Chapter – IV

Method of The Study
CHAPTER – IV

METHOD OF THE STUDY

In the preceding chapters, the theoretical framework of the problem, review of related studies, emergence of the problem, objectives, hypotheses and description of the tools were discussed. The present chapter deals with the method of the study, which focuses around the tools used, the sample, design of the study, procedure and statistical techniques used for the purpose of data analysis.

Research is not a haphazard task; it requires one to proceed in a definite direction along with well-defined lines. Research is a purposive, scientific and pointed deliberation. Planning and procedure for study is deemed essential if it is to be saved from becoming a heap of jumbled ideas picked up from here and there or anywhere. To carry out any research investigation effectively, it is necessary to adopt a systematic method and procedure.

The method of investigation has been discussed under the following headings:

- Tools used
- The Sample
- Design of the study
- Procedure
- Statistical techniques used

4.1: TOOLS USED

To do an objective research, the tools selected should be appropriate, culture free and be in the regional language for the collection of aimed evidence or information.

The following tools were used in the present study for collecting the data:
Method of the Study

• **Tools for Life Skills:** Following tools were used for the selected four life skills:
  
  » **Test for Skill of Acquiring Knowledge:** The Summative Tests were used to evaluate skill of acquiring knowledge (developed and validated by the investigator).
  
  » **Scale for Self Awareness Skill:** developed and standardized by Roy, P. (2000). It includes six sub scales related to six life skills of self awareness i.e. Self Image, Self Control, Creativity, Co-operation, Planning and Concentration.
  
  

• **Scale of Psychological Hardiness:** developed and Standardized by Nowack, K. M. (1990).

• **Personal Values Survey Schedule:** developed and validated by Gupta, N. L. (2000).

• **Tests for Entry Behaviour, Summative and Formative evaluation for the subject of Economics:** developed and validated by the investigator.

• **Instructional Modules based on Awareness Training Model for the subject of Economics:** developed and validated by the investigator.

4.2: SAMPLE

Sample is a selected subset of a population chosen by some process usually with the objective of investigating particular properties of the parent population. The process of selecting some part of a population to observe, so as to estimate something of interest about the whole population is known as sampling.

Sample plays an important role since generalizations about the population are made from the findings based on sample, which will have validity of results depending upon the characteristics of sample itself. The sample can thus be
described by a distribution of proportions propelling the probability distribution of function. The sampling distribution can be thought of as the result of repeating a sampling operation many times with a fixed sample size, and calculating a statistic from each sample. At the same time, the sampling distribution of statistics gives us a way of relating the sample estimate to the population parameter. It provides a way of determining the significance level of a given result under the null hypothesis (Garrett, 1981; Ebel, 1979; and Lomax, 2001).

The size of the population places an upper limit on the size of the sample that can be drawn from it. The sample cannot be larger than the population. The larger the population, the more likely it is to be heterogeneous, i.e. to include diverse and semi-independent areas of knowledge or ability. In order to achieve equally accurate results, a somewhat larger sample is required in a heterogeneous domain than in a homogeneous domain (Robson, 1996). A large sample will always yield a sample statistics closer to the population parameter than a more limited sample (Garrett, 1981). The larger the sample, the smaller the sampling errors are likely to be and such errors are not caused by mistakes in sampling (Ebel and Frisbie, 1991).

Various techniques have been devised for obtaining a sample which will be representative of its population. The adequacy of a sample (i.e. its lack of bias) will depend upon our knowledge of the population or supply as well as upon the method used in drawing the sample. (Garrett, 2004)

Generally there are two basic methods of sampling viz. probability and non-probability sampling. Probability sampling is a technique used to ensure that every element in a sample frame has an equal chance of being incorporated into the sample. The examples of probability sampling are simple random sampling, stratified random sampling, cluster sampling etc., whereas non probability sampling is any procedure in which elements will not have the equal opportunities of being included in a sample. The examples of non-probability sampling are incidental sampling, purposive sampling, quota sampling etc.
Most commonly used sampling techniques are random sampling, stratified or quota sampling, incidental and purposive sampling.

**Random sampling** means that we rely upon a certain technique of selection called random to provide an unbiased cross section from the larger group or population. Randomization yields sample that is representative of the population and that is free of systematic bias and which generally occurs when there is a non random selection procedure (i.e. a person is assigned to be in a condition depending on his particular characteristics) and ensures that for any sample of subjects, there is no bias in assigning any person to any particular treatment group.

The criteria for randomness are met when:

- Every individual in the population or supply has the same chance of being chosen for the sample; and
- The selection of one individual or thing in no way influences the choice of another.

Thus, randomness in a sample is assured when we draw similar and well shaken up slips out of a hat or numbers in a lottery (provided it is honest) or a hand from a carefully shuffled deck of cards. In each of these cases, selection is made in terms of some mechanical processes and is not subject to the whims or biases of the experimenter.

**Stratified sampling** is a technique designed to ensure representativeness and avoid bias by use of modified random sampling method. It is applicable when the population is composed of sub-groups or strata of different sizes, so that, a representative sample must contain individuals drawn from each category of stratum in accordance with the sizes of the sub-groups. Within each stratum of sub-group, the sampling is random as nearly as possible. This involves dividing the population into a number of groups or strata where members of a particular group share a particular characteristic.

**Incidental sampling** is sometimes referred to as accidental sampling. It is applied to those groups, which are used chiefly because they are easily or readily obtainable. School children, college students are readily available, and laboratory
animals are also readily available at all times in numbers and under conditions none of which may be of the experimenter's choice. Such casual groups rarely contribute random samples of any definable population.

**In purposive sampling** a sample is built up which enables the investigator to satisfy his specific needs in the project. The principle of selection in purposive sampling is the investigator’s judgment of the typicality of his interest. A sample may then be especially chosen because in the light of the available evidence, it mirrors some larger groups with reference to a given characteristic. (*Stodla and Storodahl, 1967*).

The sample selection for the present investigation was done at two stages with multistage random sampling.

- The School Sample
- The Student Sample

**The School Sample**

The school sample was drawn from the representative senior secondary schools of Chandigarh. The list of the schools under the administration of the Union Territory of Chandigarh was procured from the Director Public Instructions (Schools) through the District Education Officer. The schools were compared with regard to following criteria: Schools had almost the same classroom climate, physical facilities, teacher-taught ratio, sex ratio, socio-economic status etc. It was ensured that all the schools were of senior secondary level, co-educational and English medium affiliated to Central Board of Secondary Education (C.B.S.E). A list of such schools was formed and three schools were randomly selected from this list. One of these schools was again randomly allocated to experimental group and remaining two were assigned to control group. Thus, three schools, which fulfilled the criteria, were approached for seeking the permission to conduct the experiment.

The following three schools were drawn for the data collection:

- Government Model Senior Secondary School, Sector 40-B, Chandigarh
- Government Model Senior Secondary School, Sector 23-A, Chandigarh
- Government Model Senior Secondary School, Sector 37-B, Chandigarh
Method of the Study

The principals of these schools were approached. All the three Principals welcomed the idea and promised to co-operate very enthusiastically.

The sample drawn from these schools has been shown below in the table 4.1.

**Table – 4.1**  
School-wise Distribution of the Sample

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of the School</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-A)</td>
<td>Experimental Group-I (N=64)</td>
</tr>
<tr>
<td>2.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-B)</td>
<td>Experimental Group-II (N=62)</td>
</tr>
</tbody>
</table>

The Student Sample

Out of randomly selected three schools, initial sample of 246 students of class XI of Commerce stream were selected randomly. Out of these three schools, one school (selected randomly) was considered for conducting experiment and the remaining two were selected as the control group. Each of the selected three schools had more than one sections of XI Commerce stream students. Hence two sections from Government Model Senior Secondary School, Sector 40-B, Chandigarh and one section each from remaining two schools were randomly chosen as intact groups. In the experimental group, students were imparted instructions through Awareness Training Model (ATM). Control group was taught by their own teachers through Conventional Group Learning (CGL).

The distribution of initial sample according to instructional treatment has been presented in the table 4.2.
Table – 4.2
Distribution of the Initial Student Sample according to Instructional Treatment

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the School</th>
<th>Treatment Group</th>
<th>Instructional Strategy</th>
<th>No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-A)</td>
<td>Experimental Group-I</td>
<td>Instruction through Awareness Training Model (ATM)</td>
<td>64</td>
</tr>
<tr>
<td>2.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-B)</td>
<td>Experimental Group-II</td>
<td>Instruction through Awareness Training Model (ATM)</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>246</strong></td>
</tr>
</tbody>
</table>

➢ The Final Sample

Great care was taken while determining the final sample. The Psychological Hardiness scale was used for classifying students into high hardy and low hardy students. A few (N=32) students were dropped out of the study at the final stage of the data analysis, who were either absent, or due to incompleteness of data, or were not found appropriate to be selected on the basis of their psychological hardiness. The final sample comprised of N=214 students on which the analysis was done have been given in the table 4.3
Method of the Study

Table – 4.3
Distribution of the Final Student Sample according to Instructional Treatment

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the School</th>
<th>Treatment Group</th>
<th>Instructional Strategy</th>
<th>No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-A)</td>
<td>Experimental Group-I</td>
<td>Instruction through Awareness Training Model (ATM)</td>
<td>56</td>
</tr>
<tr>
<td>2.</td>
<td>Government Model Senior Secondary School, Sector 40-B, Chandigarh (Commerce Section-B)</td>
<td>Experimental Group-II</td>
<td>Instruction through Awareness Training Model (ATM)</td>
<td>52</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td>214</td>
</tr>
</tbody>
</table>

The structure of the final student sample for the experimental groups and control groups has been given below in the table 4.4

Table-4.4
Distribution of the Final Sample according to Psychological Hardiness

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Treatment Group</th>
<th>Psychologically High Hardy Students</th>
<th>Psychologically Low Hardy Students</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ATM</td>
<td>37</td>
<td>71</td>
<td>108</td>
</tr>
<tr>
<td>2.</td>
<td>CGL</td>
<td>41</td>
<td>65</td>
<td>106</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>78</td>
<td>136</td>
<td>214</td>
</tr>
</tbody>
</table>

ATM: Awareness Training Model
CGL: Conventional Group Learning
4.3: DESIGN OF THE STUDY

A research design is a plan for collecting and utilizing data so that desired information can be obtained with sufficient precision or so that an hypothesis can be tested properly (Peirce, 1989). It is the structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance (Lindquist, 1956). Definition of the term experimental design is comparatively restricted. The term is used to state statistical principles underlying experimental designs and their analysis, wherein an experimenter can schedule treatments and measurements for optimal statistical efficiency. It contains activities like procedure for selection of factors and their levels of manipulation, identification of extraneous variables that need to be controlled, procedures for handling experimental units, selection of criterion measure, selection of specific design, and analysis of data (Brooker, 1999). A research design had two aspects:

- There is the matter of whether it permits the collection of the evidence that is necessary to solve the problem.
- Whether it permits the collection of the maximum amount of information with the least amount of effort or not.

Experimental design is the blue print of the procedures that enable the researcher to test the hypotheses by reaching valid conclusions about relationships between independent and dependent variables. Experimental designs vary in complexity and adequacy depending on such factors as the nature of the problem under investigation, the nature of data, the facilities for carrying out the study, and especially the research sophistication and competence of the investigator (Sidhu, 2004). Educational research is therefore described as experimental if and when the researcher has:

- Firstly, specified the finite set of researchable hypotheses.
- Secondly, has established a systematic programme of data gathering, under precisely defined conditions in an effort to test these hypotheses (Ingersoll, 1982).
Method of the Study

- And finally good experimental designer should provide some information with respect to all the objectives of the experiment and be kept as simple as possible (Montgomery, 1994).

In the present study, the experimental method was adopted employing Pre-Test - Post-Test design to study the effect of awareness training model on life skills and personal values of secondary school children in relation to their psychological hardiness.

The dependent variables in the present study were life skills and personal values i.e.:

- Life Skills viz.
  - Skill of Acquiring Knowledge
  - Self Awareness Skill
  - Assertiveness Skill
  - Social Skill

- Personal Values

Instructional model was independent treatment variable. It was studied at two levels viz.

- Awareness Training Model (Experimental Group)
- Conventional Group Learning (Control Group)

Psychological Hardiness was classification variable and it was also studied at two levels viz.

- High Hardiness
- Low Hardiness

The schematic layout of the design has been presented in figure 4.1
Method of the Study

Where

- **A.T.M**: Awareness Training Model
- **C.G.L**: Conventional Group Learning

![Fig. 4.1: Schematic Layout of the Design](image)

**Fig. 4.1: Schematic Layout of the Design**

- **LIFE SKILLS**
  - Skill of Acquiring Knowledge
  - Self Awareness Skill
  - Assertiveness Skill
  - Social Skill
- **PERSONAL VALUES**

Where

- **A.T.M**: Awareness Training Model
- **C.G.L**: Conventional Group Learning

**Controls in Experimental Design**

The design of research is closely associated with the use of experimental controls (Travers, 1958). They are defined as those factors, which are controlled by the experimenter to cancel out or neutralize any effect they might otherwise have on the observed phenomenon (Tuckman, 1972).

By selecting a control group made up of persons who, as nearly as possible, have the same idiosyncrasy as the experimental group subjects so that the researcher will minimize selection invalidity. The following approaches deal with control measures:

- **Randomization**: It is a procedure for controlling selection variables without first having to identify them. A researcher randomizes by beginning with a subject pool and randomly assigning members of this pool to the experimental and control
Table of random numbers, lottery system are popular techniques of random sampling.

- **Matched - Pair Technique:** Here the researcher first decides which control variables applicable to individual differences are his most prominent sources of problems in the experiment he is designing. It is necessary then for the researcher to identify within the subject pool the pairs of persons who are most equivalent on the specific variable(s) he wants to control. Then, one member of each pair, chosen from among the two members on a random basis, would be assigned to the experimental group and the second to control group. Each of the remaining pairs would be split similarly. The resultant two groups would be considered reasonably equal on the measures in question, thus providing control over selection variables.

- **Method of Constancy:** Experiences other than those resulting from the manipulation of the independent variable should be constant across the experimental and control groups. If instructions need to be given, these should be written in advance and then read to both groups to guarantee their constancy across conditions. Tasks experiences, or procedures not unique to the treatment should be identical for experimental and control groups.

- **Method of Counter Balancing:** In experiments where subjects perform more than one task or take more than one test, it is often necessary to control for the effects of order, that is, for apparent progressive shifts in a subject’s response as he continues to serve in the experiment. These shifts may be a function of practice or of fatigue (Tuckman, 1972).

In the present investigation, the controls were exercised using the following techniques of controlling extraneous variables:

- **Randomization** was exercised at the initial stage of selecting schools. Out of a list of 19 schools, three were chosen randomly. One school was again randomly selected as experimental group and remaining two as control groups. There were three sections of XI grade Commerce stream students in each school; hence two
sections from experimental group school and one section each from control group schools were also selected randomly for conducting experiment.

- **Matching of the Groups** was one of the controls where in all the relevant variables were controlled. The matching of the groups was done on all the relevant variables like intelligence, age, gender, socio-economic status and entry behaviour of the learners etc. It was essential because two different instructional strategies (ATM/CGL) were administered in three different schools to ensure equality in groups.

- **Method of counter balancing** was used by
  » Observing same sequence in administration of all the tools.
  » By keeping up similar time limits for all events in the experimental and control groups.
  » No time gaps were allowed for data collection in experimental and control groups. Simultaneous occurrence of events was ensured.

- To ensure **constancy** across conditions, similar sequence and conditions were followed to administer pre-tests, instructions and post-tests in similar conditions of classroom environment and instructions. The experimenter himself administered the Awareness Training Model. However, for the control group where Conventional Group Learning (CGL) was followed, the experimenter along with the teachers concerned did pre-testing and post-testing and guidelines were given to the school teacher for instructions beforehand. So, that the conducting of the experiment was totally matched by the time period and schedule of control group. This was done to eliminate contamination also.

4.4: **PROCEDURE**

Procedure of the experiment comprised of two main stages, which were:

- Selecting the sample
- Conducting the experiment
Method of the Study

Stage I: Selecting the Sample

The sample was selected at two levels. The School Level and the Student Level. Three schools with 246 students were selected for conducting the experiment. The Process of sample selection has already been discussed under the heading sample in the preceding paragraphs of this chapter.

Stage II: Conducting the Experiment

The experiment was conducted in five phases as stated below:

» Phase-I: Administration of Entry Behaviour Test

» Phase-II: Administration of the Pre-Tests viz. Criterion Test; Life Skills Tests; Personal Values Survey Schedule; and Psychological Hardiness Scale.

» Phase-III: Implementing instructional programme: Implementing the instructional modules based on Awareness Training Model.

» Phase-IV: Administration of the Post-Tests viz. Criterion Test; Life Skills Tests; and Personal Values Survey Schedule

» Phase-V: Scoring, tabulation and analysis of data.

The detailed school-wise Date schedule of all the above mentioned phases is presented in table 4.5. The detail of all phases of experimentation has been discussed below:

Phase-I: Administration of Entry Behaviour Test

Before implementing the modules based on Awareness Training Model (ATM) to the experimental group, all the 246 students (total initial sample) were given an Entry Behaviour Test (EBT). Scores of this test were used to determine whether or not the students had adequate entry behaviour required for the instructional treatment. The investigator provided full cooperation to the students who did not fulfill the condition of entry behaviour, as the subject of the Economics at XI level was new to them. An orientation was provided to all the students by the investigator to bring students at par with respect to their entry behaviour.
behaviour status. The school-wise schedule of administration of entry behavior test is presented in table 4.5

**Table- 4.5**  
School-wise Date Schedule followed for the Conduction of the Experiment

<table>
<thead>
<tr>
<th>Phase of the Experiment</th>
<th>Nature of the Phase</th>
<th>G.M.S.S.S., Sec. 40-B, CHD.</th>
<th>G.M.S.S.S., Sec. 23-A, CHD.</th>
<th>G.M.S.S.S., Sec. 37-B, CHD.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase-I</strong></td>
<td>Entry Behaviour Test</td>
<td>12\textsuperscript{th} July, 2010</td>
<td>13\textsuperscript{th} July, 2010</td>
<td>14\textsuperscript{th} July, 2010</td>
</tr>
<tr>
<td><strong>Phase-II</strong></td>
<td>Criterion Tests</td>
<td>13\textsuperscript{th} &amp; 14\textsuperscript{th} July, 2010</td>
<td>14\textsuperscript{th} &amp; 15\textsuperscript{th} July, 2010</td>
<td>15\textsuperscript{th} &amp; 16\textsuperscript{th} July, 2010</td>
</tr>
<tr>
<td></td>
<td>Summative Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Life Skills Tests</td>
<td>15\textsuperscript{th} to 17\textsuperscript{th} July, 2010</td>
<td>16\textsuperscript{th} to 19\textsuperscript{th} July, 2010</td>
<td>17\textsuperscript{th} to 20\textsuperscript{th} July, 2010</td>
</tr>
<tr>
<td><strong>Pre-Testing</strong></td>
<td>Personal Values</td>
<td>19\textsuperscript{th} July, 2010</td>
<td>20\textsuperscript{th} July, 2010</td>
<td>21\textsuperscript{th} July, 2010</td>
</tr>
<tr>
<td></td>
<td>Survey Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological</td>
<td>20\textsuperscript{th} July, 2010</td>
<td>21\textsuperscript{th} July, 2010</td>
<td>22\textsuperscript{th} July, 2010</td>
</tr>
<tr>
<td></td>
<td>Hardiness Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase-III</strong></td>
<td>Instructional</td>
<td>23\textsuperscript{rd} July to 4\textsuperscript{th} Oct., 2010</td>
<td>Conventional Group Learning by their own teachers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Programme</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase-IV</strong></td>
<td>Criterion Tests</td>
<td>5\textsuperscript{th} &amp; 6\textsuperscript{th} Oct., 2010</td>
<td>6\textsuperscript{th} &amp; 7\textsuperscript{th} Oct., 2010</td>
<td>7\textsuperscript{th} &amp; 8\textsuperscript{th} Oct., 2010</td>
</tr>
<tr>
<td></td>
<td>Summative Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post-Testing</strong></td>
<td>Life Skills Tests</td>
<td>7\textsuperscript{th} Oct. to 9\textsuperscript{th} Oct., 2010</td>
<td>8\textsuperscript{th} Oct. to 11\textsuperscript{th} Oct., 2010</td>
<td>9\textsuperscript{th} Oct. to 12\textsuperscript{th} Oct., 2010</td>
</tr>
<tr>
<td></td>
<td>Personal Values</td>
<td>11\textsuperscript{th} Oct., 2010</td>
<td>12\textsuperscript{th} Oct., 2010</td>
<td>13\textsuperscript{th} Oct., 2010</td>
</tr>
<tr>
<td></td>
<td>Survey Schedule</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Phase-II: Administration of the Pre-Tests

The pre-tests viz. criterion test (Summative Test); life skills tests; personal values survey schedule; and psychological hardiness scale were administered to all the students of selected groups. Scoring was done to obtain the information regarding pre-treatment knowledge of the students on the selected content; life skills attainment; preferences on personal values; and level of psychological hardiness. The required time was provided to complete the tests so that a clear and exact level of students regarding instructional content can be assessed. The investigator himself monitored the process of pre-testing. Scale of psychological hardiness was administered to students in order to identify and classify the psychologically high hardy and low hardy students. The scores arrived at, after scoring against prescribed scoring keys, were used in classifying the students according to their psychological hardiness at the initial step of the descriptive analysis of the data. The school-wise schedule of administration of pre-tests is presented in table 4.5

Phase III: Implementing Instructional Programme

The experimental group learnt through Awareness Training Model (ATM) and control group was taught through Conventional Group Learning (CGL). Eight instructional modules based on ATM prepared and validated by the investigator (as explained in chapter III) were used for experimental group. So instructional treatment was imparted to 108 students who were further classified for the purpose of descriptive analyses of the data on the basis of their psychological hardiness at the later stage.

The instructional programme based on ATM for Experimental Group was administered according to the following plan:

» Students were motivated for the novel method of instruction.

» As this method of instruction depends upon activity based learning, congenial atmosphere; cordial teacher-taught relationship; healthy rapport and encouragement for utmost participation of students were initiated.
Method of the Study

» Initial days of experiment were devoted towards the activities which were very helpful in developing awareness of self and of peer group. Some examples of such activities are Good and New, Group Discussion, Self Introduction etc.

» More emphasis was given for the development of interpersonal relationships in the group activities and to increase one’s capacity for self awareness and self exploration by knowing own weaknesses and strengths.

» The investigator himself taught the groups through exploratory games followed by open discussion to make them more aware about the learning.

» Incubation period was also given wherever required in the programme, so as to make projects or summaries or to think collectively upon some challenging/recent/current issue of the subject concerned.

» Seating plan was also set according to the requirement of the activity, so as to get maximum utilization of the instruction. Sometimes circular seating plan was recommended for face to face contact in the activities like Fish Bowling, Snow Balling etc.

» The investigator’s role was dynamic. Sometimes he played an active role in the classroom activities; like during lecturing, directing or in some activities also, and sometimes he was totally passive; just watchman of the activities. It all depended upon the requirement of the activities and level of learning.

» Students were encouraged to participate in each and every activity. Group leaders were made for small and large group activities; wherein shift in the choice of leaders in various activities was formed.

» Each lesson’s content was recapitulated and summarized at moderate levels.

» The enrichment material like daily life examples, teaching aids, real things, handouts, prepared sheets etc. were employed throughout the eight modules.
Method of the Study

» Daily formative test was administered at the end of lesson. It was very beneficial in knowing the knowledge gained by the students. Students actively participated in the daily formative test as the results were announced by the investigator regularly. These formative tests were very beneficial for the investigator also as these helped him to plan his next day’s strategy according to the level of learning.

» Module wise, pre and post criterion summative tests were administered. All the eight modules were followed by post criterion summative tests to know terminal behavior of the students. (See Appendix D-2)

» Motivational efforts were made continuously by the investigator especially for those students who were shy in nature and hesitated in participating in the classroom activities. Investigator gave special attention by devoting some extra time or motivating them by praise and recognition or by giving them some rewards at every success.

» Spontaneous and planned discussions were used as the means of achieving full clarity of the content. It was helpful in creating the atmosphere which was full of freedom to share views and to be aware of one’s own capabilities and interest.

» The main focus of this model was to develop insight regarding self awareness and awareness of others in the students through exploratory games/activities; as it was the pre-requisite of gaining real education. The knowledge thus gained by the students was everlasting and permanent. For this purpose, investigator had asked the students to tell one best thing (what they liked most about the activity) and one worst thing (what they liked least about the activity) for each activity they had participated at the end of each activity.

» Each module took seven to eight days to complete and conduct of total experiment took seventy four working days.

» The time schedule for each module was more or less same. The basic structure of each module was same. However slight modifications were
made wherever required. Detailed step by step, day-wise description of all the modules has been given in Appendix D-3.

The instructional programme based on CGL for Control Group was administered according to the following plan:

- This group was taught by their Commerce (Economics) teacher in the conventional manner. It generally refers to reading out the chapter by teacher or some explanations by the teacher, solving exercise and providing notes for certain important questions.
- Objectives and content of all eight modules were provided to the regular Economics teacher by the investigator, so that, there might not be any difference among groups on the amount of content taught to them.
- No daily formative tests were conducted after the completion of every lesson.
- After having completed content, criterion summative test was administered to this group.

The time schedule implementing the instructional programme of ATM in experimental group along with the conventional instruction in the control group has been given in the table 4.5

Phase IV: Administration of the Post-Tests

After completion of the instructional programme of both the groups; the post-tests i.e. criterion summative test; life skills tests; and personal values survey schedule, were administered to all the students. Time limit for different tests was different and students were informed about that. At the end, students were thanked for their full cooperation. The date wise schedule of post-testing phase followed for the experiment has been given in the table 4.5

Phase-V: Scoring, Tabulation and Analysis of Data

All the tools were scored according to their prescribed scoring keys and data thus obtained was subjected to statistical analysis.
4.5: STATISTICAL TECHNIQUES

The following statistical techniques were employed to analyse the data obtained in order to test the hypotheses:

- Means, Standard Deviations, Skewness and Kurtosis were used wherever required.
- Graphical presentations: Bar Diagrams, Line Graphs and Frequency Curves were drawn to support statistical data.
- Two-way Analysis of Variance (ANOVA) was employed to study significance of difference among various combination groups. Separate 2x2 ANOVA was used on gain scores of:
  - Skill of Acquiring Knowledge (Achievement)
  - Self Awareness Skill
  - Assertiveness Skill
  - Social Skill
- Significant F-ratios were followed by T-test wherever required.
- Data pertaining to preferences on Personal Values were analyzed through normalized master ranks worked out on matrix of pooled preferences and calculated through C-Scale values.

The detailed results and discussions are presented in Chapter V.