CHAPTER III

METHODOLOGY

3.1 Method Adopted
3.2 Variables of the Study
3.3 Sample Selected for the Study
3.4 Tools Used for the Collection of Data
3.5 Description of the Tools
3.6 Procedure for Data Collection
3.7 Statistical Techniques Adopted
Educational research is the process of arriving at dependable solution to problems through planned and systematic collection, analysis and interpretation of data. Research methods are of utmost importance in a research process. It occupies a decisive role in any kind of research, as the validity and reliability of the findings depends upon the methods adopted. The success of any research depends largely upon the availability of the data and the suitability of the method. By indicating the significance of methodology, Barr (1953) pointed out that ‘The vehicle of the research cannot perform its function without it, since it is methodology which lays out the way in which research is to be carried out and outlines the detailed description of research variables and procedures’. Research methods describe the various steps of the plan of attack to be adopted in solving the research problem such as the manner in which the problem is formulated, the definition of terms, the choice of subjects for investigation, the validation of data-gathering tools, collection of data, analysis and interpretation of data and the process of inferences and generalizations (Koul, 1997).

A suitable method helps the researcher to explore the diverse stands of the study and adequately measure them so as to satisfy the requirements and thus it is the means to an end.
This chapter is devoted to the description of the method of investigation followed in the study. The method adopted, tools used, description of tools, sample selected, procedure for data collection and statistical techniques adopted for analyzing the data have also been discussed in this chapter.

3.1 Method Adopted

The method adopted should always be valid, reliable and appropriate to the nature of the problem under investigation and the kind of data that the problem demands.

The study being the Influence of Certain Socio-Psychological Factors on the Vocational Skill Attainment of Orthopaedically Handicapped Adolescents, the Investigator has selected Normative Method, in which Survey is the technique adopted for the collection of data. The word normative is used because surveys are frequently made for the purpose of ascertaining which is normal or typical condition or practice.

The normative survey method is that method of investigation, which attempts to describe and interpret what exist at present in the form of conditions, practices, process, effects, attitudes, beliefs etc. It is concerned with some phenomena that are typical or normal conditions.

According to Good and Scates (1954), the term ‘Survey’ indicates the gathering of evidences relating to current conditions.
Different types of surveys help to establish the status of the phenomenon under investigation. The purpose is to survey the present conditions, understand relationships, and base future action on the findings. Surveys can be confined to fact-finding on large number of areas or they can be complex and sophisticated in design providing accurate findings. Adoption of the survey method in the present study helped the researcher to collect proper data from an adequate number of Vocational Training Centres for Handicapped in Kerala.

3.2 Variables of the Study

The study has been conceived with Vocational Skill Attainment as dependent variable and the following Socio-Psychological Factors as independent variables - (1) Social Factors has been operationalised as the sum of scores of two factors viz, Socio-Economic Status (S.E.S) and Home Environment (H.E) and (2) Psychological Factors has been operationalised as the sum of scores of two factors viz, Self-Concept (S.C) and Achievement Motivation (A.M).
### Table 3.1
Variables of the Study

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social Factors</td>
<td>Socio Economic Status</td>
</tr>
<tr>
<td></td>
<td>Home Environment</td>
</tr>
<tr>
<td>2. Psychological Factors</td>
<td>Vocational Skill Attainment</td>
</tr>
<tr>
<td></td>
<td>Self- Concept</td>
</tr>
<tr>
<td></td>
<td>Achievement Motivation</td>
</tr>
</tbody>
</table>

#### 3.3 Sample Selected for the Study

Sampling is a valuable technique to save time and expense and to minimize wastage. Sample is a small portion of a population selected for observation and analysis (Best, 1989). For any study in educational research, adequate and representative sample is necessary. The findings can be generalized as the sample represents the population. The Investigator adopted stratified random sampling technique to make the findings a reflection of the whole population. This technique is applicable when the population is composed of subgroups or strata of different size, so that a representative sample
must contain individuals drawn from each category or stratum in accordance with the size of sub-groups.

The Investigator at first carried out a preliminary trial on a few Orthopaedically Handicapped Adolescents undergoing training in typewriting in vocational training centres to get an idea about the availability of the students to be selected for the study. At present there are about 52 Vocational Training Centres for Orthopaedically Handicapped in Kerala run by Government, Private and Voluntary Organizations. The Investigator had selected the sample only from Government Vocational Training Centers and from those institutions which receive grant-in-aid from the Government. Such institutions follow certain norms and regulations to admission, minimum qualifications for an entry in the particular vocation, age limit, duration of the course, examination procedures and certificate issuance etc. The Investigator personally visited the Vocational Training Centres and found that there are lot of opportunities for Orthopaedically Handicapped in vocational skill training. Book Binding, Typewriting, Stitching, Carpentry etc. are the courses provided to them. Since majority of the orthopaedically handicapped trainees are engaged in typewriting and also because of the fact that the Investigator herself is qualified in the particular skill, it was decided to select 200 Orthopaedically Handicapped Adolescents who had selected typewriting as their vocation, from nine Vocational
Training Centres for Handicapped located in five districts of Kerala viz., Trivandrum, Pathanamthitta, Ernakulam, Thrissur and Kozhikode. A list of such Vocational Training Centres are given in Table 3.2.

**Table 3.2**  
List of Vocational Training Centres for the Handicapped Selected for the Study

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Vocational Training Centres</th>
<th>Types of Management</th>
<th>Locality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Vocational Training Centre, Poojappura, Trivandrum.</td>
<td>Govt: Urban</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Vocational Training Centre, Mayanad, Kozhikode.</td>
<td>Govt: Rural</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Bethaniya Rehabilitation Centre for the Disabled Women, Kumarapuram, Trivandrum.</td>
<td>Aided Urban</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Karthika Nair Smarak Samithi for Handicapped, Vallamkulam, Pathanamthitta.</td>
<td>Aided Rural</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Santhigiri Rehabilitation Institute Thodupuzha, Idukki.</td>
<td>Aided Rural</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>The Kerala Rehabilitation for the Physically Affected, Kripa’s Province Home, Erumathala, Ernakulam.</td>
<td>Aided Rural</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Santhi Bhavan Social Centre, Chalakkudy, Thrissur.</td>
<td>Aided Rural</td>
<td></td>
</tr>
</tbody>
</table>
The selected subjects were between the age group of 15 and 20 years. They were matched with regard to the degree of handicap, type of vocational skill selected for training, age, intelligence, sex etc. Other criteria for selecting them was determined as follows.

The children suffering from limb problem or lame or leg affected either inborn or due to any disease or accident were taken from different Vocational Training Centres for the Handicapped for the study. Only students with mild handicap (below 40%) were taken for the present study. Their handicap was only in the lower part of the body, i.e; from hip onwards. Except this mild handicap, they are completely fit like normals. Only the Orthopaedically Handicapped identified by orthopaedic surgeons regarding the degree of disability (below 40%) were selected for the present study. The categorization of orthopaedic disability according to the extent and severity are presented in Table 3.3.

Table 3.3
Categorization of Degree of Disability

<table>
<thead>
<tr>
<th>Category</th>
<th>Degree of Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>&lt; 40%</td>
</tr>
<tr>
<td>Moderate</td>
<td>40% and above</td>
</tr>
<tr>
<td>Severe</td>
<td>70% and above</td>
</tr>
<tr>
<td>Profound</td>
<td>100%</td>
</tr>
</tbody>
</table>
The Vocational Training Centres provide two years training for the typewriting course. On completion of the two years training, they become proficient in the vocation. At the end of the course, trainees also have to appear for the Kerala Government Technical Examination (K.G.T.E.). The selected samples had already completed two years training and were qualified for appearing the final examination.

The total sample divided on the basis of sex and locality is given below.

**Table 3.4**

**Break-up of total sample selected on the basis of Sex and Locality**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Locality</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Boys</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Girls</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>70</td>
</tr>
</tbody>
</table>

Proportionate weightage given to each strata such as rural and urban is 2:1, and boys and girls is 1:1. These ratios show that for each student in an urban institution, two students were selected from a rural institution, and for every boy one girl was taken. Distribution of the sample based on sex and locality of the institutions are presented in Figure 3.1.
Figure 3.1 shows that 130 students (65%) were selected from rural-based training centres and 70 students (35%) from urban-based training centres. Equal number of boys and girls were selected as the sample. From rural areas 65 boys and 65 girls were selected. Similarly, 35 boys and 35 girls were selected from the urban centres.

The rural and urban sample was distinguished on the basis of the locality of the training centres and not on the basis of the place of residence of the students. Those Vocational Training Centres which
are situated under panchayath administration were grouped as rural and those under municipal administration were treated as urban.

3.4 Tools Used for the Collection of Data

Factual materials unknown so far are necessary for every study. They can be obtained from many sources - direct or indirect. Selection of suitable instruments or tools are also of vital importance in every research study. According to Best (1989), “Like the tools in the carpenter’s box, each research tool is appropriate in a given situation to accomplish particular purpose.” For the purpose of quantification of data related to the study, the following tools which are prepared by the Investigator and also borrowed have been used.

I Vocational Skill Attainment Tests

1. Speed Test in Typewriting
2. Test for Typing Official Matters
3. Theoretical Awareness Test in Typewriting
4. Test for Identifying and Operating Parts of Typewriter

II Socio-Economic Status Scale

III To measure Home Environment, the following tools were used.

1. Family Environment Index Inventory
2. Family Cultural level Rating Scale
3. Home Learning Facility Inventory
IV Kerala Self-Concept Scale

V Kerala Scale of Achievement Motivation.

3.5 **Description of the Tools**

The detailed information about the tools used for collecting data relevant for the present study are given below.

3.5.1 **Vocational Skill Attainment Tests**

For the purpose of the present study, the Investigator had selected only one vocational skill, viz, skill in Typewriting and had prepared four tests for measuring the subject’s skill in Typewriting. As per the directions given by the experts, the Vocational Attainment Tests is divided into four sections and four separate tests were prepared to know the attainment of Orthopaedically Handicapped Adolescents in the particular skill. Among them, two were for measuring the speed, accuracy and neatness in typing the ordinary and official matters. The remaining two tests were for measuring the subject’s awareness about the typewriting and also for assessing his or her skill in identifying and operating parts of the typewriter.

Vocational Skill Attainment refers to the level of student’s aggregate performance in the particular vocation (Typewriting in the present study) and it is determined by the marks obtained by the students in the particular test meant for the purpose. So the Investigator had prepared the following tests to measure the same.
(i) **Speed Test in Typewriting**

**Preparation and Scoring**

This was intended to test the accuracy, speed and neatness of the work executed by the candidate. The Investigator personally visited many Vocational Training Centres for consultation with experts in the field. Investigator got immense help from the Director, Kerala Government Technical Examination (K.G.T.E.), Trivandrum regarding the preparation of the test. The test was prepared under the guidelines given by the experts in the field. (List of experts attached in Appendix XIX) and also with the help of K.G.T.E. rules and regulations. General instruction was given to the candidates in the Speed Test in Typewriting. The test contains a paragraph of 1500 strokes. The maximum marks for the paper was 100 and the minimum for pass was 40. The speed test was of 10 minutes duration. The paper was valued with the help of the scheme of valuation prepared by the Investigator herself under the guidelines followed by the K.G.T.E. The marks were awarded on the basis of the prescribed chart.

The scheme of valuation contained 7 general instructions and 19 nature of mistakes that can be occurred while attempting Speed Test in Typewriting. A chart showing the scoring procedure of the Speed Test in Typewriting was also prepared by the Investigator in which the total number of strokes, number of mistakes allowed, and
the marks corresponding to each mistake were clearly mentioned. The students with zero mistake score the maximum of 100 marks and the students who make mistakes above 125 would get zero marks and the students with upto 75 mistakes can score pass mark of 40. The student who makes mistakes above 75 will be considered failed in the test. A copy of the Speed Test, Scheme of Valuation and the Chart for Scoring are given in the Appendices I, II, & III respectively.

(ii) Test for Typing Official Matters

Preparation and Scoring

The test was intended to measure the subject’s efficiency in typing official matters in proper form. It was prepared under the guidelines given by the experts and also with the help of K.G.T.E rules and regulations. The general instructions were given in the question paper. The question paper contained 3 types of questions which the candidate is expected to answer.

(i) Retype the given incorrect statements in proper form which carries 35 marks.

(ii) Type the given ‘Government Order’ in proper form by making necessary corrections. This question also carries 35 marks.

(iii) Type the given ‘Display’ in proper form with governmental borders. It carries 30 marks

The maximum marks for this paper also was 100 and the minimum for pass was 40. The time allotted for the test was one hour.
The paper was valued with the help of the scheme of valuation prepared by the Investigator under the guidelines followed by the K.G.T.E. Failure to expand abbreviation, displacement of figures, bad centering of headings, failure to indent or uneven indentation of paragraphs, failure to type in the capital letters wherever indicated, failure to underline headings wherever indicated etc. may be considered as mistakes. Proportionate marks may be given for incomplete answers. If the matter in each question is typed in the proper form, three marks may be given. Five marks is set apart for neatness and marks for neatness shall not be awarded to a candidate who have secured less than 40 marks.

A copy of the test and scheme of valuation are given in the Appendices IV and V respectively.

**Tryout**

A tryout of the ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’ were made on a sample of 10 Orthopaedically Handicapped Adolescents selected from one Vocational Training Centre for Handicapped at Vallamkulam to find out practical difficulties if any in the administration of these tests. Try out helped the Investigator to remove the vague and difficult words from the content in ‘Speed Test’ and difficult and ambiguous questions from the ‘Test for Typing Official Matters’. Necessary modifications have
been made in these tests after the tryout. Also, the number of questions were reduced after the tryout.

Validity and Reliability of the ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’

Validity

All possible measures were adopted to establish the validity and reliability of these tests used for the study. But it is not possible to adhere to statistical procedure for measuring Speed Test in Typewriting and Test for Typing Official Matters which cannot be subjected to Item Analysis. It is not possible to drop any question as it is either difficult or easy because only the speed in typing and efficiency in typing official matters are evaluated here.

The content of these tests is so simple that the candidate can easily type it. The Investigator therefore relied mostly on non-statistical procedures to determine the validity of the Speed Test in Typewriting and Test for Typing Official Matters.

Due care was taken to meet the requirements of these tests. Efforts were made to prepare the content in the ‘Speed Test’ and ‘Test for Typing Official Matters’ and it was done in consultation with experts (Instructors in different Vocational Training Centres) in the field.
Construct validity of ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’ was ensured by giving a simple paragraph and content. Moreover, pilot testing of these tests also helped to establish the validity. Thus utmost care was taken by the Investigator to see that the ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’ used for the study had content and construct validity.

**Reliability**

The Reliability of the ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’ was established by using the test-retest method. A sample of 15 Orthopaedically Handicapped Adolescents was used for the purpose. In the test-retest method, both of these tests were administered twice on the same sample with an interval of two weeks each. The scores of the ‘Speed Test in Typewriting’ and ‘Test for Typing Official Matters’ of individuals, conducted twice in two weeks intervals were found out. Karl Pearson’s product moment coefficient of correlation between the two scores of these tests were calculated. The test –retest reliability coefficients thus obtained for the ‘Speed Test in Typewriting’ is 0.60 and ‘Test for Typing Official Matters’ is 0.53.

**(iii) Theoretical Awareness Test in Typewriting**

**Preparation and Scoring**

The questions were prepared by the Investigator in consultation with the instructors and experts in the field and included 20 objective
type items in the test. Each question carries one mark. Maximum mark for the test is 20 and the time duration of the test was decided to be 30 minutes. Necessary instructions were given at the appropriate place in the question paper. The test was aimed at measuring the theoretical awareness of the student in typewriting. The paper was valued with the help of scoring key prepared by the Investigator under the guidance and supervision of the experts in the field.

Marks should be given for correct and complete answers only. Proportionate marks may not be given for incomplete answers. A copy of the test and scoring key are given in the Appendices VI (a), VI (b) & VII (a), VII (b) respectively.

(iv) Test for Identifying and Operating parts of Typewriter

Preparation and Scoring

Since the test preparation demanded vast experience in the field, with the support and help of experts, the Investigator was able to prepare 20 items for measuring the ability to identify different parts of the typewriter and to perform its functions. A question paper consisting of 20 items with maximum of 30 marks was prepared by giving necessary directions in the introductory part. The questions from 1 to 10 measure the ability of the students in identifying parts of the typewriter and they carry 1 mark each. Considering the difficulty
level, the questions from 11 to 20 were given 2 marks each. They measure the ability of the students to perform its functions. A scheme of valuation was also prepared by the Investigator with the assistance of experts in the field. The scoring was done according to the Scoring Key prepared for the purpose. A sample test and scheme of valuation are given in the Appendices VIII (a), VIII (b) & IX (a), IX (b) respectively.

**Tryout**

The tryout of the draft tests for item analysis was conducted on a sample of 40 Orthopaedically Handicapped Adolescents from 4 Vocational Training Centres for Handicapped at Trivandrum, Ernakulam, Thrissur and Kozhikode districts. Enough time was given so as to enable all the students to complete the tests. The sample split up for the tryout is given in Table 3.5.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Institutions</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V.T.C Poojappura, Trivandrum</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>The Kerala Rehabilitation for the Physically Handicapped, Eranakulam</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Sneha Bhavan Society, Irinjalakuda</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>V.T.C , Mayanad, Kozhikode</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

**Table 3.5**

**Sample Split-up for the Tryout**
Item Analysis

The process of Item Analysis helped to identify items with high discriminating power and optimum difficulty level. The quality of each item was determined by analysing two important characteristics of the items such as difficulty index and discriminating power. Based on the scores obtained, response sheet of the students were arranged in descending order from the highest to the lowest. The responses of the top scoring 27% of sheets and the bottom scoring 27% were used for item analysis. Items having difficulty index between 0.20 and 0.80 and discriminating power above 0.20 were selected for the final tests.

Validity and Reliability of ‘Theoretical Awareness Test in Typewriting’ and ‘Test for Identifying and Operating parts of Typewriter’

Validity

The tests were constructed keeping in view the weightages given for the content area and objectives on one hand and expert’s comments and opinions on the other and they were treated as valid tests. Construct validity of these tests were assured by giving easy and clear items. Pilot study of these tests also helped to establish the validity.

Reliability

The reliability of the tests were established by using split- half method. A sample of 20 Orthopaedically Handicapped Adolescents
from 2 Vocational Training Centres at Trivandrum and Pathanamthitta Districts were used for the purpose. Here the odd numbered items were treated as one half of the test and scored separately and the even numbered items were treated as another half and scored. Then the scores of the halves were correlated and the reliability of the tests were found to be 0.64 and 0.58 respectively.

3.5.2 Socio-Economic Status Scale

In the present study, the Kerala Socio – Economic Status Scale developed by Nair (1978) was used with slight modifications. The scoring scheme suggested for income was revised to catch up with rising cost of living, as income increases.

The SES scale was used to measure three dimensions of Socio – Economic Status, viz., Education, Occupation and Income level of the head of the family. (Appendix X)

**Education: Classification and Weightage**

On the basis of education, people were classified into seven categories. For people with professional or Post- Graduate degrees a score of ten is given. In the case of people with bachelor's degree like B.A., B.Sc., a score of eight; for people with education upto higher secondary or pre-degree, a score of five; for people who have studied upto S.S.L.C., a score of four; people who have studied upto middle school (Std VII), a score of two; people who have completed lower
primary, a score of one; and people who are illiterate is given zero score.

**Occupation: Classification and Weightage**

People were classified into six categories on occupational basis as high professional, semi-professional, skilled, semi-skilled, unskilled and unemployed.

**High professionals**

This group consists of individuals who have very high education and are engaged in decision making process, laying down policies and executing them like Doctors, Engineers, Lawyers, Principals of colleges, Readers, Professors, Bank Managers, Business Executives, University Officials, Head of Research Organization, Head of Department of Govt., big Land Holders, Secretaries, and Assistant Secretaries to Govt., State or District Level Officers, Chief Executives of quasi governmental body etc. For this category a weightage of 10 score is given.

**SemiProfessionals**

This group consists of occupations which require college education. Here job is of routine nature. This group includes Lecturers, Chemists, Teachers, Officers at sub–district level, Public Health Workers, Superintendent of any govt. office, Contractors, Sub-Inspector of Police, Excise Inspector, Sub-Registrars. For this category a weightage of 8 score is given.
**Skilled workers**

This group consists of workers who have a long period of training in complicated tasks. Mechanics, Fitters, Electricians, Drivers, Painters, Photographers, Masons, Carpenters, Document Writers, Advocates, Clerks, Head Constables of Police and Village Officers can be included in this category. A weightage of 7 score is given for this category.

**Semi-Skilled workers**

This group includes occupations which require some training on the part of the persons - Shopkeepers, Attenders, Farmers, Small Scale Merchants, and Police Constables come under this category. The weightage given to this category is a score of 4.

**Unskilled Workers**

All persons who are doing work which involves neither education nor training belong to the unskilled group. The watchman, Labourer, Peon and Coolie belong to this category. A score of 2 is given to this category.

**Unemployed**

The unemployed includes persons who are unemployed irrespective of their education or training. Zero weightage is given to this category.
Income : Classification and weightage

On the basis of monthly income also, people were classified into six categories. For the group having monthly income Rs.8,000/- and above, a score of 10 is given. For the group having monthly income in the range of Rs.4,351/- to Rs. 8,000/- a score of 8; of Rs.3,451/- to Rs.4,350/- a score of 6; and of Rs.2601/- to Rs.3450/- a score of 4 and of Rs. 1751/- to Rs. 2600/-, a score of 2 is given. For the group having monthly income of Rs.1,750/- and below, a score of 1 is given. The weightage given to the various categories are consolidated and presented in Table 3.6.

Table 3.6
Weightage Given to Items in the SES Scale

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Education</th>
<th>Weight-age</th>
<th>Occupation</th>
<th>Weight-age</th>
<th>Income Per month. Rs.</th>
<th>Weight-age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Master’s degree, Professional Degree and above</td>
<td>10</td>
<td>Professional</td>
<td>10</td>
<td>Above 8,000</td>
<td>10</td>
</tr>
<tr>
<td>2.</td>
<td>Bachelor’s Degree</td>
<td>8</td>
<td>Semi-Professional</td>
<td>8</td>
<td>4351-8000</td>
<td>8</td>
</tr>
<tr>
<td>3.</td>
<td>Pre-Degree, Pre-University</td>
<td>5</td>
<td>Skilled Workers</td>
<td>7</td>
<td>3451-4350</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>S.S.L.C</td>
<td>4</td>
<td>Semi Skilled Workers</td>
<td>4</td>
<td>2601-3450</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>Upto Std. VIII</td>
<td>2</td>
<td>Unskilled Workers</td>
<td>2</td>
<td>1751-2600</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>Literate (Completed Lower Primary)</td>
<td>1</td>
<td>Unemployed</td>
<td>0</td>
<td>Below 1750</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Illiterate Weight -age</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
**Computation of SES of the Families of Students**

Full weightage is given to the head of the family /father / mother. Half the credit is given to the other parent. If the elder sister/brother’s education, occupation or income is higher than that of parents, one point weightage is given and a maximum of two points if both the sister and brother are higher in education, occupation or income. If the sister or brother is unmarried or staying with the family after marriage a one point weightage is given.

The total of the scores obtained for the three dimensions of socio-economic status designated above yielded a composite score for each member. The sum of the composite score obtained for all the members in the family was taken as the SES of the family. The maximum score of 48 is fixed for a student as the SES score of his family.

3.5.3 To measure Home Environment of the Students, ‘Family Environment Index Inventory’, ‘Family Cultural Level Rating Scale’, ‘Home Learning Facility Inventory’ and ‘Family Acceptance of Education Rating Scale’ are used

(i) **Family Environment Index Inventory**

The 14 statements of the scale rate the cultural level and environmental background of the pupil’s family neighbourhood. There are again, three possible answers for each statement, viz., ‘Many’, ‘Few’ and ‘None’. The pupil is required to make a tick mark in the
appropriate box. Three scores are allotted to ‘Many’ two to ‘Few’ and one to ‘None’.

**Reliability and Validity**

The scale has been validated against rating by specialists. Forty five households occupied by forty five respondents were independently rated by a team of three social researchers. They rated the family environment by observing the surroundings and rating each on a five point scale. The ratings were converted into scores using conventional procedure. The scores assigned by the three members were arranged and used as the external criterion. A product moment correlation of 0.47 was obtained showing that the scale is a reasonably valid instrument for measuring ‘family environment’. The split-half reliability (N=79) was 0.66, again showing that it is a reasonably reliable instrument.

A specimen copy of the test is given in Appendix XI.

**(ii) Family Cultural Level Rating Scale**

This Scale helps to evaluate the cultural background of the pupil’s family. There are 18 statements, of which, for the first 8 statements, three alternatives, viz., ‘Many’, ‘Few’ and ‘None’ are given and for the remaining ten statements, three other alternatives, viz; ‘Always’, ‘Sometimes’ and ‘Never’ are given. The pupils are to choose one alternative and mark a tick in the box. The scoring is done by allotting the points to the ‘Many/Always’ response, two points for
‘Few/Sometimes’ response and one point for every ‘None/Never’ response.

**Reliability and Validity**

The validity and reliability of the test is reported in the test manual. The test has been validated by correlating it with the Kerala Socio-Economic Scale for a sample of secondary school pupils. The coefficient of correlation is 0.38 (N = 47). The split half reliability of the test was estimated on a sample of 84 school pupils. The test indicated a relatively high degree of reliability (0.83.)

A specimen sample of the test is given in Appendix XII.

**(iii) Home Learning Facility Inventory**

This inventory helps to know the various home facilities that the parents arrange for learning of their children. The 18 questions are to be answered by marking ‘Yes’ or ‘No’ in the respective column. One score each is given for a ‘Yes’ response and none for a ‘No’ response.

**Reliability and Validity**

The validity of the inventory has been answered in terms of the definition and representation given to the concept under measurement (construct and concurrent validity). A crude form external validation is also reported. The scores of the inventory was correlated with total class achievement of 85 pupils of standard X in a selected secondary school. The correlation obtained was 0.41. The split-half reliability coefficient of the test (worked out using the
sample used for the external validation study reported above) was 0.69. Thus the test on the whole is a reasonably valid and reliable instrument for measuring the construct of ‘home learning facility’ under Kerala condition. A copy of the test is given in Appendix XIII.

(iv) Family Acceptance of Education Rating Scale

This tool helps to note the extent to which the parents accept the educational work of their children and their interest in the children’s progress. There are 16 statements and three possible responses viz., ‘Always’, ‘Sometimes’ and ‘Never’. The students are to make a tick mark in the appropriate box. Three points are awarded to a tick mark ‘Always’, two for ‘Sometimes’ and one for ‘Never’.

Reliability and Validity

The authors of the scale claim validity in terms of the procedures adopted for developing the scale, and in terms of the results of the external validation study conducted by them. Apart from the fact that the sixteen items has been selected by a select panel of twenty judges from a list of 100 items presented to them, the test has been validated against two external criteria. The co-efficient of correlation of the scores on the rating scale with total class achievement (marks obtained by pupils in a generalized achievement test in six school subjects is 0.39. The study used 123 pupils of standard X. Another validity used the same sample. The scores of the scale were correlated with the scores on another standardized scale
viz; ‘Scale of Attitude Towards Academic Work’. The correlation in this case was 0.44. The split-half reliability of the scale using a sub-sample (N = 54) of the above sample was estimated as 0.73. These values show that the scale is a reasonably valid and reliable instrument for the purpose of the present study. A copy of the scale is given in Appendix XIV.

3.5.4 Self Concept Scale

The variable was measured using the Kerala Self Concept Scale, standardized by Nair (1976). This Scale is a self-report inventory, standardized for cultural samples from South India. The test contains sixty items grouped in pairs and divided into two sections A and B. For each item in Section A, there is an equivalent item in Section B. The subjects are asked to enter their responses by marking against any one of its five entries marked ‘A’, ‘B’, ‘C’, ‘D’, or ‘E’ in the response sheet. Here ‘A’ stands for ‘strongly agree’, ‘B’ stands for ‘Agree’, ‘C’ stands for ‘Neutral’, ‘D’ stands for ‘Disagree’ and ‘E’ for ‘strongly Disagree’. The score for each item in section A is compared with score in section B. The difference is computed using appropriate procedures.

Each item in section A represents an individual’s perception of ideal self. Two examples are given below from section A.

(i) I wish, if my parents had been the most influential people in our locality.
(ii) I wish, if I could be the most popular student in my class.

The matching items in Section B for these two items are the following

(i) My parents are the most influential people in our locality.

(ii) I am the most popular student in my class.

Item ‘1’ in Section A represents the concept of the individual with respect to the influence that his parents can wield in the locality. Item ‘I’ in Section B represents the actual concept of the individual about actual influence that his parents wield in the society. The individual by ticking in one of the five response categories (A,B,C,D,E) is getting a score for his perception of the ideal self and real self. The responses for each item can be scored according to the scheme given below.

<table>
<thead>
<tr>
<th>Rating</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Theoretically the score for the ‘ideal self’ cannot exceed the score for the ‘real self’. When the difference is small, it represents a higher self-concept as compared with larger difference. The maximum possible difference is 4. This represents the lowest score of an item with respect to self-concept. Each difference is subtracted from four (the maximum possible difference) to obtain a positive self-concept score for each item. This procedure helps to express a higher self concept in terms of higher scores and vice versa.
All the item scores are summated to obtain the total score of the whole test.

**Reliability and validity**

The test manual provides evidence of the test’s reliability and validity. The reliability of the scale has been established in two methods - the split-half reliability co-efficient for the scale, as reported in the test manual, is 0.74 (N=100) and the test-retest reliability co-efficient for the scale is 0.83 (N=56). The co-efficient quoted above indicates that the scale is a reasonably valid and reliable instrument for measuring the self concept.

The validity of the scale has been estimated against a ‘Semantic Differential Sale’ of Self concept (translated version of the Osgood model developed for another research study) as external criterion. The resulting correlation was 0.48 (N=56) showing that the scale is a reasonably valid measure of self-concept. Sample test and Scoring Sheet are given in Appendix XV and XVI respectively.

**3.5.5 Kerala Scale of Achievement Motivation**

The Kerala Scale of Achievement Motivation developed by Nair (1976) is standardized for the secondary school students and college students in Kerala. The scale measures the achievement motivation by a self report of the subject. There are 60 items in the scale in the form of statements. Some items in the scale for getting the opinion of the subjects about the attitude of the parents, friends and others
towards his or her achievement. The items in the scale are related to the subject’s own view about achievement, the different ways adopted for achieving the goal, opportunities for doing things extra ordinary, being a leader in different activities. The scale thus on the whole measures the subject’s power to initiate, direct and sustain achievement-oriented behaviour. For each statement the subject is required to respond by selecting and marking any one of the three responses Yes (Y) undecided (U) and No (N) on the response sheet supplied. The score will be Y3, U2 and N1 for positive items and Y1, U2, and N3 for negative items. There is no time limit for the test.

Two illustrative items are:

(i) What others think of me won’t be an obstacle to my success in life.

(ii) I feel tired when I have to perform very important things.

**Reliability and validity**

The test-retest reliability of the scale is 0.73 (N=56) and the split-half reliability co-efficient for the scale is 0.82. The test has been validated against the total achievement of students of Secondary School classes as external criterion. Details of validity are:-

With School marks of standard VIII as external criterion, validity is 0.33 (N=47).

With School marks of standard IX as external criterion, validity is 0.44 (N=38).
With School marks of standard X as external criterion, validity is 0.39 (N=42).

A copy of the Sample Test and a Scoring Sheet are given in the Appendix XVII and XVIII respectively.

3.6 Procedure for Data Collection

The Investigator obtained adequate copies of all the tools and the response sheets for the collection of data. The Investigator visited the selected vocational training institutions and contacted the principals and instructors for getting permission and co-operation for collection of data.

After establishing rapport with students, Investigator had explained the purpose of study and assured them that their data would be maintained under strict confidence and would be used only for the research purpose.

The ‘Vocational Skill Attainment Test’ to measure the Vocational Skill Attainment of the students; ‘Socio-Economic Status Scale’ to measure Socio Economic Status; ‘Family Environment Index Inventory’, ‘Family Cultural Level Rating Scale’, ‘Home Learning Facility Inventory’, and ‘Family Acceptance of Education Rating Scale’ to measure Home Environment; ‘Self-Concept Scale’ to measure self-concept; and ‘Achievement Motivation Scale’ to measure Achievement Motivation of the students were distributed among the Orthopaedically Handicapped Adolescents. Adequate instructions
were given in making the response. However, those who have difficulty in understanding the items or mode of responding to them were assisted by the Investigator. Response sheets were provided and allotted sufficient time to make the responses. Every precaution was taken to make the study valuable and reliable.

3.7 Statistical Techniques Adopted

The objectives of the study warranted the use of the following statistical techniques in analyzing the data

1. Arithmetic Mean (A.M)

\[ A.M = A + \frac{\sum fd}{N} \times c \]

where;

- A = Assumed Mean
- f = Frequency of each class
- d = deviation of scores from assumed mean
- c = class interval
- N = Total frequency \((Kaul, 1997)\)

2. Standard Deviation (σ)

\[ \sigma = c \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2} \]

where;

- c = class interval
- d = deviation of each score from assumed mean
- f = frequency of each class
- N = total sample \((Kaul, 1997)\)
3. Classificatory Techniques

The important variables were classified into three groups under the following conditions.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Above (M+ σ)</td>
</tr>
<tr>
<td>Average</td>
<td>Between (M + σ) to (M- σ)</td>
</tr>
<tr>
<td>Low</td>
<td>Below (M-σ)</td>
</tr>
</tbody>
</table>

Where

M= Mean

σ = standard deviation of the independent variables

(Garrett, 1981)

4. Analysis of Variance

Analysis of variance is an effective technique that permits the comparison of the mean of small groups at a time and see whether they differ significantly from each other. It is affective way to determine whether the means of more than two samples are too different to attribute sampling error. Analysis of variance makes it possible to determine whether more than two means differ significantly or not. The details of the procedure of one-way analysis of variance are the following.
The first step used is to find the sum of the squared deviation of each person’s scores from the mean of all the subjects (X). This is known as the total sum of squares (SS_T) and is found by using the formula:

$$SS_T = \sum X^2 - \left( \frac{\sum X}{N} \right)^2$$

The next step is to divide the total sum of squares in two groups (1) between group (SS_b) and (2) within groups (SS_w)

SS_b is found using the formula:

$$SS_b = \left( \frac{\sum X_1}{n_1} \right)^2 + \left( \frac{\sum X_2}{n_2} \right)^2 + \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \left( \frac{\sum X}{N} \right)^2$$

Where

- \( n_1, n_2 \) are the sizes of the groups to be compared and \( N \) is the number of subjects for all the groups combined.

The within groups sum of squares (SS_w) is calculated using the formula:

$$SS_w = SS_T - SS_b$$

The mean square variance between (MS_b) and mean square variance within (MS_w) are then calculated using the formula:

$$F = \frac{MS_b}{MS_w} = \frac{MS_b/df_b}{SS_w/df_w}$$

Where

- \( df_b = n-1 \)
- \( df_w = N-n \)
The significance of an F-ratio is assessed with respect to the table of F with (n-1, N-n) degrees of freedom for a particular level of significance. If, for a required level of significance, the obtained value of F is higher than the tabled value of F, then the difference between group means is considered significant for that level of significance.

(Best and Kahn, 1995)

5. Scheffe’s F Test

In this test, F’s are calculated for all the paired groups using the formula:

\[ F = \frac{\left( \bar{X}_1 - \bar{X}_2 \right)^2}{\frac{MS_{w}}{N_1 + N_2}} \]

Where

\( \bar{X} \) = Mean of the first group
\( \bar{X}_2 \) = Mean of the second group
\( MS_{w} \) = Mean square within groups
\( N_1 \) = Total number of the first group
\( N_2 \) = Total number of the second group

Then (K-1) F, where K is the number of groups under study and F is the tail value obtained for the general F test calculated. If the F value is greater than (K-1) F, then the difference between mean scores is significant for the groups under comparison. If the calculated F value is less than (K-1) F then the difference is not significant.
The Scheffe’s method was adopted as it is more rigorous than other multiple comparison methods with regard to type I error. It also leads to fewer significant differences. Further it is easy to apply this test. It uses the readily available F test and the criterion it employs in the evaluation of the null hypothesis is simple and readily understood. It is not seriously affected by violations of the assumptions of normality and homogeneity of variance unless these are gross. Further it can be used for making any comparison the investigator wishes to make.

6. Test of Significance of Means

\[ C.R = \frac{M_1 - M_2}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}} \]

Where

- \( M_1 \) = Mean of the first group
- \( M_2 \) = Mean of the second group
- \( \sigma_1 \) = Standard deviation of the first group
- \( \sigma_2 \) = Standard deviation of the second group
- \( N_1 \) = Total sample of the first group
- \( N_2 \) = Total sample of the second group \( \text{(Mangal, 2002)} \)

7. Karl Pearson’s Product Moment Coefficient of Correlation (r)

In order to estimate the extent of relation between the criterion and associate variables the technique of Pearson’s Product Moment
Coefficient of Correlation was used. For this the data was processed into respective bivariate frequency distribution.

The Pearson’s coefficient of correlation is calculated using the formula:

\[
r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{N\Sigma X^2 - (\Sigma X)^2} \sqrt{N\Sigma Y^2 - (\Sigma Y)^2}}
\]

Where

- \(X\) = sum of the X scores
- \(Y\) = sum of the Y scores
- \(X^2\) = sum of squared X scores
- \(Y^2\) = sum of the squared Y scores
- \(XY\) = sum of the products of paired X and Y scores
- \(N\) = number of paired scores.

The coefficients are verbally interpreted by the following conventions:

i) ‘\(r\)’ from 0.00 to ± 0.20 denotes indifferent or negligible relationship.

ii) ‘\(r\)’ from ± 0.20 to ± 0.40 denotes low correlation present but of slight.

iii) ‘\(r\)’ from ± 0.40 to ± 0.70 denotes substantial or marked relationship.

iv) ‘\(r\)’ from ± 0.70 to ± 1.00 denotes high to very high relationship.  

\(Garrett, 1981\)
**8. Test of Significance of ‘r’**

The obtained ‘r’ is tested to find whether it is significant or not using ‘t’ distribution developed by Fisher.

\[ t = \frac{r \sqrt{N - 2}}{\sqrt{1 - r^2}} \]

where,

- \( r \) = coefficient of correlation
- \( N \) = size of the sample

Degree of freedom is \( N - 2 \). If the value for ‘t’ is greater than the table value for \( N - 2 \) degrees of freedom of a given level of significance, the relation is said to be significant at that level.

**9. Significant Difference between two ‘r’s**

Computation of critical ratio for testing the significance of difference between correlation coefficients, was calculated by using the formula,

\[ C.R = \frac{Z_1 - Z_2}{S.Er} \]

Where

- \( Z_1 \) and \( Z_2 \) are the Fisher’s coefficients
- \( S.Er \) = Standard Error

\[ S.Er = \sqrt{\frac{1}{(N_1 - 3)} + \frac{1}{(N_2 - 3)}} \]

where

- \( N \) = sample size  \( (Garrett, 1981)\)
10. Multiple Regression Equation

This part of the analysis was directed towards developing an equation for predicting attainment of typewriting skill using the predictor variables. The regression equation is

\[ Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + E \]

Where

- \( x_1 \) = score of Socio Economic Status
- \( x_2 \) = score of Home Environment
- \( x_3 \) = score of Self-Concept
- \( x_4 \) = score of Achievement Motivation
- \( Y \) = score of Vocational Skill Attainment
- \( E \) = random disturbance term
- \( a \) – is a constant
- \( b_1 \) – regression coefficient of Socio Economic Status
- \( b_2 \) – regression coefficient of Home Environment
- \( b_3 \) – regression coefficient of Self –Concept
- \( b_4 \) - regression coefficient of Achievement Motivation

\( a, b_1, b_2, b_3 \) and \( b_4 \) are estimated using Ordinary Least Squares (OLS) method.

(Garrett, 1981)