CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter expounds the methods employed to conduct this study and provides discussions on research design; population, sample size, and sampling methods, research tools, data-gathering procedure, data analysis, and consideration of ethics.

3.2 Research Design

The Quasi-Experimental research design (non-equivalent pre-test post-test control group design) present study was carried out through to compare the effect of ICT Mediated teaching on the academic achievement of Class 9th students in Physics. The reason for adoption of such design is based on the fact that intact classes were randomly assigned as experimental and control groups, respectively, as complete randomization of subjects was impossible. The experimental group experienced ICT Mediated teaching while the control group received instructions through traditional method of teaching. Both groups were assessed before (pre-test) and after (post-test) the treatment was given to the experimental group.

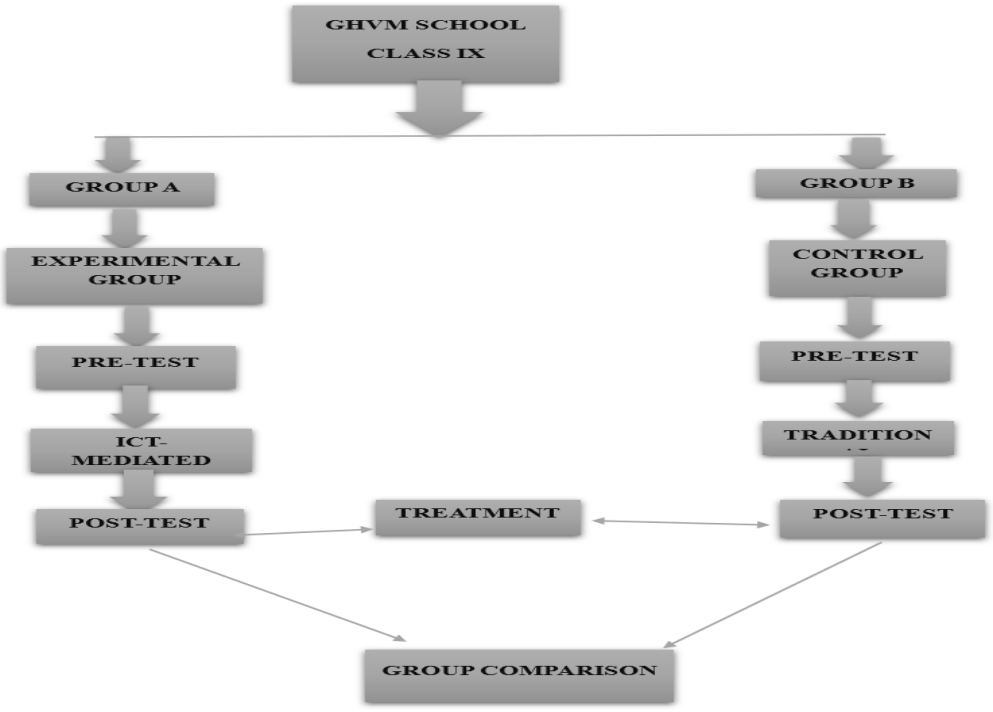

Fig. 3.1 Conceptual framework of the research

3.3 Population

The target population for this study comprises all Class 9th students studying physics in Senior Secondary Schools within Jharsuguda district, Odisha.

3.4 Sample

Class 9th students of GHVM Senior Secondary School, Jharsuguda district, Odisha.

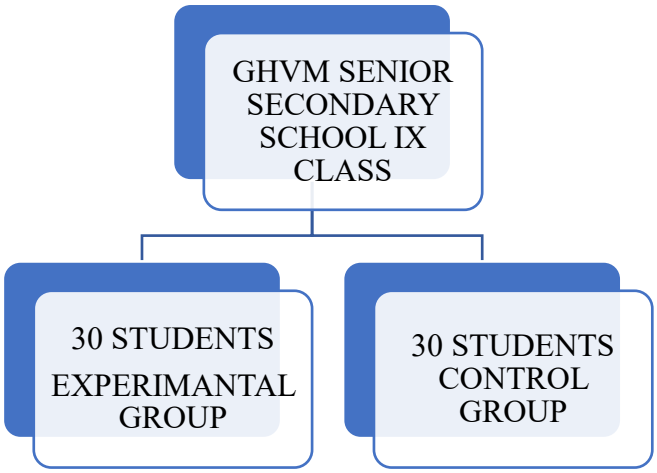

Fig. 3.2 Numbers of students in experimental and control group

3.5 Variables

Variables simply constitute the periphery in research. They are entities that take on different values. The dependent variable is the factor being measured so that the effect of the independent variable can be determined. In other words, what is being studied in a particular research endeavour is the dependent variable. It bestows on a researcher their predictions. Hence in this study, the ICT Mediated Teaching and traditional teaching is an independent variable and the dependent variable is academic achievement in Physics.

3.6 Research Methodology

For the present research, three tools and teaching models were developed and then adopted earlier in the quasi experimental process of the present study, which later formed the bases for the collection of data from students involved in the research. The detailed elaboration is as follows in two steps

1. Developmental Phase

The current phase encompasses the development of constructivist-based teaching materials using the 5E model. Two types of a Physics Achievement Tests were prepared namely; PAT - 1 (Pre-test) and PAT – 2 (Post-test)

2. Implementation Phase

In this phase, researcher conduct PAT – 1 on both the groups. Then, researcher teaches using ICT Mediated lesson plan to experimental group and traditional lesson plan to control group. After completion of chapter researcher conducts PAT – 2 for both groups and result is analyzed.

3.7 Tools of the Study

Two kinds of tools had been used in the study:

1. Instructional Tool
2. Assessment Tool

3.7.1 Instructional Tools

Teaching tools were utilized for the experimental and control groups. A lesson plan was developed considering the ICT-mediated constructivist approach for the experimental group and the other traditional methods for the control group. Materials have been selected from Ninth Grade Physics Book of N.C.E.R.T. Work and Energy topic was selected and 5 lessons plan of each for both the group were developed.

- Lesson Plan based ICT- mediated Constructivist Approach
- Lesson Plan based Traditional Approach

3.7.2 Instructional Materials for ICT Mediated Teaching

The present study aims to investigate the effects of ICT-mediated teaching on the students' academic achievement in Physics. Hence, teaching materials were developed following the ICT-based constructivist approach that would be tested in the classroom and had passed through the following steps.

- Selection of content
- Content analysis
- Stating instructional objectives

3.7.3 ICT Mediated Lesson Plan

The researcher chose the 5E model from constructivist approach as a basis for teaching the experimental group and then created a lesson plan with this model. The researcher finished the lesson plan by including ICT in it. ICT involved in the lesson plan were PowerPoint, projector, projection screen, laptop, photo, animated video etc.

3.7.4 Assessment Tools

Assessment tools assessed students' Physics achievements and tested previous knowledge which are as follows :

- Physics Achievement Test for Pre-Test
- Physics Achievement Test for Post-Test

3.7.5 Physics Achievement Test

The researchers selected the 'questionnaire' as the instrument used for gathering the responses of the students regarding their academic success in Physics due to ICT Mediated teaching.

The formulation of Questionnaire include:

a) Selection of Questions
b) Formation of Questions
c) Try-out Questionnaire
d) Item Analysis
e) Final Draft of Questionnaire

The questionnaire consists of 16 items. The set of questions are divided into three parts

a) Ten multiple-choses index items were counted on one item for each correct response and scored at 1 whereas for incorrect responses they were scored at 0.
b) Short Answer Question 5 involves scoring of correct responses by giving 2 points while incorrect responses are scored 0.
c) Long-answer questions are those items that scored responses correctly on the questionnaire and were given a 5 as the score for such a response. Misleading responses on the questionnaire scored 0.

3.7.6 Statistical Techniques

1. Mean
2. Standard Deviation
3. T-test