CHAPTER-IV

METHODOLOGY OF THE STUDY

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4.1 INTRODUCTION

After formulation of the research problem theoretically, the next task is to find out empirically dependable and valid answers to research questions. This requires deciding about the research methodology to be used for collection, analysis and interpretation of data. Methodology of the study involves design of the study, sample, variables involved in the study, tools to be used, procedures for data collection and statistical techniques to be used for data analysis.

The objectives of the present study as indicated in Chapter-I of the thesis show that it is an investigation which attempts at studying the effectiveness of Advance Organizer Model (AOM) in relation to its instructional and nurturant effects. It involves the comparison of Advance Organizer Model of teaching with the traditional method of teaching in relation to the two instructional effects, namely, development of conceptual structures and meaningful assimilation of information and ideas, and two nurturant effects, namely, interest in inquiry and habits of precise thinking. In order to carry out the comparison between Advance Organizer Model of teaching with traditional method

of teaching, a suitable research design had to be selected.

4.2 DESIGN OF THE STUDY

Experimental method was considered appropriate using posttest only control group design. This research design was considered to be the most appropriate to obtain answers to research questions under consideration. The experiment had to be conducted in a school without disturbing the natural classroom environment in which the students were situated. Therefore, true experimental design which requires formation of treatment groups through the process of randomization with little regard to the natural sociometric environment existing in the classroom was not considered suitable for the purpose of experimentation in the present investigation. Instead, quasi-experimental design was selected for the experimentation purpose. Under this design, naturally assembled groups as intact classes which may be similar are taken to constitute the treatment groups, namely, experimental and control groups.

Hence, two sections of eighth class of Kendriya Vidyalaya, No.I, Bhubaneswar, were taken for the experimentation purpose. These two sections were naturally assembled intact groups. One of the groups was considered for experimental group and the other for control group. Although two groups were naturally assembled intact groups, the groups were required to be matched with each other to fulfil the

requirements of quasi-experimental design. Therefore, intelligence of the students and their previous scholastic achievement in 1st terminal examination of the school were used as matching variables to match the two groups.

The present study was designed on the lines of posttest - only control group design. All the four criterion tests to measure four effects of the model were used as post-tests only. It was not considered necessary to use these tests as pre-tests, because tools to measure instructional effects were content-based. Students selected for the experiment were new to the contents taken for the investigation. Using these tests as pre-tests, therefore, would not have yielded any significant result. However, by taking previous scholastic achievement in social sciences to match the two groups, the above point was taken care of. Similarly, tests on interest in inquiry and habits of precise thinking were also not used as pre-tests, as intelligence can safely be assumed to have significant coorelation with precise thinking ability as well as interest in problem solving. It is, generally assumed that most of the precise thinking abilities like distinguishing between fact and hypothesis, recognising underlying assumption behind a proposition, etc. require high level of intelligence on the part of an individual. Similarly it is assumed that one's interest in the inquiry process is also guided by one's level of intelligence.

The research design selected for the investigation ensured both internal and external validity as suggested by Campbell and Stanley (1963). Internal validity of the design was taken care of by controlling extraneous variables such as history, maturation, pre-testing, instrumentation, statistical regression, differential selection of respondents, experimental mortality and selection - maturation interaction. External validity was also taken care of as the findings of the study could be generalised to the central schools of Bhubaneswar.

Decision about research design guides the variables involved in the study, the selection of the sample, tools to be used for collection of data, procedures of data collection and statistical techniques to be applied for analysis of data.

4.3 Variables of the Study

There were different kinds of variables involved in the study. These were independent, control, dependent and intervening variables.

(a) Independent Variable :

Teaching through Advance Organizer Model of teaching was the independent variable.

(b) Control Variable:

Teaching through traditional method of teaching was control variable.

(c) **Dependent or Criterion Variables:**
The dependent variables of the study were the measures of (1) development of conceptual structures, **(2)** meaningful assimilation of information and ideas, **(3) interest in inquiry, (4) habits of precise-thinking, (5) retention of meaningful assimilation of information and ideas, and (6) reactions of the students towards Advance Organizer Model.**

(d) **Intervening or Interactional Variables:**
Intervening variables are those which affect the learning over and above the independent variables. In the experiment, intelligence, previous scholastic achievement and age were considered as intervening variables. Intelligence and previous scholastic achievement of the students were controlled statistically. Age of the students were controlled as all the students belonged to the age group of 13 to 14 years.

The Table 4.1 presents types of variables and name of the variables involved in the study.

TABLE 4.1 : Types of Variables and Name of the Variables involved in the Study

Types of Variables	Name of the Variables
Independent	Teaching through Advance Organizer Model
Control	Teaching through Traditional Method
Dependent or Criterion	i) Development of conceptual structures
	ii) Meaningful assimilation of information and ideas
	iii) Interest in inquiry
	iv) Habits of precise thinking
	v) Retention of meaningful assimilation of information and ideas
	vi) Reactions of students towards Advance Organizer Model
Intervening or Interactional	i) Previous scholastic achievement
	ii) Intelligence
	iii) Age

4.4 SAMPLE

The sampling method used in the investigation was purposive. Such a sample is arbitrarily selected because there is good evidence that it is a representative of the total population. The evidence is always based on experience (Koul, 1986). Moreover, such a sampling method is very convenient in the situations where the sample to be selected is very small. Thus, the sample of the present study comprised class VIII boys and girls of the Kendriya Vidyalaya No. I, Bhubaneswar, Orissa. This school was chosen due to certain reasons. It is because the researcher belongs to the State of Orissa. Second, the consent of the School Principal for the research purpose could be obtained. Although doing the experiment in one school causes some bias in sampling, this was resorted to for avoiding inter-school differences in climate of the classrooms and other administrative inconveniences in conducting the experiment. Class VIII was selected for the present study because students belonging to this class were comparatively free from the pressures of the common examinations and it was thought that application of the Advance Organizer Model of teaching in the lower classes may not be effective.

Kendriya Vidyalaya, No.I, Bhubaneswar is a senior secondary school which is under the control of Kendriya Vidyalaya Sangathan and is financed by the Govt. of India.

It is a co-educational school and students of the school are day-scholars. Students of the school are generally the children of the Central Government employees serving in Bhubaneswar and nearby cities and towns. Students in the school belong to the State of Orissa as well as other Indian states as the parents of some of the students hail from other states. Teaching in the school is done both in English and Hindi, which is a common feature in all the Kendriya Vidyalayas.

Class VIII of the school has three sections, namely, A,B, and C. Out of these three sections, two sections A and C, were selected for the purpose of the study as the nature of the study required two sections - one for experimental and the other for control. Sections A and C were selected because teachers teaching civics in these sections, the subject of teaching taken in the present study, agreed to help in the research work. Students of Section - A formed the experimental group and students of Section -C constituted the control group. It was because the teacher teaching students of Section A volunteered to act as the experimental teacher, whereas teacher teaching students of Section C agreed to act as the control teacher.

An initial sample of 64 students in two sections was obtained at the pre-testing phase of the experiment. After the treatment and post-testing phases were over, only those students were finally included in the study who were present throughout

all the phases of the experiment. Thus, 54 students finally constituted the sample. Experimental group, namely, Advance Organizer Model Group (E) and Control Group (C) consisted of 28 and 26 students respectively. Out of the total sample of 54 students, 32 students were boys and 22 students were girls. In the experimental group there were 16 boys and 12 girls. Similarly, there were 16 boys and 10 girls in the control group. All the students included in the sample belonged to the age group of 13-14 years. Sample size of the experimental and control groups (both boys and girls) at the pre-test and post-test phases of the study is presented in Table 4.2.

TABLE 4.2 : Sample Size of the Experimental and Control Groups (Both Boys and Girls) at the Pre-test and Post-Test Phases of the Study

Phases	Experimental			Control		
	Boys	Girls	Total	Boys	Girls	Total
Pre-test	18	15	33	18	13	31
Post-test	16	12	28	16	10	26

4.5 IDENTIFICATION AND SELECTION OF TEACHERS

Unlike many experimental researches in which the researchers themselves act as the teacher for both the Experimental and Control groups, the researcher selected

two teachers, whose willingness to cooperate in the investigation could be obtained, to carry out the experimentation. This was resorted to due to certain reasons. First, the researcher had no previous experience of teaching at the school level. Second, the researcher had no proficiency in Hindi which some students in the classes needed. Third, the researcher acting as a teacher might lead to some class-room discipline problem which would hamper the smooth running of the experiment.

The teacher in the experimental group was a male teacher, whereas the teacher in the control group was a female teacher. Both the teachers were trained graduate teachers in social studies and had fairly good experience in teaching social studies in the VIIIth class. Though, there was gender difference in the selection of teachers, it was assumed that gender plays an insignificant role so far as teaching competency of the teachers is concerned. Moreover, same competency level of both the teachers could be judged from the fact that there was an insignificant difference between the mean performance of the two groups in the social studies in the first terminal exmination which is evident from the Table 4.4.

4.6 SELECTION OF TEACHING SUBJECT

The researcher after going through the syllabus prescribed for social studies decided to select Civics for the purpose of experiment. This is because, the researcher

has the competence in the subject as he had political science, which deals with topics on Civics, as a subject of study at his graduation stage. Moreover, the content matter of the subject is more structured and organised and hence quite appropriate for Advance Organizer Model of teaching. Therefore, the Text book in Civics for Class VIII entitled "Our Country today: Problems and Challenges", was selected for the experimentation. Four chapters from this book which were earmarked for teaching in the second half of the session were chosen for the study.These chapters were : National Integration, India's Defence, Foreign Policy of India, and the United Nations.

4.7 TOOLS USED IN THE STUDY

The following tools were used in the present study for the purpose of data collection.

i) Unit Tests on Conceptual Structures.

ii) Unit Tests on Meaningful Assimilation of Information and Ideas.

iii) Comprehensive Test on Conceptual Structures.

iv) Comprehensive Test on Meaningful Assimilation of Information and Ideas.

v) Test on Interest in Inquiry.

vi) Test on Habits of Precise Thinking.

vii) Retention Test on Meaningful Assimilation of Information and Ideas.

viii) Reaction Scale to Study Students' Reactions towards Advance Organizer Model.

All the above tests were developed by the researcher. The description of the detailed procedures followed in the development of the tests is not presented in the present Chapter. The Chapter V deals with the description of the detailed procedures followed in the development of the tests. But, to match the experimental and control group on intelligence a standardized intelligence test was adopted . For this purpose, Standard Progressive Matrices by Raven et al. (1983) was used. The description of the test follows.

ix) Intelligence Test

The study required the two groups, namely, experimental and control to be equated on the intervening variable of intelligence prior to the experiment. For this purpose, Raven's Standard Progressive Matrices (SPM) by Raven et al. (1983) was used. The S.P.M consists of 60 problems divided into five sets. Each set consists of 12 problems. In each set the first problem is as nearly as possible self-evident. The problems which follow become progressively more difficult. The five sets provide five opportunities for grasping the method and five progressive assessments of a person's capacity for intellectual activity. It is designed to cover the widest possible of mental ability and to be equally useful with

persons of all ages, whatever their education, nationality and physical condition. A person's total score provides an idex of his intellectual capacity. This test is a non-verbal test. Scoring of the test scores is done with the help of a scoring key given in the test manual. The test-retest reliability of the test ranges from 0.83 to 0.93 (Raven, 1948). Different types of validity of the test are also available in the test manual.

x) Theory Check-up (Weil and Joyce, 1978)

xi) Teaching Analysis Guide (Weil and Joyce, 1978)

4.8 PREPARATIONS FOR THE EXPERIMENT

The experiment to be conducted for the present study involved a few preparations which were to be completed before the experiment was conducted. The discussion on these preparations follow:

(i) Training in Teacher Competency

The study required the orientation of the teacher who would teach the experimental group to be competent enough to carry put the experiment on the line of the Advance Organizer Model of teaching.

Before orientation of the experimental teacher, the researcher had to equip himself with the requisite experiences as to how to implement the model in classroom situation. For this purpose, the researcher first got detailed theoretical

understanding about the model by going through the original works on meaningful verbal learning and advance organizer by Ausubel (1963, 1967, 1968, and 1985) and the works on models of teaching by Joyce and Weil (1972 and 1980), Weil and Joyce (1978), and Eggen et al (1979). Then, the researcher had discussions with the experts on models of teaching at the University of Indore and watched a video film prepared by a researcher. Similarly, the researcher had discussions with the experts on models of teaching in N.C.E.R.T., New Delhi and watched another video film on Advance Organizer Model of teaching developed by EMRC, Pune and presented by U.G.C's countrywide classrooms.

With the above experiences, the researcher got the necessary competence to use the model of teaching in classroom situation. The orientation of the experimental teacher began in the first week of January, 1992. In the first phase, the researcher explained to the teacher theoretical concepts related to Advance Organizer Model such as the Ausubel's idea on teaching and learning, nature and concept of advance organizer, the role of advance organizer in facilitating effective learning, the nature and concept of mapping, the use of concept maps while presenting the learning material, etc. The theoretical understanding of the model was assessed with the help of Theory Check-Up (Weil and Joyce, 1978). From the responses on the Theory Check-Up, the researcher was satisfied that the experimental teacher had understood the

theoretical concepts related to the model. The Theory Check-Up is given in Appendix K.

In the second phase, the researcher demonstrated before the experimental teacher the use of the model for classroom teaching with the help of two lessons. The demonstration followed the three phases given inthe syntax of the model. The researcher demonstrated the use of concept maps while presenting the learning material. After the researcher's demonstration, the experimental teacher was asked to impart two lessons on the line of the model in a simulated condition, which were observed by the researcher with the help of Teaching Analysis Guide (TAG) by Weil and Joyce (1978).Apart from these lessons, four lessons, one from each of the four units, were also observed with the help of Teaching Analysis Guide (TAG) The lessons chosen for the orientation were different from the lessons taken for the experimentation. From the analysis of the teacher's performance in these lessons, it was observed that the overall performance of the teacher was satisfactory. The Teaching Analysis Guide (TAG) is given in Appendix L.

ii) Development of Concept Maps

Since the teacher was asked to make use of concept maps while presenting the learning material, the researcher prepared concept maps on all the four chapters taken for the study.

These concept maps were lesson specific, however, maps were used for more than one lesson in order to show the linkages among the concepts in a particular chapter. While preparing the concept maps, the steps prescribed by Novak et al.(1981) and Ault (1985) were adhered to. The samples of concept map used for teaching are given in Appendix N.

iii) Development of Lesson Plans

Although teaching in the experimental group was done by the experimental teacher, lesson plans for teaching were developed by the researcher. These plans were prepared strictly on the basis of the Lesson Plan Guide (LPG) given by Weil and Joyce (1978). These lesson plans included broadly the objectives of the lessons, the advance organizers, the learning passages and the questions to be asked at the third phase. While developing the lesson plans, the views of the teacher were also taken into consideration. A total number of sixteen lessons from the four chapters were developed. Contents covered under each lesson are presented in Table 4.3. A sample of a lesson plan is given in Appendix M.

TABLE 4.3 : Contents Covered Under Each Lesson

Lesson No.	Chapter	Contents covered
1.	National Integration	Historical Background, the concept National Integration.
2.	-do-	Types of Unity.
3.	-do-	Forces hampering National Integration.
4.	-do-	Forces promoting National Integration.
5.	India's Defence	Role of the Defence Force.
6.	-do-	The Army, The Navy and the Air Force.
7.	-do-	Second Line of Defence, The Coast Guard.
8.	-do-	Defence Force in Peace-time and its relation with Citizens.
9.	Foreign Policy of India	The Policy of Non-alignment.
10.	Foreign Policy of India	Panchsheel.
11.	-do-	India's Support for Human Rights and other Countries' Independence.
12.	The United Nations	Emergence of the United Nations.
13.	-do-	Organs of the United Nations.
14.	-do-	The United Nations' Specialised Agencies.
15.	-do-	Achievements of the United Nations.
16.	-do-	India and the United Nations.

4.9 CONDUCTING THE EXPERIMENT

The experimental procedure for the study included all the works beginning from matching of the group till data collection.

i) Matching the Group

Prior to the experiment, the two groups, namely Experimental (E) and Control (C) were to be equated on the variables i.e. intelligence and previous scholastic achievement. To match the two groups on previous scholastic achievement, marks obtained by the students in social sciences in 1st terminal examination were collected from school records.

After this, intelligence test was administered to all the students of both the groups in different periods in their respective classrooms. After students completed the test, response sheets were collected from them. The response sheets were then scored using the scoring key given in the test manual.

From the scores on previous scholastic achievement and intelligence test obtained by the students, means and standard deviations were computed. The t -test of significance was then applied to determine the significance of difference between the means of experimental and control groups on these intervening variables. Means, standard deviations and t-values of these two sets of scores are presented in Table 4.4.

TABLE 4.4 : Means, Standard Deviations, and t-values for Previous Scholastic Achievement (PSA) and Intelligence Test

Tests	Groups	N	Means	S.Ds	t-values
Previous Scholastic Achievement	Experimental	28	60.92	21.02	1.39*
	Control	26	54.03	15.97	
Intelligence	Experimental	28	45.18	4.18	.02*
	Control	26	45.15	6.26	

* Not Significant at .05 and 0.1 levels

From the table 4.4 it is clear that t-values of 1.39 for previous scholastic achievement and.02 for intelligence test are not significant at .05 and .01 levels of significance for both the groups. This shows that the two groups did not differ significantly on previous scholastic achievement and intelligence test.This means that they were equated on these intervening variables.

ii) Treatment

After matching the two groups, the teaching for both the groups started in the third week of January, 1992. The teacher in charge of experimental group taught the class using Advance Organizer Model of teaching and the teacher in charge of the control group taught the class through traditional method.

The teaching processes in both the groups were totally different. The detailed discussion follows:

Teaching the Experimental group:

The teacher in the experimental group made use of the lesson plans developed by the researcher. In the beginning of the teaching, the teacher explained to the students the various steps that he would follow during the teaching. He explained to them the concept of Advance Organizer, the learning material, the concept map, etc.

In the beginning of each lesson, the teacher clarified the aims of the lesson. Then he presented the advance organizer, explained to them the essential features of the concepts used in the advance organizer with the help of suitable examples. He explored the previous knowledge of the students related to the concepts used in the advance organizer and linked them with the present concepts.

In the second phase, he presented the learning material. He explained the learning material logically and coherently. He showed the relationships between the broad concepts and the subordinate concepts. While doing so, he took the help of the concept maps developed by the researcher. Students were also distributed a copy of each concept map in order to facilitate them to comprehend the learning material in a better way.

In the third phase, the teacher initiated a lot of interactions between him and the students. He encouraged students to ask questions. The students asked questions to clarify their doubts. He also asked questions to the students to anchor the new learning material with the existing cognitive structure of the students.

Teaching the Control Group :

The teacher in the control group taught the students through a traditional method which was mainly lecture - discussion type. The teaching was mainly controlled by the teacher in the conventional way.

4.10 PROCEDURES FOR DATA COLLECTION

The following procedures were followed for collection of data by the various tools used in the test.

i) For data on previous scholastic achievement, marks obtained by the students in social studies in the 1st terminal examination were collected from the school records.

ii) For data on intelligence, test on intelligence was administered to all the students of experimental and control groups in different periods in their respective classrooms. The teachers in the respective classes helped in the administration of the test. Test booklets and the response sheets were distributed to the students.

They were provided with necessary guidelines provided in the test manual as to how to respond to the various problems in all the five sets. After they completed the test, response sheets were collected from them. They took about one hour to complete the test.

iii) For data on conceptual structures, unit tests and the comprehensive test on conceptual structures were administered to the students of experimental and control groups in different periods in their respective classrooms. While unit tests were administered at the end of each unit, the comprehensive test was administered at the end of the experiment. The students were provided with necessary guidelines with regard to development of concept maps on the passages given in the tests. The teachers in both the groups helped in the administration of the tests. The students of both the groups were able to develop concept maps within the school period of 40 minutes. After students completed the tests, concept maps developed by them were collected. Samples of concept maps developed by students of both the groups are given in Appendix O.

iv) For data on meaningful assimilation of information and ideas, unit tests and the comprehensive test on meaningful assimilation of information and ideas were administered to the students of experimental and control groups in different periods in their respective

classrooms. Unit tests were administered at the end of each unit, whereas the comprehensive test was administered at the end of the experiment. The students were provided with necessary instructions as to how to respond to the items in the tests. The teachers in both the groups helped in the administration of the tests. The students of both the groups completed the unit tests within the school period of 40 minutes. While most of them completed the comprehensive test within the school period of 40 minutes, some of them took a few minutes more. After they completed a particular test, test papers related to that particular test were collected from them.

v) For data on interest in inquiry, test on interest in inquiry was administered to the students of experimental and control groups at the end of the experiment in different periods in their respective classrooms. The students were given necessary guidelines as to how to respond to the different items in the test. The teachers in both the groups helped in the administration of the test. The students completed the test within the school period of 40 minutes. After they completed the test, the test papers were collected from them.

vi) For data on habits of precise thinking test on habits of precise thinking was administered to the students

of both experimental and control groups at the end of the experiment in different periods in their respective classrooms. The students were provided with necessary instructions as to how to respond to the items in the test. The teachers in both the groups helped in the administration of the test. The students in both the groups completed the test within the school period of 40 minutes. After they completed the test, test papers were collected from them.

vii) For data on retention of meaningful learning, test on meaningful assimilation of information and ideas was administered to the students of both experimental and control groups after a gap of 40 days of the experiment. The test was administered to both the groups in different periods. The students were given necessary guidelines to respond to items in the test. The teachers in the both the groups helped in the administration of the test. While most of the students completed the test within the school period of 40 minutes, some of them took a few minutes more. After they completed the test, test papers were collected from them.

viii) For data on students' reactions toward AOM, reaction scale was administered to students of experimental group only at the end of the experiment. The students were given instructions as to how to react to the

statements in the scale. The teacher in the experimental group helped in the administration of the test. The students completed the test within 15 minutes. After they completed the test, the test papers were collected from them.

The schematic presentation of the design of the study showing different phases, treatments given, and the time taken is provided in the Table 4.5.

TABLE 4.5 : Schematic Presentation of the Design of the Study

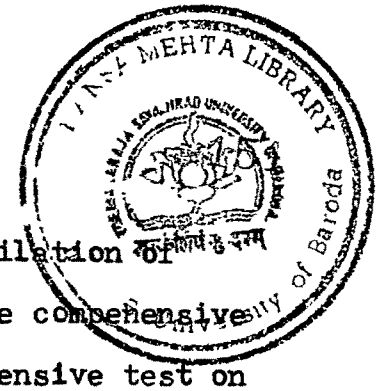
Sl.No.	Phases		Treatments	Duration
1	Pre-testing	i)	Previous Scholastic Achievement	
		ii)	Intelligence Test	2 days
2	Treatment	i)	Advance Organizer Model of Teaching	640 minutes for each of the treatments
		ii)	Traditional Method of Teaching	
		iii)	Unit Testson Conceptual Structures	
		iv)	Unit Tests on Meaningful Assimilation of Information and Ideas	4 days
3	Post-testing	i)	Comprehensive Test on Conceptual Structures	

Table 4.5 (contd)

Sl.No.	Phases	Treatments	Duration
		ii) Comprehensive Test on Meaningful Assimilation of Information and Ideas	6 days
		iii) Test on Interest in Inquiry	
		iv) Test on Habits of precise thinking	
		v) Retention Test on Meaningful Assimilation of Information and Ideas	
		vi) Reaction Scale to Study Students' Reactions towards AOM	

4.11 PROCEDURES FOR ANALYSIS OF DATA

Data obtained from the tools used in the study were analysed with the help of statistical techniques. Data obtained from previous scholastic achievement and intelligence test were analysed with the help of mean, standard deviation and t-test. Mean, standard deviation and t-test were used to analyse the data obtained from unit tests on conceptual



structures and unit tests on meaningful assimilation of information and ideas. Data collected from the comprehensive test on conceptual structures and the comprehensive test on meaningful assimilation of information and ideas were analysed using mean, standard deviation and t-test. Mean, standard deviation and t-test were used to analyse the data obtained from test on interest in inquiry, test on habits of precise thinking, and retention test. Chi-square test was applied to analyse the data collected from the reaction scale. Data obtained from the tools and the statistical techniques used to analyse the data are presented in Table 4.6.

4.12 SUMMARY

The present chapter dealt with the methodology that was followed in conducting the experiment. Under methodology of the study, design of the study, the variables involved in the study, sample, selection of teachers and subject of teaching, tools used in the study, procedures for data collection and procedures for analysis of data were discussed. The study was designed on the line of post-test only control group design. The study involved different kinds of variables namely, independent, control, treatment, and intervening. An initial sample of 64 students was obtained at the pre-test phase. But, a total of 54 students constituted the final sample for the study. Two teachers were selected for the

TABLE 4.6 : Data Obtained from the Tools and Statistical Techniques Used for Analysis

Sl. No.	Data obtained from the tools	Statistical techniques used
1.	Data obtained from previous scholastic achievement	Mean, S.D. and t-test
2.	Data obtained from intelligence test	Mean, S.D. and t-test
3.	Data obtained from unit tests on conceptual structures	Mean, S.D. and t-test
4.	Data obtained from unit tests on meaningful assimilation of information and ideas	Mean, S.D. and t-test
5.	Data obtained from the comprehensive test on conceptual structures	Mean, S.D. and t-test
6.	Data obtained from the comprehensive test on meaningful assimilation of information and ideas	Mean, S.D. and t-test
7.	Data obtained from the test on interest in inquiry	Mean, S.D. and t-test
8.	Data obtained from the test on habits of precise thinking	Mean, S.D. and t-test
9.	Data obtained from the retention test	Mean, S.D. and t-test
10.	Data obtained from the reaction scale	Chi-square test

purpose of the experiment. Four chapters from the textbook on Civics prescribed for the Class VIII were chosen for the experimental purpose. Except intelligence test, all the tools used in the study were developed by the researcher. Prior to the experiment, the teacher for the experimental group was oriented, and lesson plans and concept maps were developed by the researcher. A total of 16 lessons were imparted to the students. Data pertaining to the objectives of the study were collected with the help of the tools used in the study. Data obtained from the tools were analysed using statistical techniques, namely, mean, standard deviation, t-test and Chi-square test. The next Chapter is completely devoted to the discussion of the detailed procedures followed in the development of the tools.