

CHAPTER - III
METHODOLOGY

CHAPTER - III

METHODOLOGY

3.0.0 INTRODUCTION

The rationale of the present study along with its objectives and hypotheses have been stated in Chapter – I. The review of Related Literature has been presented in the previous chapter. The current chapter presents the description of design, sample, tools, procedure of data collection and statistical techniques used for analysing the data. The details in respect to each one of these are given below under different captions.

3.1.0 METHOD

Experimental method was employed for this research. The teaching strategy was main independent variable of the study. There were two groups of students, namely, Experimental group and Control group. Experimental group was taught through e-content and the control group was taught through the traditional method. The other independent variable was gender. The dependent variable of the study was achievement in Chemistry.

3.2.0 DESIGN OF THE STUDY

A worthwhile research project is likely to result from a formulated research design. The design can be equated to a blue print which provides a clear-cut guideline to the investigator in carrying out his/her research successfully. In the present study, the investigator developed and validated e-content package on Chemistry unit Atomic Structure. To achieve the objectives, the investigator has chosen pre-test post-test control group design. The students of control group were taught by traditional lecture method which includes verbal discourse, chalk and talk and text. The students of experimental group were taught through e-content and the measures were taken to control or minimize the threats to internal and external validity to a reasonable degree.

3.3.0 SAMPLE

In the present study sample of forty IX class students of Odisha Adarsha Vdyalaya, Sundarapal in hatadihi block of Kendujhar district will be taken using random sampling technique.

Table - 3.1: Gender-wise and Group-wise Distribution of Sample

Gender	Groups		Total
	Experimental	Control	
Boys	11	11	22
Girls	9	9	18
Total	20	20	40

Table 3.1 shows that the final experiment was conducted on forty class IX students belonging to Odisha Adarsha Vidyalaya, Sundarapal, Kendujhar. Of these 20 students were in experimental group and 20 were in control group. There were 11 boys and 9 girls in each group. Thus, the sample was representative of Gender. The medium of instruction was mixed language (Odia & English).

3.4.0 TOOLS

E-content was developed by the investigator on the selected topic. The effectiveness of e-content could be observed through the achievement test. The achievement in chemistry was assessed with the help of achievement test developed by the investigator.

Achievement test on Chemistry for IX Standard Students tool was developed by the researcher for the conduct of pre-test and the post-test. Multiple choice items were constructed from the selected content area based on the objectives of teaching of the selected content. Efforts were also made to improve the language of the items and to remove the ambiguity in the items enabling the students to understand the items without difficulty at the first attempt. The constructed items were presented to juries which consist of experts in the field of teaching of chemistry. Based on the expert opinion, the items were edited. Some items were deleted. A rough draft of the tool was prepared and it consists

of 15 items. The details regarding preliminary draft of the Achievement test tool given in the Appendix. The investigator prepared weightage tables. They are presented here.

Table – 3.2: Content Outline for the Study

Chapter	Content
Atomic Structure	Charged particles in matter
	Thomson's Model of an Atom
	Rutherford's Model
	Bohr's Model
	Electronic distribution in orbits
	Valency
	Atomic Number & Mass Number
	Isotopes & Isobars

3.4.1 Preparation of Weightage Tables for The Final Draft of Achievement Test

After the item analysis, the investigator prepared the final draft of the Criterion test tool and it consists of 15 items. The details regarding the final draft of the Criterion test tool given in Appendix.

Table – 3.3: Blue Print for the Achievement Test in Chemistry

Chapter	Content	Instructional Objective-wise distribution of Items				Total no. of Items
		Knowledge	Understand	Application	Skill	
	Charged particles in matter	1	1	-	1	3
	Thomson's Model of an Atom	1	1	-	-	2
	Rutherford's Model	1	1	-	-	2
	Bohr's Model		1	1	-	2
	Electronic distribution in orbits	1	1	-	-	2
	valency	1	1	-	-	2
	Isotopes & Isobars	1		1	-	2
Total		6	6	2	1	15

Table – 3.3, clearly, indicates that items in the Achievement Test of Chemistry adequately cover a selection of content covered during the treatment range of complexity in objective levels ranging Knowledge to Application. On the basis of these criteria, the final version of the Achievement Test of Chemistry consisted of 15 items. The reliability and validity of Achievement Test in Chemistry were established.

3.4.2 Reliability

Reliability refers to the consistency of measurement over time. Different methods were used to calculate Reliability of Achievement Test in Reliability and validity, for establishing the Reliability, the Achievement Test in Chemistry was administered on forty students of class IX belonging to Odisha Adarsha

Vidyalaya, Sundarapal, Kendujhar, Odisha. Therefore, Achievement Test in Chemistry was considered to be Reliable.

3.4.3 Validity

Content Validity is the degree to which the items on a test adequately represent the content of the discipline or field of study. The content validity of the Achievement Test in Chemistry can be established only by judgements regarding the extent to which the test measures what it intended to measure, in other words the extent to which it reflects the content. It involves essentially the systematic examination of content of the Achievement Test in Chemistry to determine whether it covers a representative sample of the concepts to be assessed. Content Validity was determined by inspection of test-items and careful analysis of actual subject matter and instructional objectives against the blueprint of this test.

The Content Validity of the Achievement Test in Chemistry was established by having a discussion with the experts from the field of Chemistry. On the basis of their opinion, the Achievement Test was found to be valid. Thus, the test had Content Validity.

3.5.0 PROCEDURE OF DATA COLLECTION

The study was experimental in nature and data were collected by conducting experiment involving two groups. One group was designated as the Experimental group and the other as the Control group in this study. Both, the experimental group and control group was taken from Odisha Adarsha Vidyalaya, Sundarapal, Kendujhar, situated in Odisha. The medium of instruction was mixed (English & Odia).

Groups were randomly assigned to the treatment. There were two levels of Treatment. These were teaching chemistry through e-content and traditional method. Both the groups were pre-tested by administering achievement test in Chemistry developed by the investigator to assess the achievement. The pre-test scores on achievement test in Chemistry constituted pre-achievement in Chemistry of class IX students.

The students of experimental group were taught through e-content developed by the investigator. At the end, the achievement test in chemistry was administered again to both the students of Experiment and Control groups in the same way as done at the beginning of the experiment. It constituted the post-test scores on the achievements test in chemistry.

3.6.0 STATISTICAL TECHNIQUES USED

The statistical techniques used in the present study for analysing the data are given here objective-wise:

1. To study the effectiveness of the e-content in teaching in terms of achievement in chemistry of students. Percentile, Mean and Standard Deviation were used for analysing the data.
2. To study the effect of treatment, gender and their interaction on achievement in chemistry of students by taking pre-test scores of achievements in Chemistry as covariate. 2 X 2 Factorial Design ANCOVA was used for analysing the data.