

a) $3m$

b) $6m$

c) $3\pi m$

d) $6\pi m$

21. If the inscribed angle of a circle is $\frac{2\pi}{6}$ then their center angle is:

a) 60^0

b) π^0

c) 120^0

d) 30^0

22. What is the relation between inscribed angles subtended by the same arc?

a) Complementary

b) Equal in measure

c) Not equal

d) Supplementary

23. What is the relation between the center angle and the inscribed angle?

a) They are equal

b) They are not equal

c) Inscribed angle is half of the center angle

d) Inscribed angle is twice the center angle

24. What is the sum of opposite angles of the cyclic quadrilateral?

a)360^0

b)180^0

c) 90^0

d) 120^0

25. What is the value of the inscribed angle from the diameter?

a)60^0

b) 80^0

c) 60^0

d) 90^0

Appendix G

Student Perception Scale

Dear Students,
Read the following items carefully and mark (√) the option that best fits your needs.

S.N	Items	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	I enjoy using digital tools in mathematics.					
2.	I used digital tools to understand a lot of circle concepts.					
3.	I was excited when using digital media.					
4.	I didn't first enjoy using digital media in the teaching circle.					
5.	Using digital tools makes geometry class boring.					
6.	I gained a lot from the interactions between the teacher and student's when they used digital tools.					
7.	I am better able to understand the concept of a circle because of digital tools.					
8.	I believe that using digital tools is important while teaching mathematics.					
9.	I consider creativity and critical thought when using digital tools.					
10.	I'm pleased if the teacher uses digital tools to teach mathematics.					
11.	I was satisfied with the use of digital tools.					
12.	Digital tools encourage to me participate in class activities.					

13.	Digital tools can help to increase my achievement in mathematics.					
14.	I was successful in making stronger connections between my prior knowledge and the new knowledge.					
15.	I like to use digital media in mathematics.					

Appendix H

Score of Pre-Test

S.N.	Score of Experimental Group	Score of Control Group
1.	18	13
2.	13	15
3.	12	11
4.	7	8
5.	10	9
6.	9	10
7.	6	7
8.	7	6
9.	8	8
10.	11	5
11.	7	7
12.	12	9
13.	15	10
14.	10	13
15.	9	6
16.	8	8
17.	7	12
18.	9	9
19.	10	8
20.	8	10
21.	6	9
22.	8	10
23.		8
24.		7
25.		5
26.		7
27.		6

Appendix I

Result of the Pre-test Comparison Group

	Group	
	Experimental Group	Control Group
Sample	22	27
Mean	9.55	8.741
S.D.	3.004	2.51
Pooled Variance	2.74	
Calculated t-value	1.03	
Tabulated t-value	2.015	
Decision	There is no significant difference.	

Appendix J

Score of Post-Test

S.N.	Score of Experimental Group	Score of Control Group
1.	24	20
2.	19	18
3.	18	15
4.	15	14
5.	16	13
6.	15	15
7.	14	12
8.	17	11
9.	18	10
10.	20	8
11.	16	10
12.	21	12
13.	23	14
14.	18	11
15.	15	9
16.	17	11
17.	16	10
18.	17	14
19.	19	12
20.	20	13
21.	19	14
22.	18	11
23.		13
24.		12
25.		10
26.		10
27.		11

Appendix K

Result of the Post-test Comparison Group

	Group	
	Experimental Group	Control Group
Sample	22	27
Mean	17.955	12.33
S.D.	2.57	2.66
Pooled Variance	9.03	
Calculated t-value	2.163	
Tabulated t-value	1.681	
Decision	There is significant difference.	

Appendix L

Comparison of mean achievement of pre-test and post-test

Experimental Group	Mean	S.D.
Pre-test	9.55	3.004
Post-test	17.955	2.57

Appendix M

The detailed Output result of Cohen's d-test

Group	Sample	Mean	SD	Cohen's Difference
Experimental	22	17.955	2.57	0.8223
Control	27	12.33	2.66	

Formula of, Cohen's d= $\frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(SD_1)^2 + (SD_2)^2}{2}}}$

Appendix N

The result of student's perceptions about using digital media in a learning circle

S.N	Items	Mean	S.D
1.	I enjoy using digital tools in mathematics.	4.05	0.58
2.	I used digital tools to understand a lot of circle concepts.	3.364	1.1
3.	I was excited when using digital media.	4.091	1.11
4.	I didn't first enjoy using digital media in the teaching circle.	2.591	1.01
5.	Using digital tools makes geometry class boring.	2.364	0.902
6.	I gained a lot from the interactions between the teacher and student's when they used digital tools.	3.82	0.7
7.	I am better able to understand the concept of a circle because of digital tools.	3.91	0.61
8.	I believe that using digital tools is important while teaching mathematics.	4.05	0.899
9.	I consider creativity and critical thought when using digital tools.	3.32	1.32
10.	I'm pleased if the teacher uses digital tools to teach mathematics.	4.182	0.96
11.	I was satisfied with the use of digital tools.	4	0.76
12.	Digital tools encourage to me participate in class activities.	3.455	0.86
13.	Digital tools can help to increase my achievement in mathematics.	4.23	0.69
14.	I was successful in making stronger connections between my prior knowledge and the new knowledge.	3.955	1.05
15.	I like to use digital media in mathematics.	3.82	1.14

Appendix O

The result overall result of student's perceptions

S.N.	Items	Mean	Sum of the Mean
1	15	3.68	55.182

Appendix P

Teaching Episode 1

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

Cooperating teacher: Ananta Thapa

---

1. **Objectives:** At the end of this lesson, students should be able to :
    - Derive the definition and parts of the circle.
    - Derive the formula of the area of the circle and solve the problem.
2. **Required Materials:**
    - A computer or laptop, a projector and screen, a whiteboard and markers, etc.
    - It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.
3. **Activities and Classroom Discussion:**

For 10 minutes:

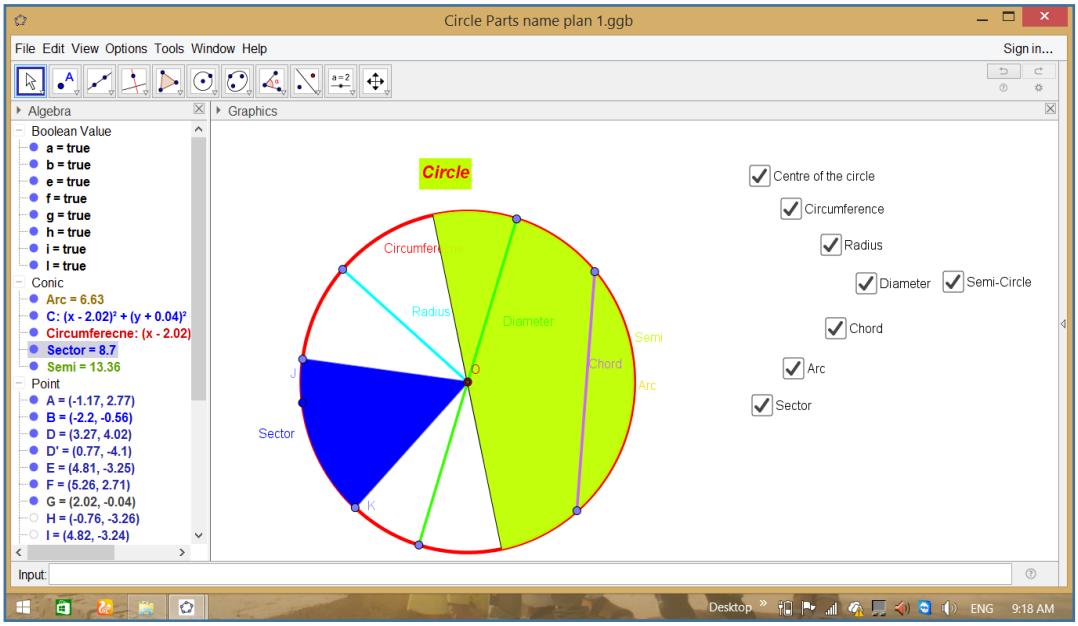
- The researcher should first inquire about the circle to learn what the students think of it. Following the students' responses, the researcher uses PowerPoint to define the circle.

Definition of the circle:

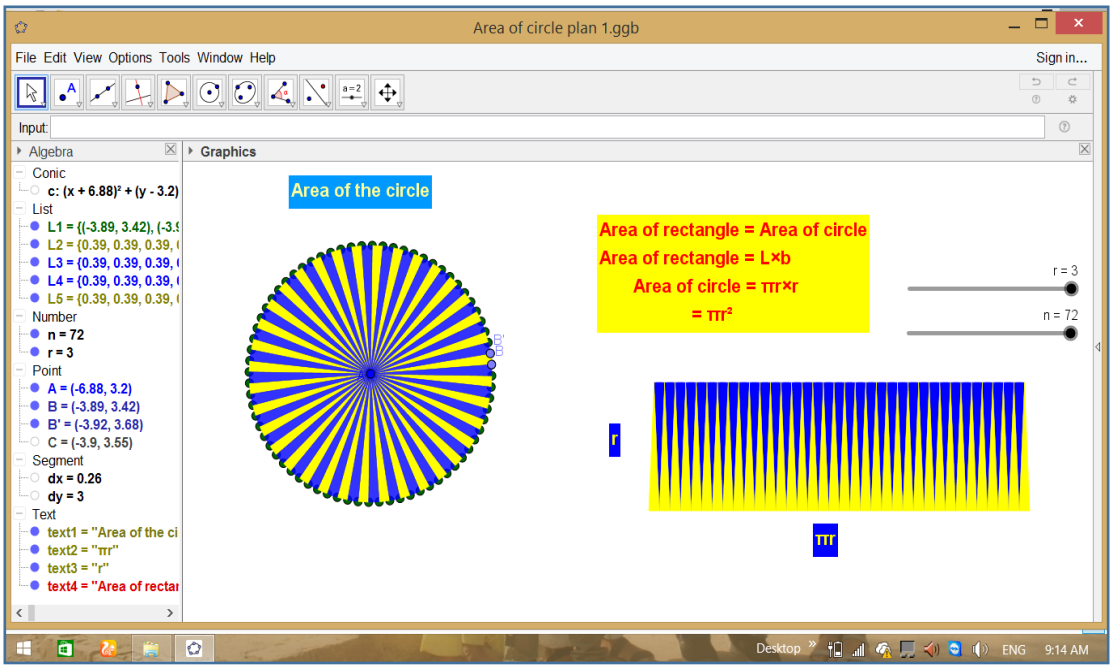
- A round plane figure whose boundary consists of points equidistance from a fixed point.
- A circle can be defined as a closed shape, two-dimensional shape, or curved shape.

For 25 minutes:

- To display the circle's component parts from the provided figure, the researcher used the GeoGebra programe. The researcher provided a step-by-step breakdown of the circle's components. Following that, the researcher and the students engage in conversation about the components of a circle.



- For the second objective, the researcher writes the formula for the area of the circle on the whiteboard.



- Once more, the researcher displayed the circle's area using GeoGebra. Following that, the researcher and the students engaged in conversation about the formula for the area of a circle.

For 10 minutes:

- Following that, the researcher writes down a few problems regarding the circle's area on the whiteboard. The problem is then resolved through discussion between the researcher and the students.

Teaching Episode 2

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

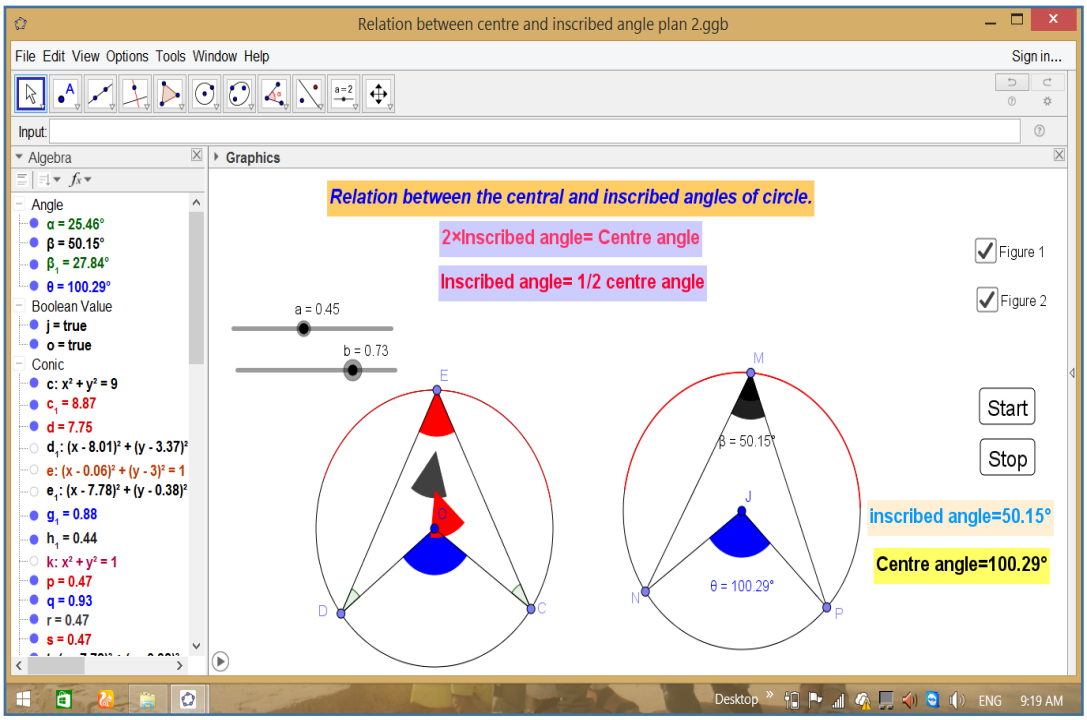
Cooperating teacher: Ananta Thapa

---

1. **Objectives:** At the end of this lesson, students should be able to :
   - Establish that the inscribed angle occupied by the same arc of a circle is equal to half of the center angle.
   - Find solutions to issues involving a circle's inscribed angle and center.
2. **Required Materials:**
   - A computer or laptop, a projector and screen, a whiteboard and markers, etc.
   - It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.
3. **Activities and Classroom Discussion:**

   For 10 minutes:

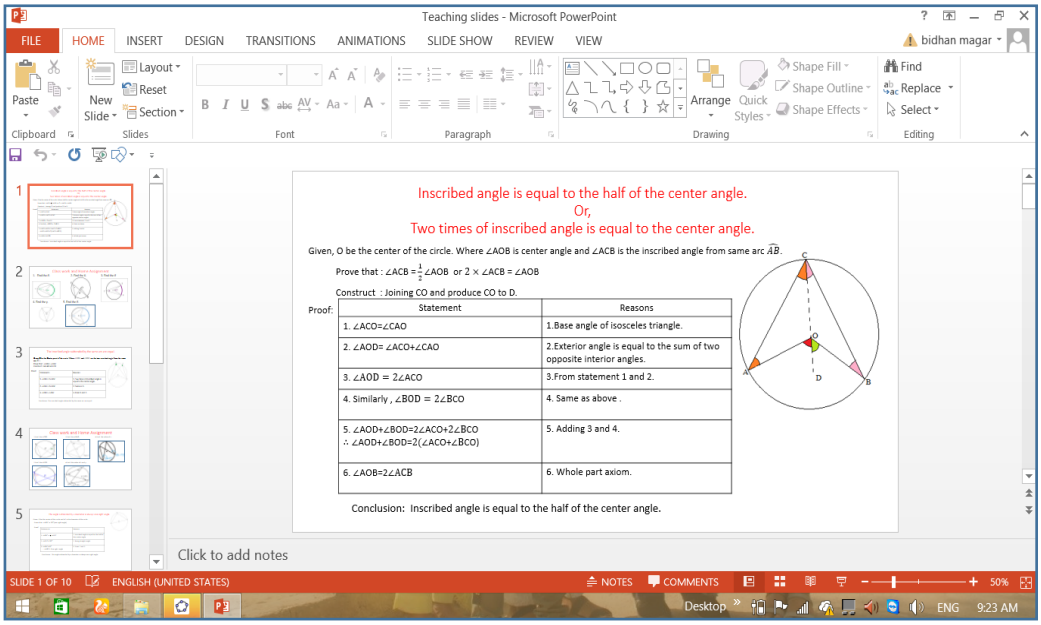
   - Students were questioned by the researcher about the previous class before the day's topic was introduced.
   - The researcher then used the GeoGebra application to explain the relationship between the center and inscribed angle.



- Following that, the researcher and the students had a discussion about them.

For 20 minutes:

- Theorem statements are written by researchers to support the claim that the inscribed angle subtended by the same arc equals to the half of the center angle.
- For the figure and the proof, the researcher used the GeoGebra software. The steps of proof are then discussed between the researcher and the students.



For 15 minutes:

- After that researchers write down a few issues with the given statements on a whiteboard. Then the researcher and the students started talking about their problems, and the researcher gave them some time to figure them out.

4. Home assignment:

I. Find the area of the circle when the radius is 14cm.

II. If the area of the circle is $81\pi\ cm^2$. Then what is the value of diameter?

III. If the diameter of the circle is 28m then what is the value of its area?

Teaching Episode 3

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

Cooperating teacher: Ananta Thapa

---

1. **Objectives:** At the end of this lesson, students should be able to:

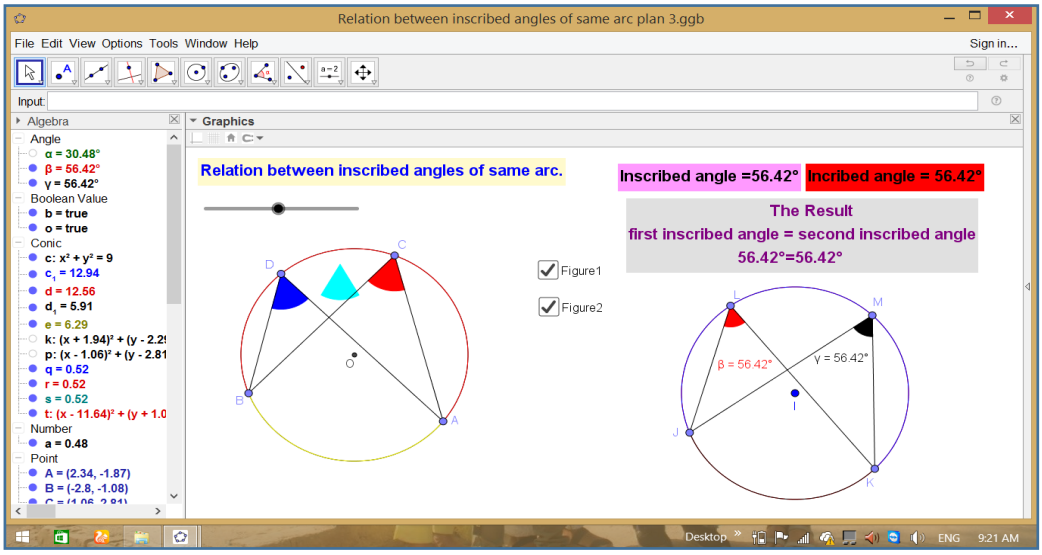
- Prove that the inscribed angles subtended by the same arc are equal to a circle.
- Solve the problems related to inscribed angles subtended by the same arc that is equal to a circle.

2. **Required Materials:**
   - A computer or laptop, a projector and screen, a whiteboard and markers, etc.
   - It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.

3. **Activities and Classroom Discussion:**

For 10 minutes:

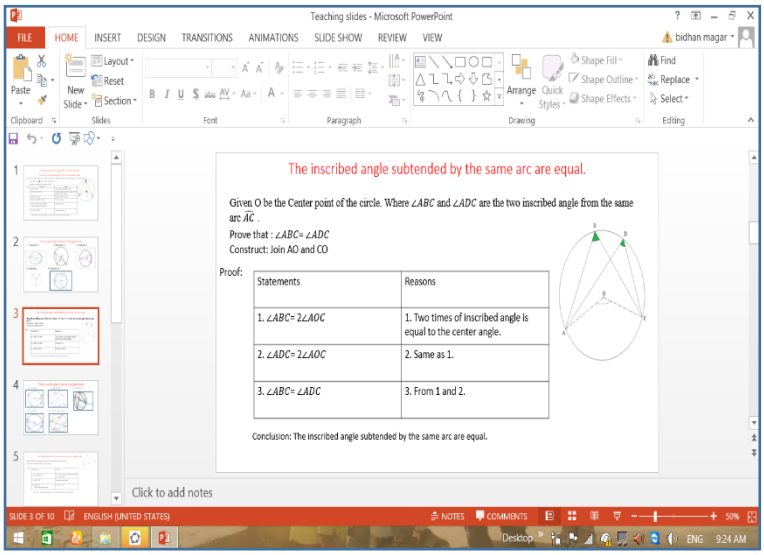
- Before introducing the day's topic, the researcher questioned the students about the previous class.
- The relationship between the center and the inscribed angle subtended by the same arc was then described by the researcher using the GeoGebra tool.



- After that researcher and students, both discuss each other about them.

For 20 minutes:

- Researchers write the theorem's statement on a whiteboard and provide evidence to support the claim that the inscribed angle subtended by the same arc equals half of the center angle.
- The figure was created using the GeoGebra software, and the proof was created using PowerPoint. The steps of proof are then discussed between the researcher and the students.



For 15 minutes:

- Researchers then list some issues with the given statement on the whiteboard. The researcher then gave the students time to solve the problems after they had interacted about them.

4. **Home assignment**

Teaching Episode 4

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

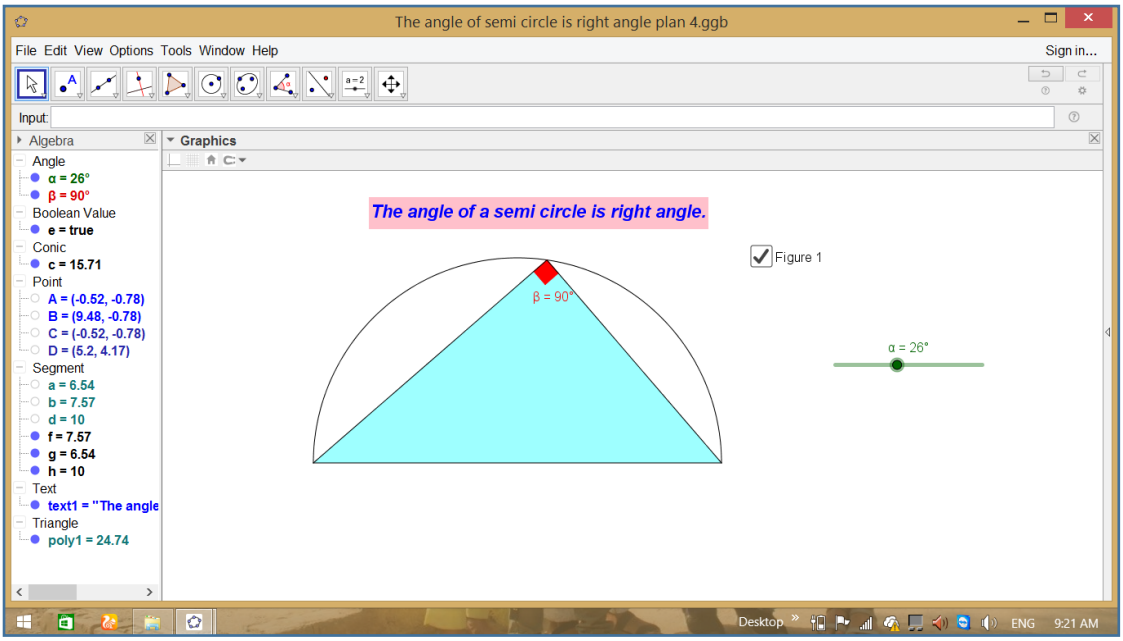
Cooperating teacher: Ananta Thapa

---

4. **Objectives:** At the end of this lesson, students should be able to :
    - Prove the angle subtended by a diameter on any point on the circle is 90^0 Solve the problem related to the angle subtended by diameter on any point on a circle.
5. **Required Materials:**
    - A computer or laptop, a projector and screen, a whiteboard and markers, etc.
    - It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.
6. **Activities and Classroom Discussion:**

For 10 minutes:

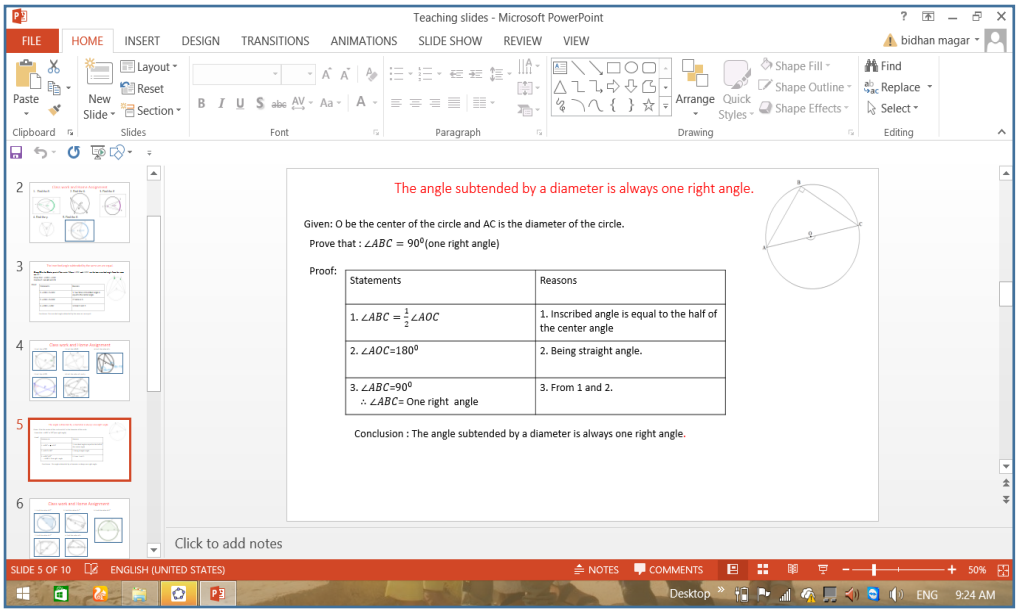
- First of all the researcher should ask about the previous lesson and start today's lesson.
- Students should be questioned by the researcher about an angle whose diameter is 90^0. The researcher then displayed data using GeoGebra software.



- After The researcher and the students then had a discussion about them and came to the conclusion that the subtended angle by a diameter is 90°.

For 20 minutes:

- The researcher writes the challenge, "Prove the angle subtended by a diameter on any point on a circle is 90°." on the whiteboard.
- The researcher displayed the graphical view using GeoGebra software. The theorem was then demonstrated by the researcher using PowerPoint.
- After that researcher and student, interact with each other about figures and steps of proof.
- Then a researcher asks some questions to the students about the steps of proof and discusses the student's answers.



For 10 minutes

- Following that, the researcher outlines a few issues with the lesion. Then, the researcher and the students engage in conversation about the issue at hand and work to find a solution.

4. Home assignment

Teaching Episode 5

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

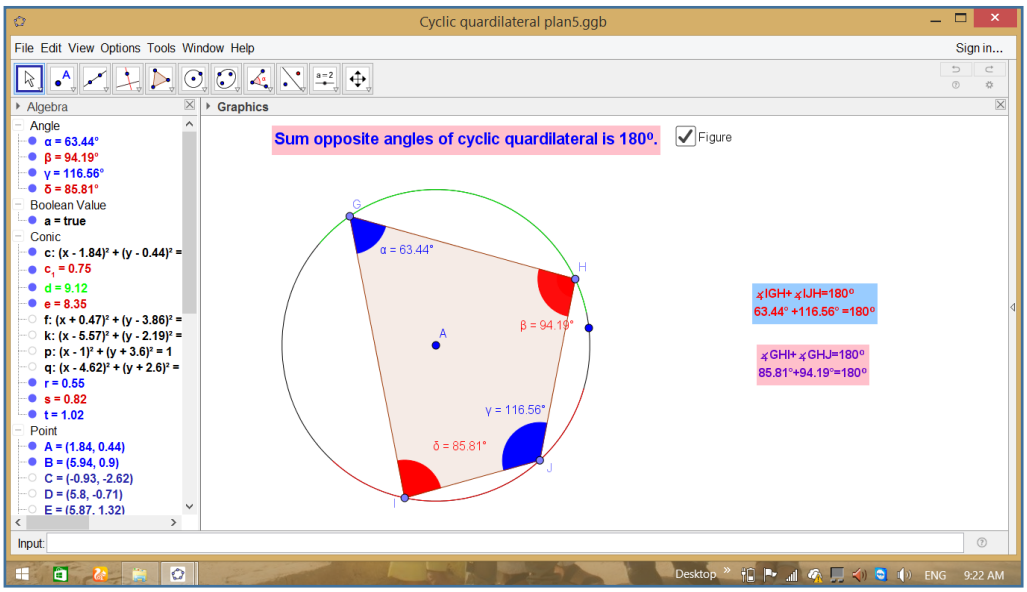
Cooperating teacher: Ananta Thapa

---

1. **Objectives:** At the end of this lesson, students should be able to:
   - Prove that the opposite angles of a cyclic quadrilateral are supplementary.
   - Solve the problems related to opposite angles of a cyclic quadrilateral.
2. **Required Materials:**
   - A computer or laptop, a projector and screen, a whiteboard and markers, etc.
   - It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.
3. **Activities and Classroom Discussion:**

For 10 minutes:

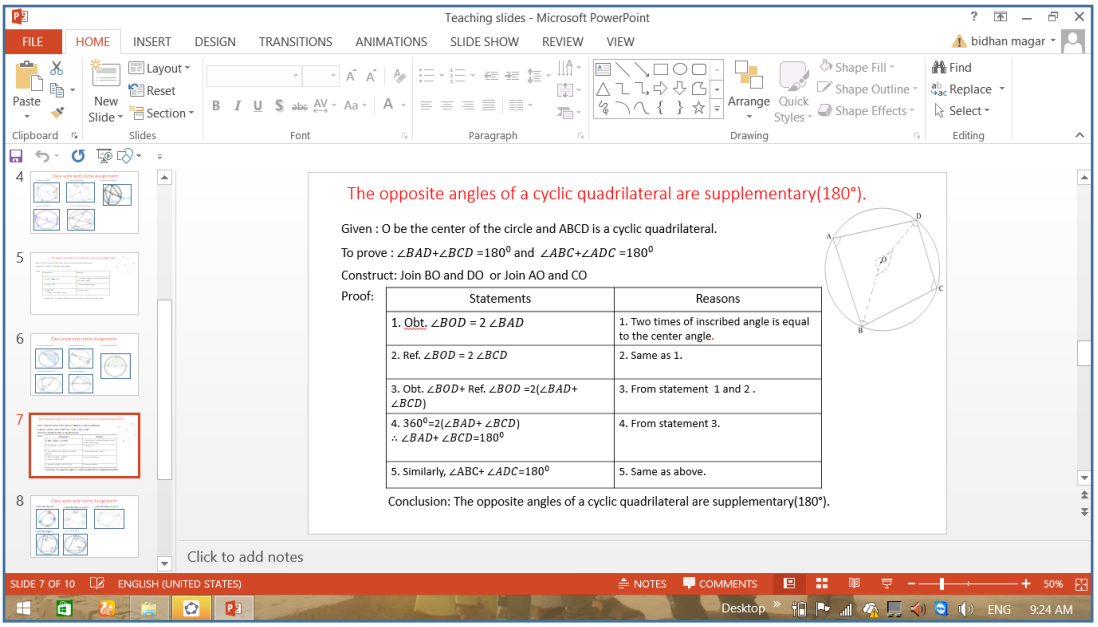
- Before introducing the day's topic, the researcher questioned the students about the previous class.
- The researcher then described the cyclic quadrilateral using the GeoGebra tool.



- After that researcher and students, both discuss each other about them.

For 20 minutes:

- Researchers write the statement of the theorem on a whiteboard and prove that the theorem of the opposite angles of a cyclic quadrilateral is supplementary.
- The researcher used GeoGebra software for the figure and PowerPoint for the proof.
- Then researcher demonstrates the figure of the cyclic quadrilateral on GeoGebra software and for the proof using power-point.
- Following that, the researcher asked the students on the proof. The researcher and the students then go over the responses.



For 15 minutes:

- After that researchers write some problems related to the given statement on the whiteboard.
- After that researcher and students both interactions each other about problems.
- The researcher provided time to solve them.

4. Home assignment

Teaching Episode 6

School: Janajyoti Secondary School, Bhojpur **Time: 45 min.**

Subject: Compulsory Maths **Class: X**

Topic: Circle

Teacher: Bidhan Magar

Cooperating teacher: Ananta Thapa

---

1. **Objectives:** At the end of this lesson, students should be able to:
   - Prove that the exterior angle of a cyclic quadrilateral is equal to its interior opposite angle.
   - Solve the problems related to the exterior angle of a cyclic quadrilateral being equal to its interior opposite angle.

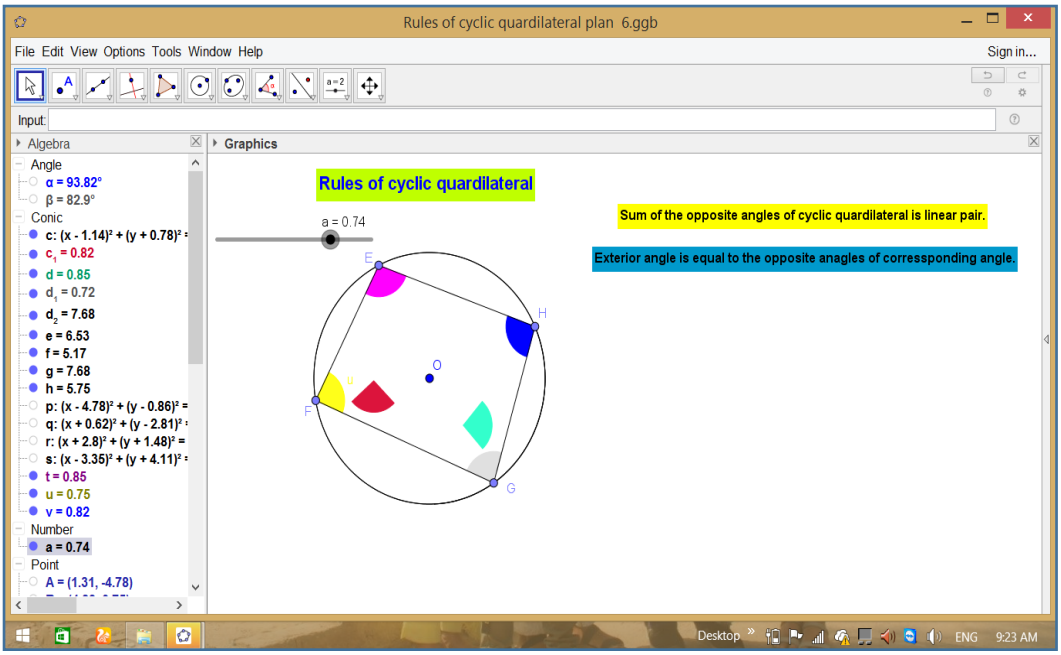
2. **Required Materials:**

- A computer or laptop, a projector and screen, a whiteboard and markers, etc.
- It is necessary to install PowerPoint and GeoGebra 5.0 on laptops and computers.

3. **Activities and Classroom Discussion:**

For 10 minutes:

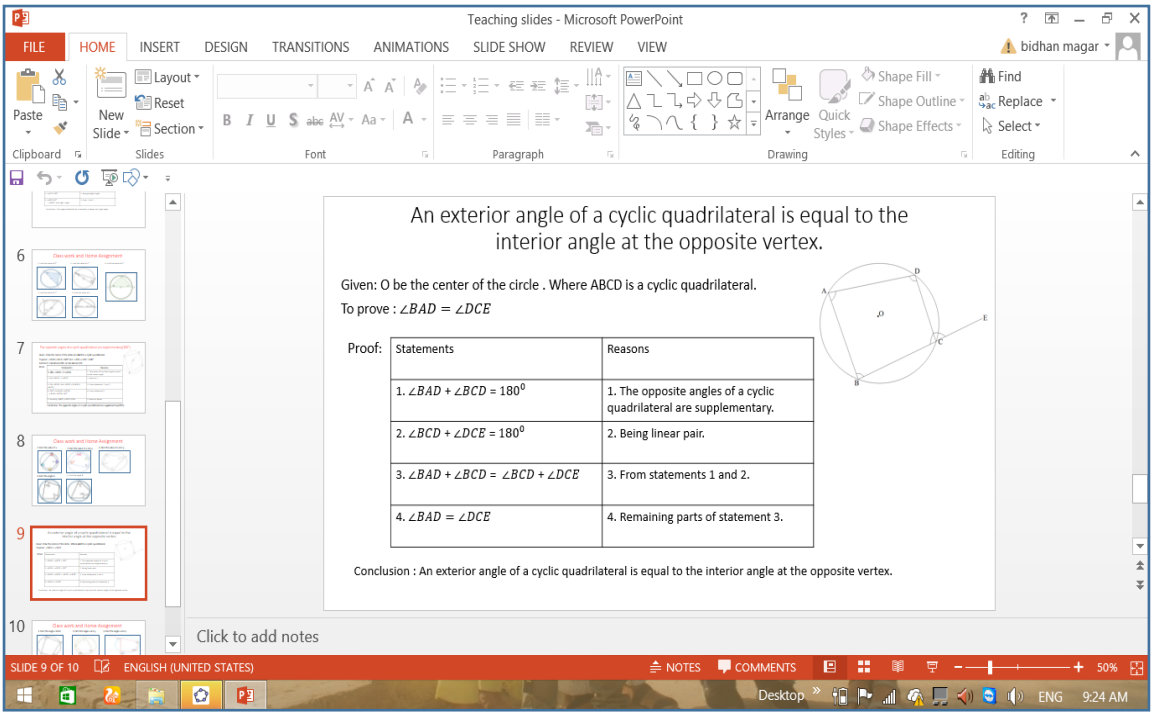
- Students were questioned by the researcher about the previous class before the day's topic was introduced.
- The researcher used the GeoGebra tool to describe the interior and exterior angles of a cyclic quadrilateral.



- After that researcher and students, both discuss each other about them.

For 20 minutes:

- Researchers write the statement of the theorem on a whiteboard, Prove that the exterior angle of a cyclic quadrilateral is equal to its interior opposite angle.
- The researcher used GeoGebra software for the figure and PowerPoint for the proof.
- Then researcher demonstrates the figure of the exterior angle of a cyclic quadrilateral is equal to its interior opposite angle on GeoGebra software and for the proof using power-point.
- After that, the researcher asked some questions for the student's about the proof. Then researcher and students discuss about the student's answers.



For 15 minutes:

- After that researchers write some problems related to the given statement on the whiteboard.
- After that researcher and students both interactions each other about problems.
- The researcher provided time to solve them.