CHAPTER-III
METHODS AND PROCEDURES

- Design of the Study
- Critical Assessment (Content Analysis)
- Experimental Study
- Case Study
- Sample
- Research Tools
- Construction of Achievement Test
- Observation Schedule (Rating Scale)
- Attitude Scale
- Data Collection and Scoring Procedure
CHAPTER-III
METHOD AND PROCEDURE

Scientific problems can be resolved only on the basis of data and a major responsibility of Scientist is to set up a research design capable of providing the data necessary to the solution of her problem. While the unit of research makes it possible to say that one aspect is more crucial than another, the collection of data is of paramount importance in the conduct of research, since, obviously no solution can be more adequate of research than the data on which it is based.

Keeping the above fact in view, the researcher felt it essential to explain the procedure used for this study and the techniques used for collecting data of this research. She had to describe the reliability and validity of tools and methods and adopted in drawing out the sample of her investigation. She was required to discuss and explain the procedure of administering her tools over the selected sample and procedure she employed in tabulating and organising data. This chapter is confined to discuss these steps as follows:

3.1 Design of the study
3.2 Sample
3.3 Research Tools
3.4 Data Collection & Scoring Procedure
3.5 Statistical Techniques used.

3.1 Design of the study

The study being multi-dimensional approach required comprehensive research method. Hence the design of the study was incorporated Descriptive or Critical Assessment, (Content Analysis), Experimental as well as Case study method.
3.1.1. Critical Assessment (Content Analysis):

Research method was to be followed in this investigation would be that of construction through criticism which was the characteristic method of philosophy of education. The researcher was strictly followed by the Content Analysis Method. A few primary and secondary sources were also be scanned, scrutinized and studied. Some of those were be subjected to a careful internal and external criticism as well.

(i) Primary means – works of Sri Aurobindo

(ii) Secondary means –

(a) Works of other writers

(b) Published work

(c) Actual study was critical examined of the practical working of Sri Aurobindo's system of education at Sri Aurobindo Ashram at Delhi.

3.1.2 Experimental Study

A pre test and post test control group and experimental group was adopted to study the effect of Sri Aurobindo's Integral Education on School students learning outcomes. The experimental design was used for the study which is the strongest of all research studies for drawing influence in order to establish cause or effect relationship between independent and dependent variables. Experimental field study design implies possibility of randomized treatment and possibility of effective observation at any point of time in a natural setting. A field study, if properly conducted, provides both internal and external validity and established the cause-effect relationship which can be directly applied in a real life situation. Keeping in view the several advantages and limitations of a experimental study, the schematic design of the present study was presented in the following table:
Table 3.1

Design of the Study Indicating Treatment and Tools Use

<table>
<thead>
<tr>
<th>Groups</th>
<th>Sample</th>
<th>Treatment</th>
<th>Research Tools</th>
</tr>
</thead>
</table>
| Experimental | • Schools  
              • Students  
              • Teachers | Exposed to Sri Aurobindo's Integral Approach | • Attitude Scale  
                                                              • Achievement Test  
                                                              • Observation Schedule |
| Control    | • Schools  
              • Students | No exposure to Sri Aurobindo's Integral Education Approach (Traditional Method) | • Achievement Test. |

3.1.3 Case Study

This study aim at educating the body, emotion, mind and helping to discover one's own inner being, instead of giving mere training to the intellect. This was a format which creates opportunity for growth of all aspects of the human being.

As a the researcher worked intensively for eight months on this aspect. Moreover, she had the opportunity to work as a Diya with children. Those two experiences had given him a broad understanding about the Mirambika.

This study covers,

- Philosophical background of Mirambika School.
- The meaning, needs and importance of Mirambika.
- Rituals in Mirambika.
- The strengths and weaknesses of Mirambika.

The researcher followed this methods:
1. **Reading and analyzing**:  
   - A representative set of planning sheets.  
   - Evaluation sheets, findings summary.  
   - Mirambika booklets.  
   - Related literature.  

2. **Observation of**:  
   - Non-participant observation from Red to Courage group  
   - Participant observation in Gratitude group.  

3. **Interviews with**:  
   - Diyas  
   - Children  
   - Parents  

   Instead day of classes with strict physical arrangement and structure. In Mirambika each age group had group named after a colour or Quality. The names of groups an their age group were  

<table>
<thead>
<tr>
<th>GROUP NAME</th>
<th>AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>4+</td>
</tr>
<tr>
<td>BLUE</td>
<td>5+</td>
</tr>
<tr>
<td>GREEN</td>
<td>6+</td>
</tr>
<tr>
<td>YELLOW</td>
<td>7+</td>
</tr>
<tr>
<td>ORANGE</td>
<td>8+</td>
</tr>
<tr>
<td>UNITY</td>
<td>9+</td>
</tr>
<tr>
<td>HARMONY</td>
<td>10+</td>
</tr>
<tr>
<td>RECEPTIVITY</td>
<td>11+</td>
</tr>
<tr>
<td>ASPIRATION</td>
<td>12+</td>
</tr>
<tr>
<td>GRATITUDE</td>
<td>13+</td>
</tr>
</tbody>
</table>
Once children move beyond the orange group they had the freedom to choose a name for their own group. These were the old names of 10+, 11+ and 12+ 13+ age groups respectively, which the children later changed.

**Strategies in Data Collection**

Since the school, Mirambika was a pre-selected case for the study, hence, the work may be called intrinsic case study (Stake, 1995) of the school's organisation, culture and the teaching – learning processes. The emphasis was on completeness of the analysis, by taking into account every possible pertinent aspect of the case, i.e. detailed examination of one setting (Good and Scates, 1954). Ethnographic approach to study the school was undertaken which primarily was dependent on the researcher as an essential component of the research process. It required the researcher to take an attitude of student attempting to study the particular group or culture "Rather than studying people, ethnography means learning from people" (Spardley, 1979, p. 3). It involved observation, discussion and learning from people" (Spandley, 1979, p. 3). It involved observation, discussion and reflection. It was neither subjective or objective, but was interpretive, mediating two worlds through a third.

**Validation by Triangulation**

Validity of the interpretation of the school phenomena were sought in triangulation, i.e. application and combination of several research methodologies in the study of the same phenomena (Denzin, 1985). The present case study relied on a number of research methods viz. participant observation, informal observation and interaction, unobtrusive methods (documents, records, phenomenological material) questionnaires and interviews. The effectiveness of triangulation rests on the premise that the weaknesses in each single method was compensated by the counter-balancing strengths of another. The present used different methods for collection of data and for cross-validating the findings. The main methods employed were observation,
interview and questionnaire. Data collection began in September, 2005 and extended over to April 2006 (8 months).

**Figure 3.1: Triangulation**

**OBSERVATION**

![Diagram](image)

**TRIANGULATION**

**QUESTIONNAIRE**

**INTERVIEW**

**Data Analysis**

Analysis of the qualitative data collected in the form of observations and interviews were mainly treated to an extent of "making sense" out of the data. The essence of dealing with data was not to impose meaning on the data but letting the data speak. Inductive data analysis was attempted for the present study. This involved the discovery of patterns, themes and categories at they emerge from the data. Analysis of data collected in the present study took place in the following stages.

**Stage I:** Keeping the research questions in mind the data was classified pertaining to school organization, culture and teaching-learning processes. The three sets of data were dealt with one at a time to develop tentative and preliminary ideas. Emerging themes and ideas provided a summary picture of the focus of the study.

**Stage II:** This involved making sense out of volumes of data and examining it from both the perspectives i.e. ideology and actual practice, resulting in recognizing the patterns across different activities in school. Grouping the data according to the emerging themes along with numbering the pages of the diaries on which observations
were made helped in "knowing" the data. This phase was an attempt at framing the data and narrowing the focus to the objectives of the study.

**Stage III**: This phase primarily dealt with the data in terms of "naming" the identified themes. It was kept in mind that the essence of the activity was not lost in the indigenous labels. The focus was to keep the meaningfulness of the data intact.

**Stage IV**: This phase dealt with comparing and contrasting the reflections on patterns and themes identified. This involved across-validating Triangulation, Denzin, 1978) among sources of data, observer and methods to "gauge and trust worthiness" of the interpretations.

**Procedure for Analysis of Data**

Data gathered in a qualitative presentation of describing the context, the site, the participants involved during the entire data collection time-period. Names were retained for confidentiality. An analysis of the actions and events with respect to the ideological or operative goals was also weaved in the description. The findings were presented of the school processes in the form of a qualitative method of the "investigations" made.

### 3.2 Sample

Many problems in educational and scientific research can not be solved without sampling. Since not educational phenomena consist of a large number of units, it is not always possible to interview, test or observe such one under control conditions. Sampling solves this dilemma, for it helps the researcher to select representative units from which she can gather data that permit her to draw inferences about nature of entire population.

Sampling is both essential and advantageous. It saves the researcher's time, money and energy. It enables her to probe population that are too widely scattered to
be approached as a whole. Cocharan (1959) analysis for principle advantages of sampling, i.e. that of reduced cost, greater speed, greater scope and greater accuracy.

The sample was consisted of one district from Delhi. One zone from district and three schools from West Zone were selected through stratified random method for the study.

A group of one hundred eighty secondary class students were selected through random sampling and forty teachers from Delhi Administration, Kendriya Vidyalaya and Public School located in West Delhi through purposive sampling method for getting the learners learning outcomes in cognitive and noncognitive domains and feedback about the Sri Aurobindo's Integral Education System. The sample of students was presented below in graphic format.

**Figure No. 3.2 : Number of students from different system of schools**

![Diagram]

- **Target Group**
  - **Experimental Group**
    - Delhi Admin. School: 30 Students
    - Kendriya Vidyalaya School: 30 Students
    - Public School: 30 Students
  - **Control Group**
    - Delhi Admin. School: 30 Students
    - Kendriya Vidyalaya School: 30 Students
    - Public School: 30 Students

Total = 180 students
### 3.3 Research Tools

The proceeding chapter dealt with the emergence of the problem, its objectives, hypothesis and delimitations. The present chapter focuses on the development of the following tools.

**Table 3.2:**

**Description of Variables and Research Tools**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Sri Aurobindo's Integral Education</th>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>Research Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 1.</td>
<td>The Physical Being</td>
<td>• Physical Exercise</td>
<td>• Tolerance</td>
<td>• Observation Schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pranayam</td>
<td>• Discipline</td>
<td>• Attitudes Scale</td>
</tr>
<tr>
<td>2.</td>
<td>The Vital Being</td>
<td>Training of the Aesthetic Personality Exploring Materials Activities</td>
<td>• Sincerely</td>
<td>• Attitude Scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Determination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Love &amp; Sympathy</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The Psychic Being</td>
<td>Integral Yoga (Activity)</td>
<td>• Will Power</td>
<td>• Observation Schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Positive Attitude</td>
<td>• Attitude Scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Self Awareness</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The Mental Being</td>
<td>• Cooperative Learning</td>
<td>Learning Achievement</td>
<td>• Achievement Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Creativity:</td>
<td>• Attitude Scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Concentration</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>The Spiritual Being</td>
<td>Meditation Exampler Materials</td>
<td>• Self realisation</td>
<td>• Observation Schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Honesty</td>
<td>• Attitude Scale</td>
</tr>
<tr>
<td>B</td>
<td>Sri Aurobindo's Philosophy of Education</td>
<td>Concepts, Objective Methods of Teaching Teacher, Discipline etc.</td>
<td></td>
<td>• Content Analysis.</td>
</tr>
</tbody>
</table>
3.3.1 Construction of Achievement Test:

"Achievement test" refers to the assessment of the outcomes of formal instructions or learning in cognitive domain (Dwyer, 1982). It can also be thought of as sample of indicator of student's knowledge taken at a particular point in a time. Achievement test may mean a sample of behaviour that provides an opportunity for comparison with a performance standard, as is criterion referenced testing (Groundland, 1973; Hambletor et al, 1978, Popham, 1978). It aids both the teacher and the student in assessing learning readiness, monitoring learning progress, diagnosing difficulties and evaluating learning outcomes (Groundland, 1977).

Strictly speaking, achievement and criterion tests differ only with respect to the interpretation of results. Thus, both types of interpretations could be applied to the same test (Groundland 1977). An achievement test is distinguishable from a criterion test on the basis of the purpose of the test besides its rigorous conditions, discriminating power and normality condition.

In the present study, achievement test was developed from those criterion items that exhibited sufficient response variance to measure the performance of the students with two different instructional test, for item selections for the achievement test, discrimination power (D.P.) was computed for all the items on the basis of the first try out data.

The achievement test for the students is based on the competency, i.e. knowledge, understanding and application in various content areas. The students competency with respect to the above factors in specified content areas can be assessed through an achievement test. The students are said to be competent if they possess adequate knowledge, understanding and application in various subject areas. The present achievement test was developed and the items were included in test only after a through analysis of instructional materials, viz. text book of science meant for class IX.
The test items were objective type and multiple choice in nature. The students were to choose the correct response out of the four alternatives for each item of the test.

For the above test construction, the content experts, methodologists, the experienced teachers of secondary schools and the measurement experts were consulted. They were requested to scrutinize the tests particularly with respect to coverage of the topics, clarity of questions, difficulty of materials, adequacy of directions etc. Thus, the test was subjected to the critical review of many experts and teachers and their suggestions and criticisms were taken into consideration in developing the final format of the test.

Before the test was constructed, a blue print was prepared. Its importance was realised for the following points.

1. It may help improve the content validity of teacher made test.

2. If defines as clearly as possible the scope and emphasis of the test.

3. It relates the objectives to the contents.

4. If provides greater assurance that the test will measure learning outcomes and course content in a balanced manner.

Keeping the above useful purposes of the blue print in view it was prepared in contents prescribed of this purpose. In consultation with the measurement experts, the following weightage has been given to the content, objectives and difficulty level in different tabular forms.

(i) Weightage to Content

Weightage has been decided for the different areas of content which are included in the test. The weightage to content has been given in the following manner.
Table 3.3:
Weightage to Content

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Content</th>
<th>Percentage (%)</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Plant Tissue</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>True Solution</td>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>3.</td>
<td>Starch Test</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>Food Adulteration</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

Justification of the Weightage to Contents

Equal weightage has not been given to all the subunits. That is because the volume of the content and the number of instruction through a cooperative learning prepared on the basis of contents vary from one another. However, in each sub-unit, these an a number of specifications that can be achieved through it. Therefore, the number of items are undertaken from each sub-unit keeping the above weightage in view.

(ii) Weightage to the Objectives

The weightage to objectives has been decided by a committee of experts including the teachers. There are mainly three objectives taken for considerations which are as follows.

Table 3.4:
Weightage to Objectives

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Objectives</th>
<th>Percentage (%)</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Knowledge</td>
<td>35</td>
<td>7</td>
</tr>
<tr>
<td>2.</td>
<td>Understanding</td>
<td>45</td>
<td>9</td>
</tr>
<tr>
<td>3.</td>
<td>Application</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>
Justification of the Weightage to Objectives

Here thirty five percent weightage has been given to knowledge objective assuming more number of average students, forty five percent weightage has been given to understanding and twenty percent to application objective has been given to discriminate normal from superiors.

(iii) Weightage to Difficulty Level

It is an accepted fact that are three types of subjects/ testees - above average, average and below average. Accordingly, the test should not be too difficult or too easy. A test should provide a suitable opportunity to the bright, the average and weak students. Keeping the above facts in view, the difficulty level has been presented in the following table 3.4

Table 3.5:
Weightage to Difficulty Level

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Objectives</th>
<th>Percentage (%)</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Easy</td>
<td>30%</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>Average</td>
<td>50%</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Difficult</td>
<td>20%</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
<td>20</td>
</tr>
</tbody>
</table>

Justification of the Weightage to Difficulty Level

As per the opinions of measurement experts, thirty percent weightage has been given to easy level of items, fifty percent weightage to average and twenty percent to difficult level of the test items. Since, these are three categories of subjects viz. above
average, average and below average, distribution of weightage to each level has been done accordingly.

First Try Out

After preparing a preliminary draft of the rest according to the instructional objectives, it was taken for a try out. The objectives of the try out were:

- to identify weak and defective items if any;
- to determine the difficulty level of individual items
- to determine the discriminating power of individual items; and
- to determine the indices of intercorrelations among items in order to avoid overlapping in item selection.

For the purpose of try out, sixty students of a representative school of Delhi. The achievement test was tried out on those students. After the try out, the data were scored and one mark was allowed to each correct item. The total score of a student was obtained by making an addition of his score given each item.

Item Analysis:

The application of statistical item analysis techniques constituted an important step in the development of standardised test. It gave a measure of the correlation between the test items. It gave information concerning the distractors included for each item in multiple choice form. It gave a basis for the arrangement of sub-test in a battery, which can be prepared on the basis of the range of difficulty values of items included in each sub-test. The item validity and difficulty indices were also obtained.

To check the relation of item response to the total score, the performance of a group of good students with that of a group of poor students was compared on the basis of their total test. For this purpose, the test prepares after scoring were arranged in order of the size of the test score. The papers in highest score were kept in top.
twenty seven percent and bottom twenty seven percent papers were kept for item analysis. Middle paper were left out.

The difficulty of an item is defined in terms of percentage of persons who answer it correctly. The formula used for estimating item difficulty was.

\[ p = \frac{P_H + P_L}{2} \]

Second Try-out

The revised version of the criterion test was administered on another group of fifty students of a representative school of Delhi. Again, discriminating powers for the twenty two items were completed. The distribution of the DP of the items can be seen in the Table. 3.6.

<table>
<thead>
<tr>
<th>Discriminating Power</th>
<th>Frequency</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-40 and above</td>
<td>10</td>
<td>Very good items</td>
</tr>
<tr>
<td>Between 0.30 and 0.39</td>
<td>6</td>
<td>Reasonably good</td>
</tr>
<tr>
<td>Between 0.20 and 0.29</td>
<td>4</td>
<td>Needing improvement</td>
</tr>
<tr>
<td>Below 0.19</td>
<td>2</td>
<td>Poor items</td>
</tr>
</tbody>
</table>
Table 3.7:
Distribution of Discriminating Power (D.P.) of Test Items of Final Draft of Achievement Test

<table>
<thead>
<tr>
<th>Discriminating Power</th>
<th>Frequency</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.40 and above</td>
<td>10</td>
<td>Very good items</td>
</tr>
<tr>
<td>Between 0.30 and 0.39</td>
<td>6</td>
<td>Reasonably good</td>
</tr>
<tr>
<td>Between 0.20 and 0.29</td>
<td>4</td>
<td>Needing improvement</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

In the final draft of the achievement test, there were six knowledge items, seven comprehension items, four concept items and three principle learning items.

In the light of the above results, out of the item falling below the discriminating power of 0.19, two items were dropped and twenty items were retained. These twenty items were improved with respect to language and distractions. This led to the preparation of the second draft of the Achievement Test.

Reliability and Validity of the Achievement Test:

Reliability:

Reliability of concerns the extent to which measurements are repeatable, i.e. when different persons makes the measurements on different occasions, with supposedly alternative instruments for measuring the same thing (Nunnally, 1982). In other words, measurement are intended to be stable over a variety of conditions in which essentially the same results should be obtained.

For determining the reliability of the Achievement Test, it was administered to fifty, students of Delhi. The reliability coefficient of the Achievement was computed with the help of the KR-21 formula:
Reliability \( r = 1 - \frac{M(K-M)}{K(S)^2} \)

Thus the reliability of the test was found to be 0.90.

Ebel (1966) suggests that most test constructors are satisfied when their test yield reliability coefficient in the vicinity of 0.90. Reliability coefficient of the present test was 0.90. Therefore, the Achievement Test may be considered a reliable tool for measurement of student's achievement.

**Standard Error of Measurement**

The standard error of measurement is an especially useful way of expressing test reliability because it indicates the amount of error to allow for when interpreting individual test scores. Standard error is computed with the help of the following formula:

\[
\text{Standard error of measurement} = \sqrt{1 - r_{11}}
\]

The standard error for the present test was to be found 4.41. In accordance with Diedrich's (1973) table with provides an estimate of the amount of error to be expected for tests of different lengths, for a twenty items test, the standard error should be approximately 5 points. As the standard error of measurement is less than the table value, the tool developed by the researcher may be considered to be reliable.

**Validity**

"Content Validity" is determined by showing that the behaviours demonstrated in testing constitute a representative sample of behaviours to be exhibited in a desired performance domain. The domain usually involves learned knowledge and skills. Thus, content validity is commonly used in Achievement Tests (Wolf, 1982). The content validity is determined comparing the items in a tests with the content
objectives of a particular domain to see how well they match, as it is essential for a valid test to reflect the content of a particular domain.

For the present test, content validity was determined on the basis of the coverage of the universe items. The test represents a fairly well-defined universe of content. Content was made closely parallel to the tasks constituting the universe under study and performance on individual items was determined both with respect to the accuracy of the response and the process used to solve the items.

3.3.2 Observation Schedule (Rating Scales)

Observation seeks to ascertain the overt behaviour of person by watching them as they express themselves in a variety of situations selected to typify the conditions of normal living or to represent some special set of factors. A desire for improved instructional and supervising procedures and interest in behaviour of learner stimulated development of the direct observation (Good, 1954).

For a systematic collection of data through observation, rating scales are the devices often used for recording. Rating is a term applied to expression of opinions or judgement regarding some situation, object or character. Rating techniques enable a qualification of such judgements of the psychological measurement methods that depend upon human judgement, rating scales procedures exceed design for their popularity and use. They are used in the evaluation of individuals, their reactions and their products as well as in the psychological evaluation of stimuli. The great ease with which they can be administered gives them unusual appeal (Guilford, 1979).

In general, a rating scales, essentially is composed of three aspects:

(i) the objects or the phenomena to be rated. – ratee

(ii) the continuum along with they will be rated – scale.
the judges who will do the rating – rater.

For the purpose of the present study rating scale was constructed. At the present study proposed to assess the performance of learners in different components Sri Aurobindo's Integral Education, e.g. The Physical Being, The Vital Being, The Psychic Being, The Mental Being, and The Spiritual Being. This was done because it was thought that Sri Aurobindo's Integral Education system for learner are determined, to a large extent by the different system of schools is governed by Delhi Administration, Kendriya Vidyalaya Schoo (K.V.S.) and Public School, a student was brought upon.

Generally, a rating scale consists of 'instructions' to use the scale and list of aspects to be rated. The rating scale was constructed through the following steps;

Step I Planning of the Scale

Step II Writing and Improvement of the item scale.

Step II Reliability of the scale.

Step I : Planning of the Scale

The meaning of the term Sri Aurobindo’s Integral Education was obtained from the Sri Aurobindo’s literature. The list of thirteen personality traits for five of Sri Aurobindos Integral Education was prepared. After selection of the traits, a qualitative analysis of the construct of Sri Aurobindos Integral Education System was performed. The meanings of the various traits were obtained from the dictionaries and a brief description of each trait was developed.

Next the operational definitions were developed. Within constraints, an effort was made to define the traits so that a rater obtains of clear univocal conception of the
continuum along which she has to evaluate objects and to give all the raters the same conception.

**Definition** of the traits were stated as much as possible in operation terms.

1. **Tolerance:** An attitude of forbearance, or willingness to consider without prejudice views, opinions, and situations with which one is not in full sympathy; also, on attitude of allowing the existence of such views, opinions or situations.

2. **Discipline:** The term denote any training intended to develop and characters or produce a pattern of behaviour.

3. **Sincerity:** It is the virtue of speaking truly about one’s feelings thoughts and desires.

4. **Determination:** A philosophical theory that suggests that human action is not entirely free but controlled by external forces acting upon the will.

5. **Love & Sympathy:** Love is a constellation of emotions experiences related to a sense of strong affections or profound oneness to naturally is an emotional affinity in which whatever affects.

6. **Will Power:** Will power is spearhead of self-discipline and concentration of force to gather up all energy and a massive thrust forward.

7. **Attitude:** A general predisposition or mental set with regard to any persons, beliefs, or other entities; educational systems typically seek to encourage the development of certain attitudes in their students, in addition to inculcating knowledge.

8. **Self Awareness:** Being conscious of oneself, in a relatively objective.
9. **Achievement:** Successful accomplishment or performance in particular subjects, areas, or courses, usually by reasons of skills, hard work, and interest.

10. **Creativity:** In popular understanding, originality, expressiveness, and imaginativeness in finding new answers to problems and doing unusually good work in any area.

11. **Concentration:** The act of directing attention towards, and becoming absorbed in, any task regardless of interruptions, and to continue doing so for a length of time.

12. **Expressions:** An action which helps to develop one's personality through feeling free to express one's own feelings.

13. **Self Control:** Restraint and control of one's emotion and actions by the determination of discipline, patience and the delay of gratification; increases generally with the maturity.

The list of the dimensions attributing to the construct of "Sri Aurobindo Integral Education" was presented to five experts from education and psychology for their Critical appraisal. The grouped agree the feeble link of a dimensions "Emotional Maturity" in the construct of the "Spiritual Being" at Higher Secondary School level. So, it was dropped from the list. The final scale consisted of the fourteen traits. Every dimension was presented along with five point linear scale with the scale values from 1 to 5. For the instructions to the rate the judgement, the rater was requested to mark a "✓" at the point which represents the assessment of the ratee.

**Step II: Writing and Improvement of the Item Scale**

In order to counteract the various problems faced by experimenters in rating scale construction, like the errors of leniency, central tendency, the halo effect, logical
error contrast error and the proximity error, it was decided that each trait be rated by at least four or five raters.

For refining scale, the tryout was conducted to September, 2006, Delhi school. Five Teachers of the School rated thirty students of Class IX. On each trait of the Sri Aurobindo's integral Education System on forms supplied for the purpose. The responses obtained from the group were used for the improvement of the scale. The scale thus finalised was used for the purpose of the data from the field.

**Step III : Reliability of the Scale**

An easy method of estimating reliability for rating has been described by Ebel (1951). If each of "K" raters has rated "N" persons on same trait on one occasion, we have the possibility of obtaining intercorrelations of ratings of the N person from all possible pairs of the 'K' raters. A statistic known as the inter class correlation , which gives essentially an average inter- correlation was used, as given by Ebel.

\[
\hat{r}_{kk} = \frac{V_p - V_e}{V_p}
\]

Thus, the reliability of the mean ratings from K raters was calculated for fourteen traits of "Sri Aurobindo's Integral Education System" as shown in Table 3.8. The reliability of each of the fourteen traits of the scale showed that on the whole the scale was reliable.
Table 3.8

Reliability Coefficients for the Traits of "Sri Aurobindo's Integral Education System"

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Traits</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tolerance</td>
<td>0.58</td>
</tr>
<tr>
<td>2.</td>
<td>Self Control</td>
<td>0.69</td>
</tr>
<tr>
<td>3.</td>
<td>Discipline</td>
<td>0.81</td>
</tr>
<tr>
<td>4.</td>
<td>Concentration</td>
<td>0.84</td>
</tr>
<tr>
<td>5.</td>
<td>Sincerity</td>
<td>0.82</td>
</tr>
<tr>
<td>6.</td>
<td>Determination</td>
<td>0.75</td>
</tr>
<tr>
<td>7.</td>
<td>Love and sympathy</td>
<td>0.71</td>
</tr>
<tr>
<td>8.</td>
<td>Will Power</td>
<td>0.67</td>
</tr>
<tr>
<td>9.</td>
<td>Positive Attitude</td>
<td>0.78</td>
</tr>
<tr>
<td>10.</td>
<td>Self Awareness</td>
<td>0.70</td>
</tr>
<tr>
<td>11.</td>
<td>Concentration</td>
<td>0.85</td>
</tr>
<tr>
<td>12.</td>
<td>Expression</td>
<td>0.73</td>
</tr>
</tbody>
</table>

3.3.3 Attitude Scale

Attitude is defined as a positive or negative sentiment, or mental state, that is learned and organised through experience and that exercises a discrete influence on the affective and conative responses of an individual toward some other, individual, object or event. The theory of reasoned action (Ajzen and Fishbein, 1980) supports the view that beliefs about an object imply the creation of an attitude towards the object. This attitude leads to behavioral intentions, which in turn affect actual behaviour causes the revision of initial attitudes. Attitudes can examined at different levels of generality, depending on the action, target, context and time elements, being evaluated.

As Woodrow (1991) argues, awareness of learners' attitude towards Sri Aurobindo's Philosophy therefore constitutes a "central criterion in the evaluation of
the system and in the development of activities for Integral Education System. With this mind, the purpose of this present scale was to develop and validate a theoretical and measure of learner's attitudes towards Sri Aurobindo's Integral Education System.

Selection of the Items:

Following Likert's example, a pool of items was developed. In this way sixty five items was developed; covering subjects; affective responses toward using integral education system; The Physical Being, The Vital Being, The Psychic Being, The Mental Being and The Spiritual Being for secondary school students and teachers. These items were presented, accompanied by a five-point Likert Scale to a sample of forty students aged fourteen – sixteen for initial item analysis.

Factor analysis was then used on the data for item analysis. A principle components factor analysis with Virmax relation was performed on the sixty five attitude items. All refained items loaded greater than ± sixty five on the relevant factor, fulfilling Hair et al.'s. (1995) criterion of the significant item, and loaded less than 0.30 on non-relevant factors. This item analysis reduced the original sixty five items to sixty items.

Reliability and Validity

The revised scale was piloted with forty , fourteen-sixteen students. thirty percent of the sample were female (n=12) and seventy percent male (n = 28). As before, the items was presented on a five point Likert Scale (labelled strongly Agree to Strongly Disagree) and with items from each construct alternately presented to prevent any "Clustering" effect. All items were positive worded to provide a check against respondents giving positive response sets. Data were analysed to assess the reliability and validity of the scale.
Internal Consistency

A Cronbach's coefficient $\alpha$ was calculated for each of component and the overall scale as a whole. Table 3.9 shows the $\alpha$ coefficients for all sub scales were significantly high; suggesting that the internal consistency of the consistency of the constructs and overall scale is satisfactory.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>SD</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Physical Being</td>
<td>1.66</td>
<td>0.22</td>
<td>0.93</td>
</tr>
<tr>
<td>The Vital Being</td>
<td>1.41</td>
<td>0.42</td>
<td>0.82</td>
</tr>
<tr>
<td>The Psychic Being</td>
<td>2.38</td>
<td>0.24</td>
<td>0.88</td>
</tr>
<tr>
<td>The Mental Being</td>
<td>1.49</td>
<td>0.36</td>
<td>0.79</td>
</tr>
<tr>
<td>The Spiritual Being</td>
<td>1.56</td>
<td>0.21</td>
<td>0.91</td>
</tr>
<tr>
<td>Overall Scale</td>
<td>1.64</td>
<td>0.59</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Test – Retest Reliability

The coefficient of stability or test retest reliability, was calculated by re-administering the scale to the original sample after a period of two weeks had passed since the initial piloting. As Table 3.10 shows, re-test coefficient for all scales were high, with an overall Pearson's test-retest coefficient of $r = 0.93$ ($P < 0.001$)
Table 3.10

Test-Retest Correlations for the Five Components and Overall Attitude Scale

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Components</th>
<th>r*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The Physical Being</td>
<td>0.94</td>
</tr>
<tr>
<td>2.</td>
<td>The Vital Being</td>
<td>0.93</td>
</tr>
<tr>
<td>3.</td>
<td>The Psychic Being</td>
<td>0.96</td>
</tr>
<tr>
<td>4.</td>
<td>The Mental Being</td>
<td>0.92</td>
</tr>
<tr>
<td>5.</td>
<td>The Spiritual Being</td>
<td>0.89</td>
</tr>
<tr>
<td>Overall Scale</td>
<td></td>
<td>0.93</td>
</tr>
</tbody>
</table>

* All correlations significant at P < 0.001 level.

Criterion Validity

As Francis (1993) has previously pointed out, the questions of assessing the validity of a attitude scale is problematic. However, the concurrent validity of the scale can be calculated by relating the scores on the scale of attitude to an independent criterion measures. Spearman's rank-order correlations were performed on the attitude and usage data obtained from the pilot sample, as Table 3.10 shows significant correlations (p < .001) were found between existing the Aurobindo's philosophy based school and five scale of components as well as the overall scale ($r_s = 0.74$, $P < 0.001$), positive correlation and therefore providing a measure of construct validity for the scale.
Table 3.11

Spearman's Rank Order Correlations between Sri Aurobindo's Integral Education System and Usage of Existing School.

<table>
<thead>
<tr>
<th>Component</th>
<th>r*</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Physical Being</td>
<td>0.41</td>
</tr>
<tr>
<td>The Vital Being</td>
<td>0.72</td>
</tr>
<tr>
<td>The Psychic Being</td>
<td>0.64</td>
</tr>
<tr>
<td>The Mental Being</td>
<td>0.68</td>
</tr>
<tr>
<td>The Spiritual Being</td>
<td>0.65</td>
</tr>
<tr>
<td>Overall Scale</td>
<td>0.74</td>
</tr>
</tbody>
</table>

* All correlations significant at P < 0.001 level.

Administration and Scoring

The final scale can be administered in forty minutes. The scale should be presented as a list of sixty items, alternately displaced so that no two items from the same construct appear adjacently, alongside a 5 point Likert Scale (Worded "Strongly Agree" to "Strongly Disagree"). Learners are advised that the scale is a survey, not a test and that there are no correct or incorrect answers. They are asked to indicate whether they agree or disagree with each statements and to answer as honestly as possible. Scores can be obtained by allocating numerical values to responses. "Strongly Agree" (SA) is scored '5'; "Agree (A) as scored '4'; Do not know (DK) is scored '3'. "Disagree (D) is scored '2'; Strongly Disagree (SD) is scored '1'. Scores from items on each sub-scale can be summed to provide individual scores on each attitude construct.
3.4 Data Collection and Scoring Procedure

After identification of the schools with open and ended closed organisational climate and selecting different system of schools from Delhi, the instruction for management of the class climate on the democratic and authoritarian patterns were administered to the concerned students and teachers by the authoritarian management of the school climate. The former was typically termed as democratic school climate and latter, the authoritarian school climate.

The students participating in the experiment were presented with a pen picture and activities of a typical democratic and typical authoritarian students in behavioural terms.

The students is supposed to:

- Participate in all the activities organised by the researcher.
- Take Cooperative decision and learning among students.
- Conduct classrooms with active cooperation of students.
- Deliver activity based, demonstration method and give information.
- Solve their learning problems.
- Provide opportunity to students for self exercise, learning followed by physical and yogic activities and group discussion.
- Maintain environment and mutual trust and friendship.
- Do all the planning of the class.
- Direct all instructional activities of the students.
- Deliver all instruction and information that students an expected to receive.
- Clarify doubts and present explanations.
• Observe strict discipline with respect to the code of conduct in school.

All these instructions were discussed in detail with the students who were participating in the experiment. They willingly agreed to comply with the above instructions.

Administration of the Pre-Test:

An achievement test was administered uniformly to all the selected groups. The time limit for the test was half an hours. The answer sheets were scored with the help of the scoring key. The scores indicated the previous knowledge possessed by the students.

Instructional Programme

The Treatment Group was taught by the researcher herself via activity based methods and cooperative learning, incorporating the integration of physical, mental, vital, spiritual and mental being of a number of ideas, assumed or proved to be essential for efficient and effective classroom and activity based instruction by the researcher in the field of Aurobindo's Philosophy.

The programme lasted for six months in different system of Delhi Schools. For this duration, one period of 40 minutes daily allotted to the physical education subject in the school time table of class IX was given to the instructional treatment. The control group was delivered by the regular science teacher and physical instructor in a conventional way. The content and the time of instruction for these groups were equated with that of the Treatment Group Five teachers were asked to rate each student on a three point scale (Very Good, (V.G.) Good (G), Not Appropriate N. App.) on the performed of the activities to make the ratings relative to other student.

Administration of The Post Test

At the end of the lessons, the achievement test and other activities were administered to the students of both experimental and control groups. Time limit was
half an hour, after completion of the test, the student's were thanked for their cooperation and were given no indication of the later test. The answer sheets were scored with the support of the scoring key.

Besides the feedback schedule and attitude scale was also administrated to be students and teachers to know that attitude towards Auroindo's Integral Education System and problems and suggestions with respect to the implement of this system in Indian Schools respectively.

3.5 Statistical Techniques Used

Since the main objectives of the study was to study the effect of Sri Aurobindo's. Integral Education System on Learners. It had been decided to see whether significant differences existed between the experimental and control groups pertaining to their learning outcomes and activities performance. For this purpose, 't' test was proposed to be used for the analysis of data.

To assess the attitude of learners and teachers towards Sri Aurobindo's Integral Education Programmes and to identity their problem and to pool their suggestions, philosophy of Sri Aurobindo Education and Case Study, quantitative and qualitative analysis were made. The Analysis and Interpretation of data is given in the following chapter.

Path Analysis

The effective use of path analysis is predicted on a number of assumption. The more important of these are described below:

1. Path-analytic models assume that the relationship among the variables are linear and additive curvilinear and multiplicative models are excluded.
2. All error terms (i.e. residuals) are assumed to be uncorrelated with each other.
3. Only recursive models are considered; that is, there are only one-way causal flows in the system; reciprocal causation between variables is prohibited.
4. Path analytic models assume that the endogenous variables have, at least, interval scale properties.

5. The observed variables are assumed to be measured without error.

6. The model being considered is assumed to be correctly specified; that is, all of the causal determinants have been properly included in the model. If other causal determinants of endogenous variables have been excluded, the assumption is that they are independent of the ones, included in the model.

One advantage of this approach is that errors in estimating the parameters of one equation do not adversely affect the estimation of other parameters appearing in other equations.