CHAPTER-III

METHODOLOGY

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3.1.   RESEARCH METHOD

Before starting any work or investigation planning is must which enables the research investigator to proceed in a sequential and systematic way. The present study was **quantitative in nature, True experimental research design.** This design employed in the present study was **two group pre-tests and post-test** design with random sample.

The present study involves the study on **A Study of Effect of Toy Based Pedagogy on Achievement in Mathematics of Class 6th Students** of Bhopal District, M.P. and the investigator has made an attempt to find out the differences in the Academic Achievement among the students.

Experimental research study requires the construction of two different types of groups for experimentation. Accordingly **control group** (VI-A) and **experimental group** (VI-B) were constituted. The control group was taught in traditional method and the experimental group was taught by applying toy-based pedagogy.

This design is stronger than single group pre-test-treatment-post-test design. In the single group design, the children get exposure to both the methods of teaching, which would affect the effects of the experiment. After gaining knowledge through the literature related to the methods of teaching and the problem under study, the experimental procedure was executed.

Table-3.1: Design of the Study

Characteristics	Control Group	Experimental Group
Early Status	Class-VIA	Class-VIB
Treatment	Traditional Method	Toy Based Pedagogy
Terminal Status	Pre Test and Post Test	Pre Test and Post Test

3.2.   VARIABLES OF THE STUDY

The present investigation is an attempt to determine **A Study of Effect of Toy Based Pedagogy on Achievement in Mathematics of Class 6th Students**.

The variables involved are:

- **Independent Variables:** The toy-based pedagogy involved in the teaching of mathematics was taken to be the independent variable in this study.

- **Dependent Variables:** The achievement in Mathematics was treated as the dependent variable in this study.

3.3.   POPULATION

The present study was conducted on class-VI school students of M.P. state. Thus, in the present investigation the population refers to all the students from class-VI studying in Demonstration Multipurpose School, Bhopal.

3.4.   SAMPLE

The present study is an experimental study concerned with the study of "A Study of Effect of Toy Based Pedagogy on Achievement in Mathematics of Class 6th Students of Bhopal District, M.P." Random sample technique is used for the present study. The researcher selected children of two sections belonging to the sixth standard DEMONSTRATION MULTIPURPOSE SCHOOL, BHOPAL as sample. It is an English medium school.

Section-A and Section-B were selected as control group and experimental group respectively. There were 20 students in control group and 20 students in experimental group. Both the groups were taught by the researcher only.

Table-3.2: Details of Sample

Group	Section	No. of Students
Control Group	VI-A	20
Experimental Group	VI-B	20

3.5.   DATA COLLECTION

The data collection for the present study was carried out using a **true experimental design** to investigate a Study of Effect of Toy Based Pedagogy on Achievement in Mathematics

of Class 6th Students. A total of 40 students were randomly assigned to two groups: the **control group** (20 students) and the **experimental group** (20 students). The instructional content focused on three key topics from the Class 6 NCERT Mathematics curriculum — **Mensuration, Integers, and Symmetry**. The experimental group received instruction using **toy-based pedagogy**, incorporating educational toys, manipulatives, and activity-based learning strategies designed to enhance conceptual understanding. In contrast, the control group was taught using **traditional methods**. The total duration of the intervention was **21 days**, during which both groups received equal instructional time under similar classroom conditions. To measure students' academic performance, a standardized **achievement test** was administered as both a **pre-test and post-test** to assess prior knowledge and learning gains. The test was teacher-made, content-validated by subject experts, and aligned with the learning outcomes of the selected topics. The collected data was later analyzed to evaluate the impact of toy-based pedagogy on student achievement in mathematics.

3.6. TOOLS

Through the review related literature, the investigator identified that the teaching strategies effectively change the pupil's attitude towards Mathematics. So, the investigator developed the achievement test to measure the achievement scores. The following tools were used:

- Achievement Test in Mathematics

The Tool was validated by the Supervisor of the study.

3.7. ACHIEVEMENT TEST

An achievement test in Mathematics was constructed and validated by the investigator, in order to measure the level of achievement in Mathematics. The question paper contains three lesson of Mathematics Text book of standard VI. Total number of questions were 18. The test comprised of 27 marks and 45 minutes were given. Test was administered on both the groups.

3.8. DEVELOPMENT OF THE TEST

The test covers the chapter Mensuration, Symmetry, Integers. Research Supervisor's opinion was taken into consideration while developing the tool.

Table-3.3: Achievement test Questionnaire

Topic	Knowledge	Understanding	Application	HOTS	Total question
Mensuration	3 (1 marks)	1(1 marks)	1(2 marks)	1(3 marks)	6(9 marks)
Symmetry	3(1 marks)	1(1 marks)	1(2 marks)	1(3 marks)	6(9 marks)
Integers	3(1 marks)	1(1 marks)	1(2 marks)	1(3 marks)	6(9 marks)
Total questions	9(9 marks)	3(3 marks)	3(6 marks)	3(9 marks)	18(27 marks)

The test included two types of questions:

- **Multiple Choice Type question.**

- **One word question.**

3.9. ADMINISTRATION OF THE PRE-TEST

Before starting the treatment to experimental group and the control group, both groups were subjected to the pre-test and the scores of the pre-test were collected.

3.10. ADMINISTRATION OF THE POST-TEST

After giving the treatment of 21 days to the experimental group and the control group, both groups were subjected to the post-test and the scores of the post-test were collected.

3.11. PROCEDURE FOR DATA COLLECTION

The present study was conducted in two stage, in the initial stage the instructional material and the tools were prepared and in the final stage implementation on the group of 40 students of class-VI as mentioned earlier from which 20 students in control group and 20 students in experimental group.

The lesson plans for both control group and experimental group and achievement test are provided in the appendix.

3.12. STATISTICAL TECHNIQUES

In the present study, the relevant data obtained from the test scores of the pre-test and

post-test was analysed using different statistical techniques.

Mean and Standard Deviation were calculated to determine the central tendencies of the samples and to compare them.

Differential analysis provides inferences involving determination of statistical significance of difference between groups with reference to selected variables. To compare the difference between the means of the small sample, independent t-test was applied.