CHAPTER THREE

METHODOLOGY

CHAPTER – III

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3.0 INTRODUCTION

The central aspect of any research embodied in its methodology that shares the idea of how the study was conducted. It refers to the plan and the procedures used by the researcher for conducting the present study. This chapter is methodology oriented where the researcher has concentrated on the plan and procedure adopted in order to attain the objectives of the present study. The present study is experimental in nature. This chapter includes Objectives of the Study, Hypothesis of the Study, Explanation of the Term, Operationalization of the Terms, Delimitation of the Study, Population of the Study, Sample of the Study, Design of the Study, Plan and Procedure, Tools for Data Collection, Procedure of Data Collection and Procedure of Data Analysis. The comprehensive detail of the methodology with reference to above aspects has been described as under.

3.1 OBJECTIVES OF THE STUDY

The present study was designed with a view to achieving the following objectives:

i) To identify the major learning difficulties in English grammar for the students of Std. IX as perceived by the teachers.

ii) To develop Computer Assisted Instruction (CAI) in English grammar for Std. IX students.

iii) To study the effectiveness of the Computer Assisted Instruction (CAI) in terms of achievement of the students in English grammar.

iv) To study the reactions of the students about the developed Computer Assisted Instruction (CAI) in English grammar.

3.2 VARIABLES OF THE STUDY

Under the present study, the following variables have been taken into consideration:

i) **Independent Variable: -** Computer Assisted Instruction (CAI) in English grammar was considered as the independent variable under the study.

ii) **Dependent Variable: -** Students' achievement in English grammar was considered as the dependent variable under the present study.

iii) **Control Variables: -** Different variables like Type of Schools (Grant-in-aid), Area of the schools (Urban), Medium of the schools (Gujarati Medium), Age group of the students (14-15 years), Standard of the students (9th) and Previous scholastic achievement of the students were controlled under the present study.

3.3 HYPOTHESES OF THE STUDY

i) There will be no significant difference in the mean achievement score of the experimental group in pre-test and post-test.

ii) There will be no significant difference in the mean achievement score of the control group in pre-test and post-test.

iii) There will be no significant difference in the mean achievement score of the experimental group and control group in post-test.

iv) There will be no significant difference in favourable and unfavourable reactions of the students of the experimental group regarding the implemented CAI.

3.4 EXPLANATION OF THE TERM

- **CAI in English:**

CAI in English based on grammar refers to the Computer Assisted Instruction Package developed by the investigator using various software like Macro Media Flash, Page Maker, Adobe Photoshop and Coral Draw to teach English grammar to the students of Std. IX. The CAI is based on some grammar teaching points which were identified as the learning difficulties of the students on the basis of the opinion of a group of experienced English teachers. The CAI is based on the identified grammar points viz. Articles, Prepositions, Conjunctions, Quantifiers, WH – questions, Question Tag, Types of sentences, Modal Auxiliaries, Degrees of Comparison, Simple Past Tense, Present Perfect Tense, Past Perfect Tense, Adverb Clause of Result, Active – Passive Voice and Reported Speech. The developed CAI includes the explanation of

various topics with examples, exercise, self-practice and self-evaluation items in different formats. It includes almost all the grammar teaching points of standard IX. This developed CAI is a multi-faceted learner-centered design based on important principles mentioned below.

- Integration of instruction, practice, assessment and feedback.
- Integration of Instructional material for active engagement of the learners.
- Integration of focused personalized cognitive efforts
- To support mastery learning through individualized learning.

3.5   OPERATIONALIZATION OF THE TERMS

- **Achievement:**

    Achievement means the marks obtained by the students of Std. IX in the achievement test based on English grammar.

- **Effectiveness of CAI:**

    Effectiveness of CAI was judged on the basis of the significant difference in mean achievement scores of the experimental and control groups in the post-test.

3.6   DELIMITATION OF THE STUDY

    The present study was delimited to the students of Gujarati medium Grant-in-aid secondary schools of Vadodara city, following the prescribed syllabus of Gujarat Secondary and Higher Secondary Education Board (GSHSEB).

3.7   POPULATION OF THE STUDY

    There were total four clusters of schools in Vadodara city known as 'Shala Vikas Sankuls' (SVSs). There were total 106 Gujarati medium Grant-in-aid secondary schools divided under the four SVSs. Thus, total 8104 students studying in these schools constituted the population for the present study. The detail of the same is given in the Table No.: 3.1.

Table 3.1

Detail of the population

Sr. No.	Name of Shala Vikas Sankuls (SVSs)	Total number of Sec. Schools (Grant-in-aid Guj. Med.)	Total number of Students in Std. IX (Grant-in-aid Guj. Med.)
1	Maharshi Arvind Shala Vikas Sankul	30	3822
2	Dr. C. V. Raman Shala Vikas Sankul	26	1662
3	Dr. Madhubhai Buch Shala Vikas Sankul	22	1430
4	Sir Sayajirao Gaekwad Shala Vikas Sankul	28	1190
	Total	106	8104

3.8   SAMPLE OF THE STUDY

Sample for the present study was selected purposively considering the nature of the study and bearing in mind the feasibility aspect of the experimentation, data collection and with the intention of getting all the necessary facilities in the schools. First of all, the list of Grant-in-aid Gujarati medium secondary schools of Vadodara city was collected from the District Education Officer (DEO) office, Vadodara. Then considering the availability of necessary facilities like the full-fledged computer lab and separate classroom with LCD projector, two schools (Jeevan Bharti School and Narayan School) were selected purposively with the consent of school management. An intact class of Std. IX from each school was considered as the sample for the present study. There were total 66 and 58 students respectively in class IX of the selected two schools. The group of students from Jeevan Bharti School was treated as the experimental group whereas the group of students from Narayan School was treated as the control group. Also, a group of 22 students of standard IX studying in Vallabh Vidya Mandir was selected for the initial tryout of the CAI. The detail of the same is given in the Table No. 3.2.

Table 3.2

Detail of the sample size

Sr. No.	Name of the school	Group	Phase	Total No. of Students
1	Vallabh Vidya Mandir	----	Initial Tryout of CAI	22
2	Jeevan Bharti School	Experimental	Final implementation of CAI	66
3	Narayan School	Control		58
		Total		124

3.9   DESIGN OF THE STUDY

The design of the present study was Quasi-Experimental Design under the Experimental research study. Under this, the 'Pretest – Posttest Non-equivalent Group Design' was adopted. Best and Kahn (2000) 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.

$$O_1 \qquad X \qquad O_2$$

$$O_3 \qquad C \qquad O_4$$

Where, O_1 and O_3 are pre-tests

O_2 and O_4 are post-tests

X stands for Experimental Group and C stands for Control Group

3.10   PLAN AND PROCEDURE OF THE STUDY

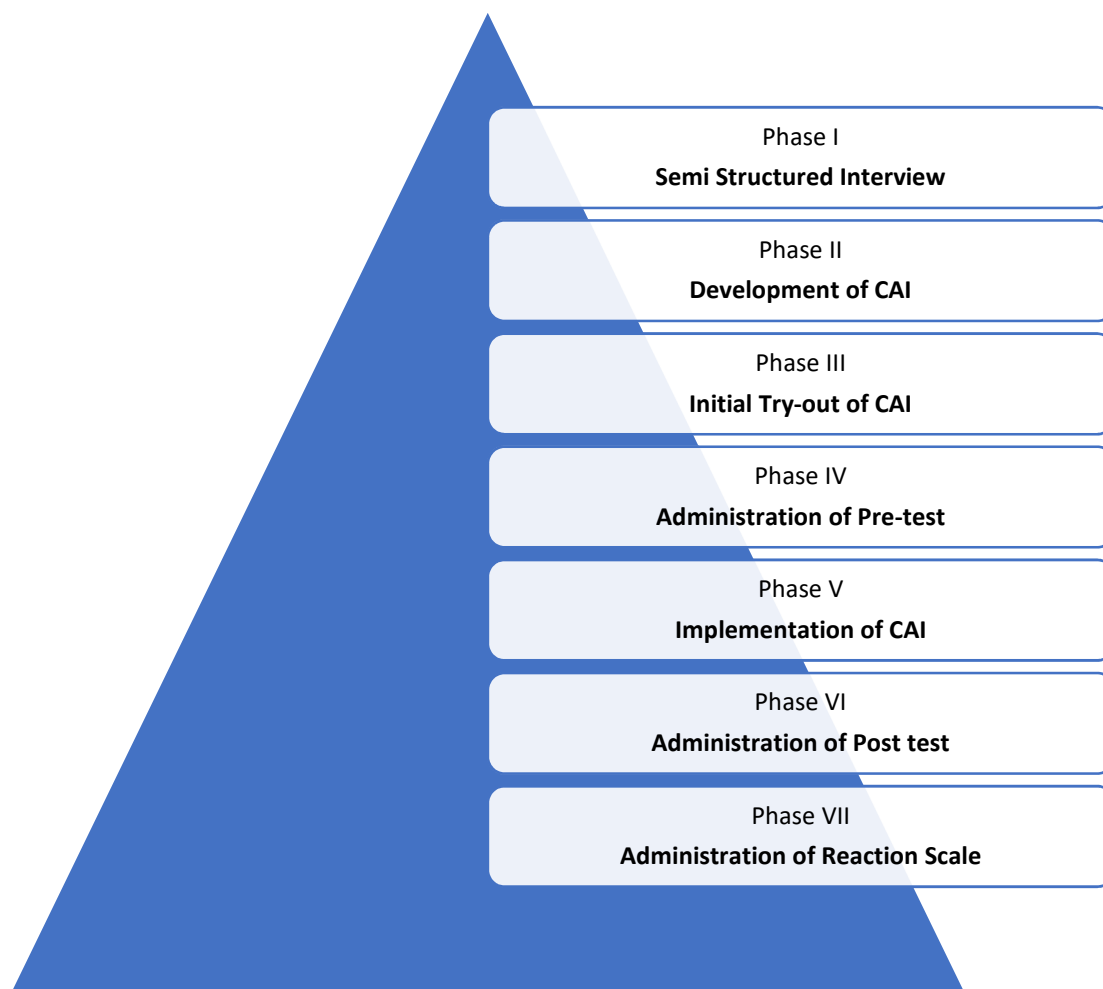The study was conducted in seven different phases. As mentioned in Figure No. 3.1.

Figure No. 3.1   Phase wise detail of the Plan and Procedure

The phase-wise detail has been described as under:

Phase I – Semi Structured Interview

This was the pre-phase activity carried out prior to the development of CAI. Under this phase, the investigator conducted a self-constructed semi structured interview on 15 experienced English teachers to identify the major learning difficulties of the students in English grammar as perceived by them. Constructed Semi Structured interview schedule can be seen from the Appendix-1. The semi structured interview schedule includes nine questions, framed with a view to collect necessary inputs which are important for the development of CAI.

Que-1: What is the importance of English Grammar?

Que-2: What are the important teaching points of English Grammar in Std. IX?

Que-3: Which topics of English Grammar in Std. IX have been taught since Std. 5th,

6th, 7th and 8th?

Que-4: Which important topics of English grammar in Std. IX are useful for upcoming standards?

Que-5: Which topics of English grammar students can learn easily in Std. IX?

Que-6: Which topics of English Grammar are difficult to learn by the students? Why?

Que-7: Which methods and approaches do you use to make the teaching of English grammar interesting? What is its result?

Que-8: Which new innovative approaches can be adopted to make easy the difficult teaching points of English Grammar in Std. IX?

Que-9: What are the challenges do you face generally while teaching English grammar?

Thus, investigator identified major learning difficulties in English grammar as perceived by the selected experienced teachers and were considered as the base for the development of CAI. The list of the teachers is given in the Appendix-2.

Phase II – Development of CAI

Prior to develop the CAI, content of the English textbook (Std. IX) was analyzed and all the microteaching points were identified. On the basis of that, a list of major grammar points was prepared, which can be seen from the Appendix-3. Then the identified major difficult teaching points under the phase-1 were considered as the basis for the development of CAI. Further, the following criteria were kept in mind for the development of CAI.

a) The CAI should be based on identified major learning difficulties of the students in English grammar.

b) The CAI should be included the explanation of various grammar points with examples, exercise, self-practice, self-evaluation and feedback in different forms.

c) The CAI for each grammar point should be based on a prepared content brief and an interesting script. (The detail script of each grammar point can be seen from Appendix-4)

d) The CAI should be based on audio material, visuals in different forms and audio-visual content with animation, images, sound and colour effects.

e) The CAI should be developed by using a variety of software like Macro Media Flash, Adobe Photoshop, Corel-Draw and Page Maker.

After identification of the major learning difficulties of the students in English grammar, the main teaching points were decided for the development of CAI. Based on that the content brief for each teaching point was developed, which was the major base for preparing an interesting script of each episode under CAI. To prepare the interesting script for each teaching point under CAI, experts help was taken. Then with the support of animation experts, the initial form of CAI was developed. After that, the developed CAI was validated on the basis of the experts' opinion with reference to the mode of presentation, appropriateness of continuity and relevance of the content. To justify the validity of the developed CAI, a group of English teachers and some animation software experts were included in the team of experts. The list of experts can be seen from the Appendix-5.

Phase III – Initial Try-out of CAI

To ensure the educational value of the CAI package, it was initially tried out on a group of 22 students of standard IX studying in another school. While initial try-out of CAI, students' opinions were received regarding its efficacy. On the basis of an informal discussion with the group of students, necessary modifications were made.

Phase IV – Administration of Pre-test

Under this phase, a Pre-test (an achievement test in English grammar which can be seen from the Appendix-6) was administered to the students of Experimental and Control groups with a view to measure their achievement level in English grammar. The data in terms of achievement scores of the students were collected under this phase for both the groups.

Phase V – Implementation of CAI

The developed CAI was implemented only in Experimental Group, under this phase. As per the Schematic Presentation for the Implementation of CAI, it was implemented for total 84 periods, under this phase. The schematic for the presentation implementation of CAI has been given in the Table No. - 3.3. The complete implementation of the CAI was done by the investigator.

Table 3.3

Schematic Presentation for the Implementation of CAI

Sr. No.	Teaching points of English Grammar	Date	Period / Class	Activities
1	Articles	11/2/2015 to 13/3/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	Self-evaluation through CAI
2	Prepositions	14/2/2015 to 17/2/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	Self-evaluation through CAI
3	Conjunctions	18/2/2015 to 20/2/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	Self-evaluation through CAI
4	Quantifiers	22/2/2015 to 23/2/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	Self-evaluation through CAI
5	WH – questions	24/2/2015 to 25/2/2015	3	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI

			1	Self-evaluation through CAI
6	Question Tag	26/2/2015 to 27/2/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
7	Types of sentences	28/2/2015 to 03/3/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
8	Modal Auxiliaries	04/3/2015 to 06/3/2015	3	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
9	Degrees of Comparison	07/3/2015 to 10/3/2015	3	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
10	Simple Past Tense	11/3/2015 to 12/3/2015	1	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
11	Present Perfect Tense	13/3/2015 to	1	Explanation & Examples through CAI

		14/3/2015	2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
12	Past Perfect Tense	16/3/2015 to 17/3/2015	1	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
13	Adverb Clause of Result	18/3/2015 to 20/3/2015	2	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	self-evaluation through CAI
14	Active – Passive Voice and	21/3/2015 to 35/3/2015	5	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			1	Self-evaluation through CAI
15	Reported Speech	26/3/2015 to 31/3/2015	6	Explanation & Examples through CAI
			2	Exercises / Drill / Practice through CAI
			3	Self-evaluation through CAI

The schematic presentation shows that total 84 class/period used during 45 days for the implementation of CAI. The implementation time of CAI was considered in accordance with the strategy evolved under each teaching point of English grammar.

PHOTOGRAPHS SHOWING IMPEMENTATION OF CAI
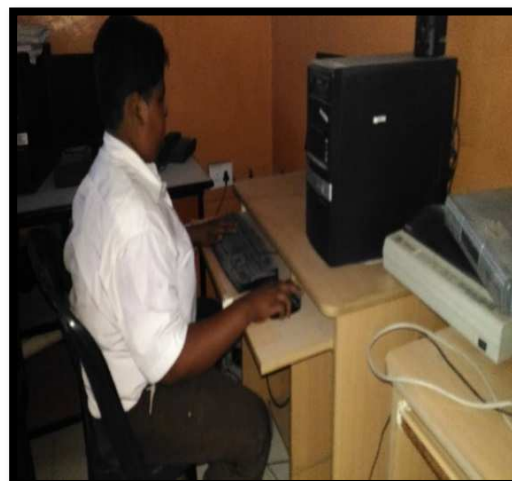
Phase VI- Administration of Post test

Under this phase, a Post-test (an achievement test in English grammar, which was used as a Pre-test) was administered to the students of Experimental and Control groups with a view to measure their achievement level in English grammar. The data in terms of achievement scores of the students were collected under this phase for both

the groups, with a view to study the effectiveness of the implemented CAI.

Phase VII- Administration of Reaction Scale

A five-point reaction scale was administered to the students of experimental group mainly to study the reactions of the students regarding the implemented CAI. This was mainly to judge the effectiveness of CAI on the basis of their reactions.

3.11 TOOLS FOR DATA COLLECTION

The following major tools were constructed by the investigator and used for the collection of data under the present study.

(i) Achievement Test

The achievement test was constructed on the basis of the identified teaching points of English grammar viz. Articles, Prepositions, Conjunctions, Quantifiers, WH – questions, Question Tag, Types of sentences, Modal Auxiliaries, Degrees of Comparison, Simple Past Tense, Present Perfect Tense, Past Perfect Tense, Adverb Clause of Result, Active – Passive Voice and Reported Speech. This achievement test was used as pre-test and post-test with a view to know the achievement level of the students in English grammar. Students' achievement level in English grammar was judged on the basis of marks obtained in the achievement test. The constructed achievement test was validated on the basis of the suggestions given by a team of English teachers. The list of English teachers can be seen from the appendix-6. The obtain suggestions from the team of English teachers were duly incorporated in the constructed achievement test.

(ii) Reaction Scale

A Likert type five-point reaction scale was prepared by the investigator to study the reactions of the students of the experimental group regarding the implemented Computer Assisted Instruction Package. The reaction scale includes 28 statements covering various aspects related to its construction, implementation and experiences of the students. The five-points of reaction scale were: 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree'. According to the students' reaction towards each statement, students were supposed to indicate their reaction by putting a tick mark (√) in any one appropriate box out of the given five provided options.

Reaction scale was validated on the basis of the suggestions given by seven teacher educators having proficiency in the construction of tools. The list of teacher educators can be seen from the appendix-VIII.

(iii)   Semi Structured Interview for Teachers

A Semi Structured Interview Schedule consisting of a series of nine questions developed by the investigator to identify the learning difficulties of the students in English grammar, as perceived by the teachers.

3.12   PROCEDURE OF DATA COLLECTION

With a view to collect the data in terms of students' learning difficulties in English grammar, students' achievement level in English grammar and their reactions about the implemented CAI; the above stated tools were employed in a logical sequence. First of all, semi structured interview was conducted on a group of English teachers with a view to identifying the learning difficulties of the students in English grammar as perceived by them. On the basis of this, the major teaching points of English grammar were identified and decided to use them as the basis for the development of CAI.

Then to collect the data in terms of students' achievement, pre-test and post-test were administered as mentioned in Phase-IV and Phase-VI. Thus, the quantitative data in terms of achievement score were collected. After that to study the effectiveness of implemented CAI, students' reactions were collected by employing a reaction scale. Thus, the qualitative and quantitative data were collected and analyzed further to draw out the findings.

3.13   PROCEDURE OF DATA ANALYSIS

As the students were selected through purposive sampling, nonparametric statistics were used for the data analysis. To test the stated hypotheses the data analysis was done with the help of Wilcoxon Signed Rank Test, Mann Whitney U Test and Intensity Index. And the data analysis related to the Semi structured interview of the teachers was done through frequency and percentage.

3.14   CONCLUSION

The present chapter focuses on the overall research methodology with due emphasis on research design and appropriate statistical techniques used for data analysis. Further, it can be said that the present chapter is the heart of entire research report as it conveys the plan, procedure and structure of the research study. The upcoming chapter clearly explains the in-depth data analysis and interpretations made on the basis of that. Further, it prepares a background to draw out conclusions and major findings of the research study.