CHAPTER - III

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methodology adopted by the investigator to realize the objectives of the present study. Methodology refers to the plan and procedures one adopts while conducting a research study The present study is an experimental study. Methodology meant for both qualitative as well as quantitative research is followed for the present study being under the umbrella of experimental study. The present chapter includes population, sample, and design of the study, required data, tools and techniques used for data collection, procedure of data collection and the procedure of data analysis

In order to realize the objectives of the study, two types of empirical data were collected i.e. qualitative and quantitative Though both qualitative and quantitative data were used in the present study, the major focus was on the qualitative data. To realize objective one i.e. *'to study the Computer Education teaching-learning process at secondary school level'*, data were collected through observation of the Computer Education theory and practical classes. All the specific behaviour of teachers and students were recorded along with description of various teachers and students behaviour. Further, this paved the way for identifying and developing the required inputs for the training programme for teachers for effective transaction of Computer Education curriculum. To realize objective two and three i.e. *'to design a teacher training programme to teach Computer Education at secondary school level'* and *'to develop a teacher training programme to teach Computer Education at secondary school level'* respectively, content analysis of Computer Education textbook was done to design and develop training programme for teaching Computer Education The data collected for objective one through observation were also utilized for developing the training programme. To realize objective four i.e. *'to implement the developed Computer Education training programme'*, the developed training programme was conducted for teacher for 36 hours spread over nine days. To realize objective five and six i.e. *'to study the effectiveness of the developed teacher training programme in*

terms of teachers' reaction' and *'to study the effectiveness of the developed teacher training programme in terms of teachers' teaching behaviour'* respectively the data were collected through reaction scale and observation after implementation of the training programme. To realize objective seven i e. *'to study the effectiveness of the developed teacher training programme in terms of students' achievement in Computer Education students' achievement'* both in theory and practical were collected before and after the training programme with a gap of five month which were analyzed quantitatively. A detail of the present chapter is presented as follow.

3.1 DESIGN OF THE STUDY

The present study was experimental in nature where Quasi-experimental design was used. The Pretest-Posttest Nonequivalent-Controlled Group Design was followed in this research. 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 design of the study is presented as follow.

O_1	X	O_2
O_3	C	O_4

Where, O_1 and O_3 are pretest

O_2 and O_4 are posttest

X stands for Experimental Group and

C stands for Control Group

Following this design, the achievement of students in computer will be measured before and after the experimentation. The similar procedure will be followed for control group. This data will be analyzed quantitatively. Teachers change in behaviour due to training programme will be studied in experimental group while transacting Computer Education curriculum with the help of observation. These data will be analyzed qualitatively.

3.2 POPULATION OF THE STUDY

The population of the present study comprised of all the Computer Education teachers teaching Computer Education as a subject at secondary school level (both Gujarati and English medium) following the Computer Education textbook prescribed by Gujarat Secondary Board of Education and all the students of English and Gujarati medium schools studying Computer Education as a subject at Secondary School level.

3.3 SAMPLE OF THE STUDY

The sample of the present study was taken purposively keeping in mind the feasibility aspect of the experimentation. For the purpose of pre-training observations eight schools of Baroda city (four English medium and four Gujarati medium) were selected purposively. Out of these eight schools, four schools (two English medium and two Gujarati medium) were selected as the sample for the experimentation in the present study. From these four schools, two schools (One English medium and one Gujarati medium) were taken as experimental group and two schools (One English medium and one Gujarati medium) were taken as the control group. For the implementation of the developed teacher training programme all the six teachers of the experimental group teaching Computer Education at secondary level were taken as the sample who were given training. 205 students of standard VIII studying computer as a subject in all the four schools were taken as the sample for the present study. 87 students of standard VIII of the two schools in the experimental group were considered for the experimentation and 118 students of standard VIII of the two schools in the control groups were considered for the control group. The students who didn't appear either theory or practical achievement post-test were discarded The sample of students after administration of post-test achievement test was 197. Thus, the student sample of the present study became 82 students of experimental group (35 English medium and 67 Gujarati medium) and 115 students of control group (48 English medium and 67 Gujarati medium).

3.4 DATA REQUIRED FOR THE STUDY

Keeping in view the objectives of the study and the nature of data required, necessary information in the form of inputs for the training programme were collected through various sources. The sources of data were observation of both theory and practical classes of eight schools in Baroda city, content analysis of the standard VIII Computer Education Textbook to design framework for Computer Education teaching, students' pre-test and post-test achievement score in computer and reactions of the teachers on training programme

3.5 TOOLS AND TECHNIQUES

To collect the data of the present study in the stated required form, the investigator prepared and used the following tools.

(i) Observation Schedule (for Theory class)

(ii) Observation Schedule (for Practical Class)

(iii) Achievement Test

(iv) Reaction Scale

For the present study four tools e.g. observation schedule for theory class, observation schedule for practical class, achievement test and reaction scale were constructed by the investigator. Details about the construction of the stated tools are presented as follow.

3.5.1 Construction of Observation Schedules for Theory and Practical Classes

To achieve objectives one, two, three and five of the present study two tools e.g. observation schedule for theory class, observation schedule for practical class, were constructed by the investigator. The first step in the construction of these tools was to identify all those components about which the information was to be obtained through the review of related literatures. The first drafts of the observation schedule for theory and practical class were prepared with 20 items and 12 items respectively. These tools were then referred to five experts in the area of teacher education in order to obtain their opinion about the validity of the items in the tools as well as the clarity

of items and their comprehensibility. The feedback obtained from the experts was utilized for the revision of the tools. The revision was mainly of done to avoid ambiguous items, rephrasing items to avoid repetitions of meaning of the items and refining the language of the certain items. Keeping in view the above points, a revised final draft of the tool was prepared by incorporating the comments and suggestions of the experts.

This schedule for theory classes consisted of the components like, name of the topic, use of lesson plan, use of textbook, introducing the lesson, teaching approach, students' participation, students' response, frequency of blackboard use, quality of blackboard work, use of teaching aids, use of skills, teacher's questions, students' questions, assignment given to workout in theory class, home task assigned, classroom management, summarization of the lesson and methods used by the teacher. The items in the observation schedule were combination of both close ended and open ended type.

The observation schedule for practical classes consisted of the items like, name of the teacher, number of machine, instruction of the teacher, classroom arrangement, nature of work assigned to work out, use of textbook, teacher's activities in the class, students' activities in the class, students' query, teacher's response to students query, supervision by the teacher, class management by the teacher and assignment given to work out in next class. Most of the items of the observation schedule were open ended. The final form of the observation schedule is attached in Appendix II and III.

3.5.2 Construction of Achievement Tests

Two achievement tests one in theory and another in practical were prepared by the investigator taking the Computer Education syllabus of Standard VIII designed by the GSEB, Gandhinagar. The achievement test was prepared on four chapters namely, (i) introduction to computers (ii) Windows' concepts and components (iii) Files and Folders and (iv) Using Additional Windows Facilities. Both objective type and subjective type questions was included in the theory achievement test. Practical achievement test includes the items related to DOS and files and folders, and Word

Processing. These two achievement tests were used for pretest and posttest of both experimental and control groups. The achievement tests had seven items for theory and nine items for practical selected by the content analysis of the standard VIII text book. These achievement tests were referred to five computer teachers and five experts in the area of teacher education in order to obtain their opinion about the validity of the items in the tools as well as the clarity of items and their comprehensibility. The feedback obtained from the experts was utilized for the revision of the tools. The revision was mainly of done to avoid ambiguous items, rephrasing items to avoid repetitions of meaning of the items and refining the language of the certain items. Keeping in view the above points, revised final draft of the achievement tests were prepared. Initially achievement tests were developed in English. These tools were then edited carefully and scrutinized by language experts. As the Gujarati medium schools were also taken as sample, the achievement test for student was translated into Gujarati with the help of Gujarati Computer Education teacher and the achievement test was given to two language expert. Keeping in view their comments and suggestions, revised and final draft was prepared The final form of the achievement test is attached in Appendix V and VI.

3.5.3 Construction of Reaction Scales

A 5 point Likert type reaction scale was prepared by the investigator for the teachers to take the reaction about the developed training programme. The reaction scale includes the items related to different components of training programme, procedure of training, impact and usefulness of the training programme in teaching learning process etc. The reaction scale had 30 items containing different components of training programme. Like other tools, the reaction scale was also given to five experts in teacher education. On the basis of the comments and reactions of the experts the scale was modified by the investigator. The reaction scale is given in appendix IV

3.6 METHODS OF DATA COLLECTION

The main data collecting strategies employed in this study were participant observation, content analysis of textbook and administration of achievement test and reaction scale. This has been summarized in the table 3.1.

Table 3.1: A Summary of Data Collection Methods and the Sources of Data According to Different Areas of Enquiry.

S. No.	Area of Enquiry	Data Collection Methods	Sources of Data
1	Preparation of the training programme Pre-Testing Phase – I	- Participant observation - Textbook analysis -Pre-Testing (Achievement Test)	-Teacher - Student -Informal discussion with teachers - Textbook
2	Implementation of training programme Phase – II	Administration of Reaction Scale	- Teachers
3	Post-training period Phase III	Post Participant observation Post-Testing (Achievement test)	- Teachers - Students

Details of the methods of data collection like, participant observation, content analysis of textbook and administration of achievement test and reaction scale are presented as follow.

3.6.1 Participant Observation

A large part of the data for the present study was collected through participant observation. The participant observation focuses on "..... *human interaction and meaning viewed from the insiders view point in everyday life situations and settings (Jorgensen, 1998)*". Prior to the observation the classes, the investigator developed good rapport with teacher and students by visiting the school frequently and interacting with them. This helped the investigator to avoid the effect of being as an outsider in the class. The investigator observed the day-to-day really happening at the Computer Education theory and practical classes. The observation schedule was semi-structured which helped to record each and every activities of the class. The participant observation was done by the investigator in two phases. In the first phase,

the pre-experiment observation helped in the preparation of the training programme and also helped to record the teaching behaviour of the teachers in the class before the training programme. These participant observations were made during 19th July, 2004 to 17th February, 2005 by the researcher. During this period 32 theory classes and 25 practical classes were observed depending upon the availability of periods. The activities of the teachers and students were observed in both theory as well as practical classes. These observations helped to arrive at curricular decisions on the preparation of training programme.

In the second phase, after the training programme, the investigator made to observe the teachers' behaviour in the same manner as in the first phase to see the change in teachers' behaviour due to the training programme using the same observation schedule. This participant observation was done after the implementation of training programme for 16 theory classes and 14 practical classes which continued from 4/07/2005 to 30/11/2005 depending upon the availability of periods. All the activities of teacher (teaching behaviour) and students were observed in both theory and practical classes. For the observation during post-training phase, the investigator trained a person to observe both theory and practical classes. The main purpose was to minimize investigators biasness after the training programme.

3.6.2 Textbook Analysis

In order to design a framework for effective Computer Education teaching-learning, it was considered to analyze the Computer Education Textbook of Standard VIII, prescribed by Gujarat Secondary Board of Education. The content analysis was done by the investigator to find out the nature of content and how it can be taught to the students for effective learning. The content analysis of the text book helped the researcher to design the training programme for the computer teachers.

3.7 PROCEDURE OF DATA COLLECTION

The data for the present study was collected through participant observation, textbook analysis and by administering achievement test and reaction scale. The data

were collected in three phase i.e. pre-training phase, training phase and post-training phase. Details of the data collection procedure are given as follow.

3.7.1 Pre-training Phase

In this phase, 32 theory classes and 25 practical classes were observed. During this phase, the investigator observed all the activities and interaction of teacher and students in both theory and practical classes. All the teaching behaviour of teachers was recorded in observation schedule. Also, informal discussions with teachers were carried out to know about their pedagogical knowledge and needs. The investigator also analyzed the Computer Education textbook of standard VIII to design framework for effective teaching-learning process. The combination of observed data, informal discussion with teacher and textbook analysis paved the way for identifying and developing the inputs for the training programme. An achievement test (pre-test) was administered on computer theory and practical to both experimental and control group students in order to know the achievement of students in Computer Education.

3.7.2 Training Phase

In this phase, the learning material of the training programme was prepared by the investigator. The prepared learning material of the training programme was given to three experts for its scrutiny, relevance and appropriateness. Based on experts' comments and suggestion, the learning material was modified and made ready for the training programme. The training programme was conducted during 13-06 -2005 to 21-06- 2005 for a period of 9 days. The training programme spread over 18 sessions, a total of 36 hours. To conduct the training programme experts from the Centre of Advanced Study in Education (CASE), Department of Education, Faculty of Education & Psychology, the Maharaja Sayajirao University of Baroda, Vadodara were invited. The investigator also conducted few sessions of the training programme. The major components of the training programme were : Importance /need of training, Aims and Objectives: Meaning of aims and objectives, Instructional objective: it's meaning and writing instructional objectives in behavioural terms; Principles and Maxims of Teaching: General principles and maxims of teaching, Skills of Teaching: (i) Introducing lesson, (ii) skill of questioning, (iii) skill of

Probing, (iv) Skill of Explanation, (v) Skill of Stimulus Variation (vi) skill of Reinforcement; Instructional Media (i) Blackboard, (ii) Charts, (iii) Over Head Projector, (iv) Computer (v) LCD Projector; Classroom Environment: Classroom environment and learning process, Dimensions of classroom environment: Teacher-student interaction, student-student interaction; Methods of Teaching: (i) Lecture Method, (ii) Demonstration Method, (iii) Problem Solving Method, (iv) Assignment Method; Approaches of Teaching: (i) Inductive Approach, (ii) Deductive Approach, (iii) Problem Solving Approach, (iv) Participatory Approach; Classroom Management; Cooperative Learning; Models of Teaching: (i) Advance Organizer Model of Teaching, and (ii) Mastery Learning Approach of Teaching; Lesson Planning and Evaluation. The training programme was a combination of both theory and practice. During the practice session activities related to training programme components were given to the teachers for workout and it was followed by discussion. Details of the training programme are given in Appendix I. After the training programme, the reaction scale prepared by the investigator was administered to the teachers to take their reaction about the training programme.

3.7.3 Post-training Phase

After the training programme the teachers were instructed to implement the learning of the training programme in their theory and practical computer classes. During this period, the investigator collected the observed data with the help of a trained observer with respect to the activities and interactions of teachers and students in 16 theory and 14 practical classes of experimental group. All the teaching behaviour of teachers was recorded in observation schedule. Besides, an achievement test (post-test) was administered on computer theory and practical to both experimental and control group students in order to know the effectiveness of training programme in terms of students' achievement.

3.8 PROCEDURE OF DATA ANALYSIS

As the present study was an experimental and developmental in nature, data analysis was done following experimental design. In the first phase, data collected through observation and content analysis of the Computer Education Textbook. This

helped to prepare framework for teaching Computer Education and in developing the inputs for the training programme for teachers. The data were analyzed using both qualitative and quantitative methods. The details regarding the procedure of data analysis have been presented objective wise in the table 3.2 as follow.

Table 3.2 A Summary of Data Analysis Procedure Adopted According to Different Objectives of the Study.

Objectives	Purpose	Types of Data	Techniques Used
Objective 1	Analysis of Computer Education teaching learning process	Qualitative	Frequency and percentage
Objective 2 and 3	Designing and development of training programme	Qualitative	Content analysis
Objective 4 and 5	Implementation of training programme and reaction of teachers	Qualitative	Frequency and percentage
Objective 6	Effectiveness of training programme in terms of teachers' teaching behaviour	Qualitative	Frequency and percentage
Objective 7	Effectiveness of training programme in terms of students' achievement	Quantitative	ANCOVA

Details of the data analysis and interpretation are presented in the chapters follow. The analysis and interpretation of the data is done objective wise and is presented in Chapters IV, V, and VI. In Chapter IV development and implementation of the training programme is presented along with the analysis and interpretation of data related to the reaction of teachers' about the training programme. In Chapter V the analysis and interpretation of the data related to the pre-training and post-training observation of both theory and practical classes is presented. In Chapter VI the analysis and interpretation of the data related to the achievement test is presented.