CHAPTER III

METHODOLOGY

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Caption no. **Particulars**

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3.0.0 INTRODUCTION

The central aspect of any research is embodied in its methodology that shares the idea about how the study was conducted. The nature, plan and procedure of the study are the core elements in the scope of methodology. It is recommended and enviable that research plan be designed and laid out in its most appropriate and methodological way. Research outcomes can be justified as more authentic and reliable ones when requisite and appropriate methodology is implemented. This chapter is methodology oriented where the researcher has concentrated on the steps and process adopted in order to attain the objectives of the present study. The present study is an experimental study. Quantitative research methodology is adopted for the present study being embraced by experimental study. The present chapter encompasses the research design for the study, the population, the sample, the tools and the techniques used for collection of data, and the procedure of data analysis. For comprehensive understanding of the methodology of the present study, the objectives and hypothesis of the present study are cited below.

3.1. 0 OBJECTIVES OF THE STUDY

The present study was designed with the following objectives.

1. To develop a multimedia package in subject of Geography for standard IX CBSE students.
2. To implement the developed multimedia package for teaching Geography to standard IX CBSE students.
3. To study the effectiveness of multimedia package in the terms of achievement of students.
4. To study the effectiveness of multimedia package in terms of reaction of students towards the developed multimedia package.

3.2.0 HYPOTHESIS OF THE STUDY

The following hypothesis was formed which was tested at 0.01 level of significance.

There will be no significant difference in the mean achievement score of Geography of control group and experimental group students.

3.3.0 METHODOLOGY

For the present study the investigator adopted experimental design, so the methodology and the process of experimental research were adhered to attain the objectives of the present study. Exhaustive methodological procedures is described together with the research design, the population, the samples, the tools for data collection, the development of multimedia package for teaching Geography, procedure of data collection and data analysis.

3.3.1 Design of the Study

The present study is experimental in its nature. As the sample for the present study was selected purposively, Quasi-experimental research design was adopted. Pre-test post-test nonequivalent group design was chosen for the present research as Best and Kahn (1996) describes, '*this design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes, which may be similar*'. The researcher did the real-time experiment for the present study, where it was difficult to use randomization for the selection of samples for experimentation and thus the researcher took the sample purposively. This leads the researcher to take the help of the Quasi-Experimental Design study instead of True-Experimental Design. The experimental design of the present study is presented as follow.

O_1 X O_2

O_3 C O_4

Where,

O_1 and O_3 are pre-test

O_2 and O_4 are post-test

X stands for Experimental Group and

C stands for Control Group

The mentioned design was followed in the process of experiment with the objective of studying the effectiveness of multimedia package in Geography. With the help of pre-test and post-test, the achievement of standard IX students of CBSE affiliated schools in Geography was measured before and after the experimentation respectively for both the experimental and control group.

3.3.2 Population of the Study

All the standard IX students studying in CBSE affiliated English medium schools of Gujarat in the year 2011-12 constituted as the population for the present study. There were a total of 232 CBSE affiliated secondary schools and 14665 standard IX students in those CBSE affiliated schools in Gujarat for the year 2011-12. (Derived data as per students enrollment done in standard IX in Gujarat for the X AISSE board examination that was to be conducted by CBSE for year 2012-13.)

3.3.3 Sample of the Study

Sample for the present study were selected purposively considering the experimental nature of the present study and bearing in mind the feasibility aspect of the experimentation, data collection and with the objective of getting all the required facilities and the researcher's convenience. Two CBSE affiliated secondary schools of Surat city were taken purposively as the sample school for the present study. The P.P. Savani Chaitanya Vidya Sankul, Abrama, Surat was considered as the school for experimental group and Radiant English Academy, Piplod, Surat was taken as the school for controlled group. Again, section A of standard IX of the P.P. Savani Chaitanya Vidya Sankul, Abrama, Surat was considered as the sample group for

experimental group and section A of standard IX of the Radiant English Academy, Piplod, Surat was taken as the sample group for the controlled group. There were 35 and 37 students in the sample of experimental and control groups respectively. Pre-achievement test in Geography was administered to both control group and experimental group and students of both the groups were assigned marks in Geography i.e. pre-test achievement score. With equal marks in the pre-test achievement test, one-one students were assigned to control group and experimental group. In this process 30 pair of students were found out and accordingly 30 students each were assigned to control group and experimental group. In terms of pre-test score the group of these 30 students can be called as equivalent groups having same group statistics like Mean, Standard Deviation and Standard Error of Mean. In this process, 30 students were segregated in each of control group and experimental group. Hence, the sample comprised of 30 standard IX students of CBSE affiliated schools for experimental group and an equivalent 30 standard IX students of CBSE affiliated schools for control group.

3.3.4 Tools for Data Collection

In the process of attainment of the objectives for the present study, an achievement test in Geography and a reaction scale were constructed by the researcher. Comprehensive procedure pursued and adhered to for the construction of tools is specified below.

3.3.4.1 Achievement Test

The researcher constructed achievement test with the intention to conduct pre-test and post-test as a part of experiment process. The achievement test constituted the questions covering the content of chapter 1 to chapter 6 of textbook- Social Science Contemporary India-I Text Book in Geography for Class IX prepared by NCERT, New Delhi published in the year 2006 reprinted in January 2010 with ISBN no. 81-7450-520-2, recommended by Central Board of Secondary Education for syllabus execution. The researcher outlined the blue print for the construction of the achievement test in Geography taking into consideration the type and level of questions. The blue print was of 100 marks with all objective type-multiple choice questions based on appropriate exposure of the content from all six chapters and with

coverage to knowledge, understanding and application levels questions. Adapting the generated blue print, the achievement test in Geography was constructed by the researcher. The constructed achievement test was shown to the ten experts (Teachers) in the field of Geography for the purpose of its validation. The suggestions of the experts were duly incorporated in the Geography achievement test. Determining the content validity of the Geography achievement test, the test was administered to 100, standard IX students of CBSE and the reliability of the achievement test was determined using split-half method. The reliability coefficient using split-half method was found to be 0.91 showing a high level of reliability. The Geography achievement test is given in appendix I.

3.3.4.2 Reaction Scale

A Likert type five point reaction scale was prepared by the researcher to study the reaction of the students of experimental group about the developed Multimedia Package for teaching Geography. 30 statements covering various aspects related to the construction, implementation, and experience from the multimedia package were framed and incorporated in the reaction scale. The five points of reaction were ranging from 'strongly agree' to 'strongly disagree' through 'agree', 'can't say', and 'disagree'. According to the student's reaction towards each statement, students were supposed to show their reaction by putting a tick mark (√) in the appropriate box for each statement. All the statements framed were positive. For validation, the reaction scale was given to ten teacher educators having proficiency in educational tools for their suggestions and accordingly their suggestions were duly incorporated in the reaction scale. The reaction scale is given in Appendix III.

3.3.5 Development of Multimedia Package

The researcher developed multimedia package to teach the selected sample of experimental group in the subject of Geography for standard IX students of CBSE affiliated schools. In order to develop a multimedia package the researcher underwent the following different stages of its development.

- In-depth planning and the analysis of the content in collaboration with the associated team member in the development process of multimedia package.

- Drafting the script of the content to be presented in the package.
- Development of animation and video features.
- Assembling the features with audio text, graphics and animation and further editing for finalization.
- Validation of Multimedia Package
- Tryout-The pilot study.

3.3.5.1 Planning and Analysis of Content

The researcher resorted on the experts of software developers and sound system management consultancy in Surat city to get designed and developed a better multimedia package. A team of ten multimedia designers (animators) were involved in the project of developing the package. The researcher shared goal of creating the package and laid down the major objectives of the project with multimedia designers so that everyone working for the creation and development of package could carry a shared vision. The researcher, for the development of package took text book titled 'Social Science Contemporary India-I Text Book in Geography' for Class IX published by NCERT, New Delhi in the year 2006, reprinted in 2010 and recommended by Central Board of Secondary Education to be used as aid to teach the students of standard IX. All six chapters of Geography text book namely, India- Size and Location, Physical Features of India, Drainage, Climate, Natural Vegetation and Wild Life and Population were taken for the development of multimedia package. The researcher did scrupulous analysis of the text book content through content analysis, to acquire the content matter for the development of multimedia package and made the syllabus planning for the year on the basis of same. The draft of the syllabus plan along with the textbook was given to multimedia designers for them to go through its content for the initial phase and also for throughout the phase of development of package. Throughout the developmental phase there was continuous coordination between the researcher, and the technocrats.

3.3.5.2 Drafting Script and Voice Recording

On completion of initial planning and analysis of the content, the researcher drafted the script for the multimedia package by outlining the content. The text covered the main points of the content to be presented with the usage of language that appeals the

audience in jargon, tone and style. The text drafted for all six chapters was converted into voice recording to be incorporated in the package. The voice used for recording the content was that of the researcher. For voice recording, regular visits were made by the researcher to the recording centre. The researcher tried his best to give better tone and style to the speech and recording.

3.3.5.3 Development of Video Features (Story Boarding and Designing Phase)

Multimedia package is usually a collaborative output of varied aspects in the form of audio, video, imagery, text for voiceovers and on-screen titles which the team was supposed to bind everything together for each scene. For every scene the sketch of visual elements, the voiceover (title text) and the production notes were created. Further visual aspects were developed, graphics were created, navigations were designed, information design was created, and photographers were directed regarding the correct shots, photography and images to be collected. For information design and graphics design, the researcher browsed the topics on the internet and in the books, collected the necessary images and information to design the layout for multimedia package. The researcher also noted down, the narration and information to be included in Geographical vocabulary and technical design of the multimedia package. Accordingly the material was gathered as information for the topics, in the form of theory content, photographs, some of the static images that were free images downloaded from the internet. Along with this the process of creation of 2D animation video was carried on with the usage of Abode Flash (Monthly trial version packages).

3.3.5.4 Assembling the Features with Audio, Text, Graphics and Animation i.e. (Production)

The text material and media material that was collected from the books, internet were in their raw state, were assembled and assimilated in a multimedia package. The recorded voice was also merged in the multimedia package. The software used for development of multimedia package was Abode Flash. Graphics in the forms of 2D animation were merged in the presentation. Presentation incorporated detail explanation of each topic with an adequate amount of instances, illustrations and example. Explanation incorporated in itself examples related to each topic with theoretical and structural aspects. Adequate coverage of maps with proper labeling

was instilled in the package to have good idea about imaginary aspects of Geography. The images and pictures used in the developed package were associated to the real life situations. Researcher with the support of technical team tried to take care of the principles of developing multimedia package while building up the multimedia package. Researcher attempted to put pictures and words simultaneously wherever needed. He attempted by putting animation and narration together considering split attention effect. Researcher tried to present corresponding words and pictures near rather than far from each other on the page or screen. Researcher tried to avoid and exclude the usage of irrelevant extraneous material, sound, words in order to remove the negative effect of the same on learning by incorporating the use of proper words, sound and material in the package itself. The researcher tried to make best use of visual and auditory channels by explaining graphics with audio so that students improve learning. The build-up Multimedia Package was with enough scope for the teacher (here researcher himself) to be the facilitator and guide wherever an individual wants to get involved in the process of teaching. In order to evolve such multimedia package the researcher with the support of technical team edited it many a times especially after every chapter, taking into consideration the time constraints, story line and creative specifications. Each chapter was edited separately. In fact, this was more a complex stage and most time consuming. Where the large amount of editing was involved, longest time was consumed. The researcher gave his ample time and visits to the technicians to make modifications to bring best in the package. After rounds of scrutiny and reviews and final edits, the package was developed. The developed package was exposed to the experts in the field of education, technology as well as Geography. After obtaining reaction towards the developed multimedia package from Geography teachers (experts) of the schools of Surat, multimedia package was validated. The suggestions from these subject experts were duly incorporated by researcher on the way of construction of finally brought up multimedia package.

3.3.5.5 Validation of Multimedia Package

The development of Multimedia Package was shown to 20 experts. Ten of them were the teachers teaching Geography and ten were the software experts. All these experts were asked to give their feedback for the improvement of the developed package. On the basis of their feedback and suggestions the package was modified and made ready for tryout.

3.3.5.6 Tryout of the Multimedia Package

Pilot Study is a kind of user testing phase to ensure the multimedia package to have the desired impact. The pilot study of the package was done with the standard IX students of another English medium school affiliated to CBSE. The researcher observed students reaction, asked them few questions to see if the package hits the right marks and noted down the flaws and clues and on the basis of the reaction of the students, indispensable amendments were incorporated in the package. On getting satisfied, the package was made ready for its implementation by the researcher. The soft copy of multimedia package is provided with the thesis.

3.3.6 Procedure of Data Collection

Following phases were undertaken for the purpose of data collection.

3.3.6.1 Phase-1: Pre-Testing

In the beginning of the experimentation, the researcher administered the achievement test in Geography for the purpose of pretesting on both the experimental group and control group students. Both the control and experimental group students were informed about the testing two days before pretesting. Time duration of the test was one hour forty minutes (100 minutes), giving 1 minute to each multiple choice question. Both the groups were made equivalent on the basis of this pre-test score. In this process 30 student were segregated in each of control group and experimental group as samples for the purpose of experimentation.

3.3.6.2 Phase-II: Implementation of Multimedia Package

After taking the required permission from the authorities of the experimental school, Researcher being the Principal and the Geography teacher arranged a total of 60 periods in the timetable each with the duration of 35 minutes for the whole year of 2011-12 starting from June 2011 to February 2012 for the implementation of the multimedia package. The researcher himself taught all the six chapters of Geography to the whole experimental group for the arranged time period with the help of the developed multimedia package. Throughout the process of teaching-learning the researcher acted as a facilitator and guide. The researcher used discussion method while teaching Geography to the experimental group with the help of multimedia package. During this period of time, the researcher observed the students of the experimental group too. During the same duration the control group was taught Geography by their own teacher through traditional method. Few pictures are added here showing the researcher teaching the experimental group with the help of developed multimedia package.

Figure 3.1: The Researcher while Teaching Physical Features of India, the Great Northern Plains

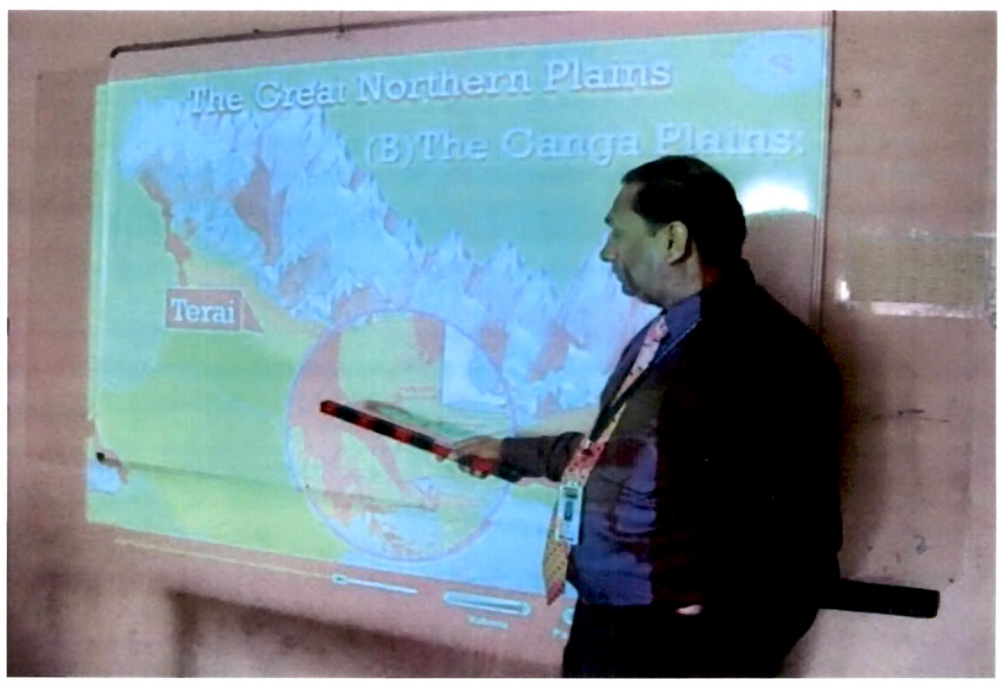

Figure 3.2: The Researcher & Students while Viewing Physical Features of India

Figure 3.3: The Researcher while Teaching Latitudinal Extent of India

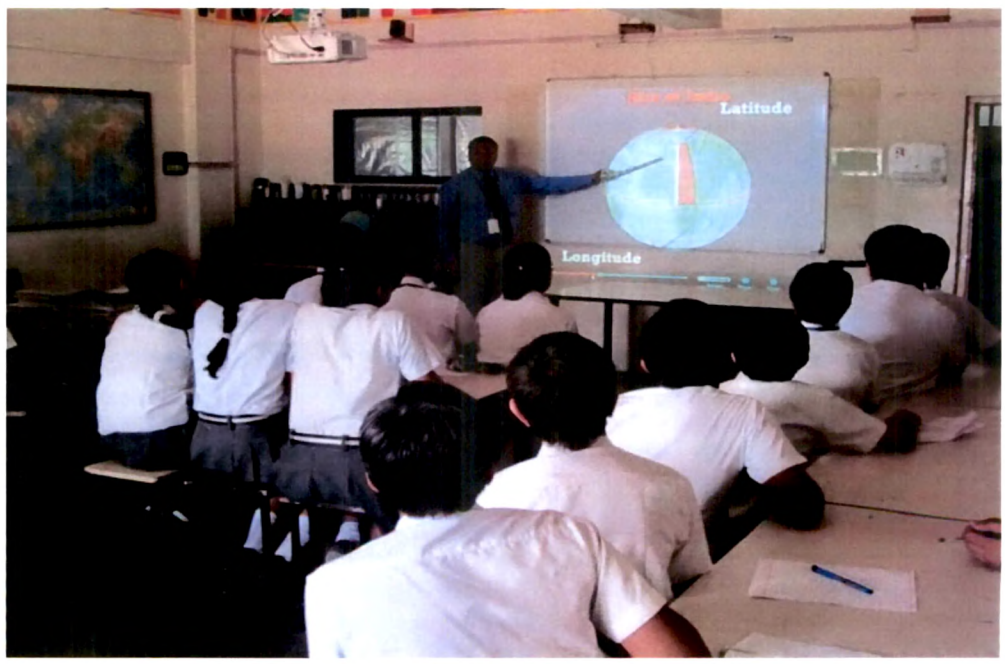

Figure 3.4: Self-Assessment by Students in Computer Lab

Figure 3.5: The Researcher while Writing Question on Board for Assessment of Learning among Students

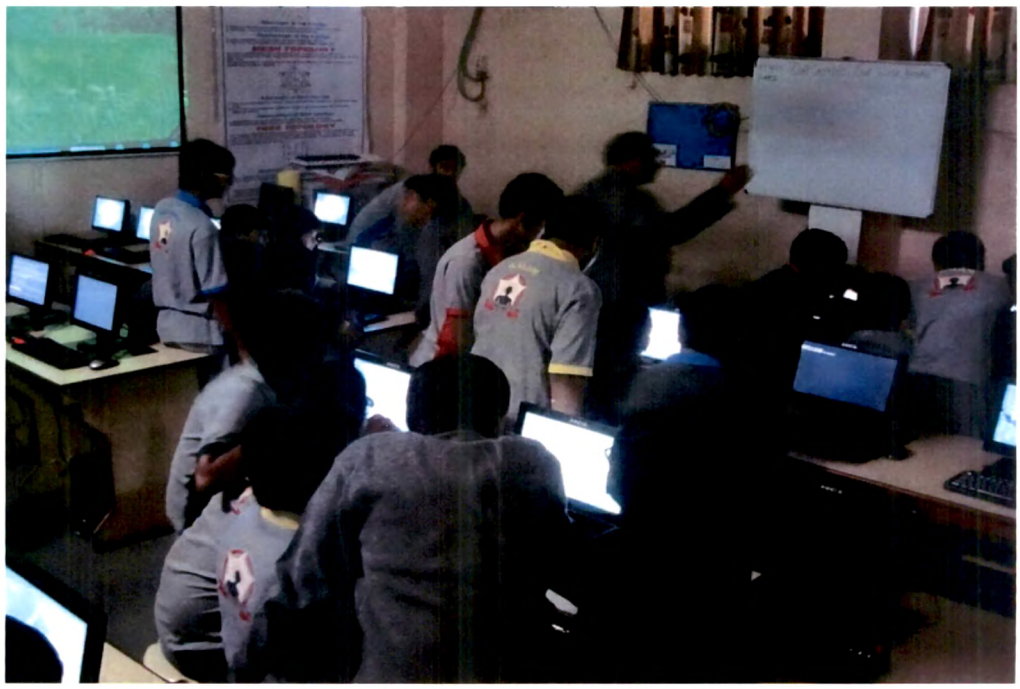

Figure 3.6: The Researcher while Assessing Peer Group Activity

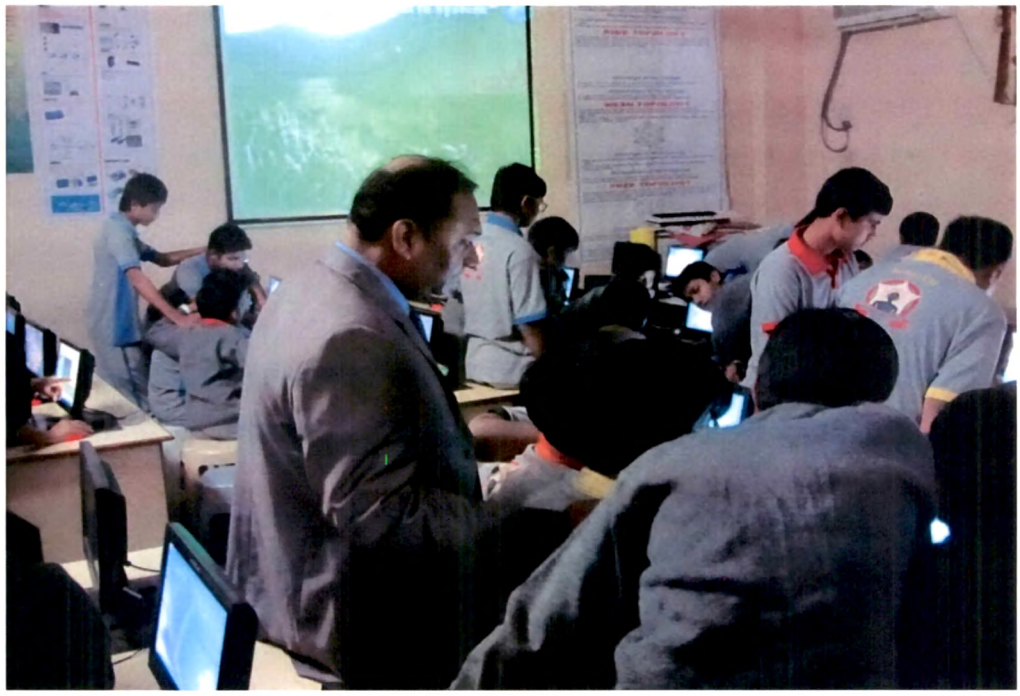

Figure 3.7: Student Engaged in Viewing the Images Features of Vegetation in India

3.3.6.3 Phase – III: Post-Testing

In the second week of February 2012 the researcher completed the teaching of Geography to the experimental group through multimedia package. During the same time the teaching of Geography to the control group was also completed by their teacher using traditional approach. During this time the developed achievement test in Geography used as the pre-test before, was administered again on both the whole control group and experimental group as the post-test by the investigator. The prepared reaction scale was administered on the experimental group students to know their reaction towards the developed multimedia package through which they were taught Geography for the whole year.

3.3.7 Procedure of Data Analysis

The collected data obtained through pre-test and post-test were analyzed by employing quantitative data analysis techniques. Pre-test achievement data related to Geography was used to make control and experimental group equivalent. Mean, Standard Deviation, Standard Error of Mean and Mann-Whitney U-test were used to analyze the quantitative data collected through post-test. The non-parametric Mann Whitney U-test was used to analyze the data as the sample was taken purposively as it is considered as the most powerful non parametric equivalent of t-test of parametric family. Data collected through reaction scale was analysed quantitatively with the help of percentage calculated for the frequency of responses and Intensity Index (II). The detailed analysis and interpretation of the data is given in chapter IV.