

# **Research Methodology**

# **Chapter - 3 : Research Methodology**

## **3.1 Introduction**

The research methodology provides research validity and provides scientifically sound findings. It also provides a detailed program that helps keep researchers on track, making the process smooth, efficient, and manageable. The researcher's approach allows the reader to understand the process and the methods used to conclude. Some researchers who want to repeat the study have enough knowledge to do so. Researchers who receive criticism may also comment on how they work. It can help to give researchers a specific plan to follow throughout their research. The process of designing a methodology helps researchers to select appropriate methods for the purposes. It allows researchers to write down their goals for research from the beginning.

The research methodology is an integrated term for a systematic research process. There are many different methods used in different types of research and this term is often considered to include research design, data collection, and data analysis. The research method aims to inform: Why the research was done, how the research problem was described, how and why the hypothesis was formed, what data was collected and what method was used, why the process was used to analyze data and many other similar questions are often answered when talking about the research method. About a research or research problem.

In simple terms, a research method is used to give a clear idea of what a researcher is doing his or her research. To plan promptly and to advance the research work, the research approach creates the right platform for the researcher to plan the research work in conjunction with making solid plans. In addition, the research approach directs the researcher to participate in a specific field of research. In most cases, the purpose of the research and the topic of the research will not always be the same depending on the purpose and flow of the research, but by adopting the right approach this can be achieved.

## **3.2 Research Design**

Before commencing any work or planning an investigation is a requirement that enables the researcher of the study to proceed in a consistent and orderly manner. The current study was extensive, a design equivalent to the experiment was used.

The research involves the study of game-based teaching in Mathematics and the researcher has attempted to find out the differences in the cognitive skills and achievement among the students.

Experimental research requires the creation of two different types of groups for testing. Accordingly, the control group and the experimental group were formed and students were randomly selected and groups were formed, and then game-based teaching methods were used to teach the grades 7 – A. The control group was taught by the 5E model of the constructivist method.

In this research one pre-test was conducted for both the groups i.e., the control group and experimental group, after this researcher taught different groups accordingly. After completion, one post-test was conducted and one achievement test was conducted to check the difference between the groups. Pre and Post-test were conducted to measure the cognitive skills of the students whereas achievement test was conducted to check their mathematical achievement regarding the topic.

<b>Design of the study</b>		
<i>Characteristics</i>	<i>Control Group</i>	<i>Experimental Group</i>
Early Status	VII B	VII A
Treatment	Constructivist Approach	Online Game-Based Approach
Terminal Status	Pre, Post & Achievement test	Pre, Post & Achievement test

### **3.3 Population**

The research population were students of class VII.

### **3.4 Sample**

The research participants were students of class VII who were students of DMS (Demonstration Multipurpose School). As the name suggests this school had the features of an ideal research possible entry, possession of mix population, the likelihood of developing positive relations between the participants and researchers, and ethical approval.

The researcher selected students from two different sections belonging to the VII standard of Demonstration Multipurpose School, NCERT, Shymala Hills, Bhopal as a sample. It is an English Medium School. Since it was not possible to employ randomization that is why the class as a whole in its natural setting was considered for the study.

The research was conducted in the school upon the principal's and the assistant principal's approvals. The mixed school population provided an opportunity to test game results for different participants' language domains and success rates. Teachers and students grew up with confident relationships with researchers as they liked to use games as other tools for teaching and learning. The study was ethically approved.

### **3.5 Variables**

As the present study is an attempt to determine the effectiveness of online computer games, students' cognitive skills, and achievement the dependent and independent variables involved are as follows.

1. Independent Variables:
  - Game-based teaching strategies
  - Constructivist strategy
  - Computer Skills
2. Dependent variables
  - Participant's Mathematics Achievement Scores (By Benchmark Test)
  - Participant's Cognitive Skills (By Pre & Post Test)

### **3.6 Tools**

By reviewing the related literature, the researcher identified that by using online computer games we can effectively change the pupil's attitude toward learning mathematics so the investigator developed certain tests to measure the cognitive skills and their achievement in Mathematics. The tool was prepared by the researcher after intensive explanation of reviews. The following tools were used

1. Pre-Test
2. Post-Test
3. Achievement Test

The test covers the topic 'Integers'

Test	
Type of question	Number of Questions
Reasoning	8
Application	7
Knowledge	8
Accuracy	7

### **3.7 Administration of the test**

Initially, the researcher began with the regular classes and used the constructivist method on both the groups i.e., the Control Group and Experimental Group. A Pre-Test was administered for both the groups, and results were recorded. After this experimental group was treated with online games whereas the control group continued with the traditional method. Lastly, both the groups took Post-Test and Achievement tests and the results were collected and compared.

### **3.8 Procedure for Data Collection**

The study was conducted for approximately two weeks. Beginning with a pre-Test to gain an understanding of the student's previous knowledge. After this, the experimental group was exposed to online computer games, and the control group continued with the traditional method. And in the end, both the groups were given a post-test and achievement test to compare the difference between the two methods. Feedback was obtained from students after the learning activities i.e. playing games. Students informed that learning through games was fun. They were motivated to learn more. It was reported that they were more interested and eager. Few students mentioned that their problem-solving capabilities were improved and they became more attentive. It was

observed that playing interactive mathematical games improved mathematical thinking in students. It was informed by students that their ability to retain the mathematical principles improved a lot as now they can relate it.

### **3.9 Techniques used for Data Analysis**

For the study, relevant data were extracted from various tests conducted throughout the process of data collection using different statistical methods.

Then to determine the central tendencies of the sample and to compare them, the mean and standard deviation were calculated.

Finally, to understand the differences T-test was applied to the collected sample. This analysis provides an understanding of the determination of the statistical difference between groups concerning the selected variables.