

Chapter VI

RESEARCH METHODOLOGY

Research methodology clarifies the concept, methods and techniques that are utilized to design a study, to collect the information, to analyze the data and to interpret the findings for revelation of truth and formulation of theories. This chapter presents the research methodology adopted for carrying out the study undertaken.

The methodology deployed in this work can be itemized as follows:

- A. Locale of research
- B. Sampling design
- C. Pilot study
- D. Variables and their measurements
- E. Method of data collection
- F. Statistical tools used for the analysis of data

6.1. Locale of Research

The present study was conducted at the nineteen districts of West Bengal, selected purposively for complete enumeration of the districts representation in the present study due to the following reasons:

- ❖ The researcher's close familiarity with respect to area, people, officials, and local dialects.
- ❖ The ample opportunity to generate relevant data due to the availability of the students for learning SLA at Higher Secondary level.
- ❖ The highly cooperative, responsive, and homogeneous respondents.
- ❖ The profuse scope to get relevant information regarding the attitude and

motivation of Higher Secondary students in Second Language Acquisition (SLA).

- ❖ Easy accessibility of the area.
- ❖ The study would help the researcher to construct diversified policies and strategies in future regarding the acquisition of SLA at Higher Secondary level.

6.2. Sampling Design

The purposive as well as simple random sampling techniques were adopted for the present study. It may be termed as multistage random sampling procedure. The nineteen districts were purposively selected for complete enumeration of the district representation. Under the nineteen selected districts, thirty-eight schools were randomly selected from an exhaustive list of Higher Secondary schools in West Bengal (Captured partial view of most of the schools are given in appendix-V). From the selected schools an exhaustive list of Higher Secondary students was prepared with the help of school administrators. From the prepared list, three hundred eighty three respondents were selected randomly for the final data collection. The assumptions behind this type of sampling frame are as follows:

- a) Representation of all districts
- b) Representation of at least one school in each district
- c) At least five students in a school to be interviewed

6.2.1. Sampling Scheme (Multistage Random Sampling)

The Sampling Scheme is given in Appendix-III.

6.3. Pilot Study

A pilot study was conducted in the selected schools before constructing the data collecting devices. In course of this survey, informal discussion was carried out with some Higher Secondary students and school administrators. An outline of socio-economic background of the Higher Secondary students of the concerned schools, their opinion regarding the acquisition of English as Second Language at Higher Secondary level were obtained that helped in the construction of reformative working tools.

6.4. Variables and their measurements

After conceptualizing the attitude and motivational aspects of learning English as Second Language at Higher Secondary level the researcher had felt to correlate the social attributes for characterizing the attitude and motivation as a whole. Attitude is predisposition of behavior and motivation is the goal directed behavior. Attitude and motivation are the prime movers of any learning process. Similarly, the social attributes also have a significant impact in characterizing and operationalising the attitude and motivation of human being in social system. Hence, a Personal Interview Schedule (Appendix-II) was designed and framed with a focus on obtaining appropriate data for the research work.

Appropriate operationalisation and measurement of the variables help the researcher to land upon the accurate conclusion. Therefore, the selected variables for this study had been operationalised and measured in the following manner:

6.4.1. Independent Variables

6.4.1.1. Age of the student

In all societies, age is one of the most important determinants of social status and social role of the individual. In the present study, the number of years rounded in the nearest whole number the respondent lived since birth at the time of interview, was taken as a measure of age of the student.

6.4.1.2. Sex (Gender) of the student

Biological Sex (Gender) differentiation was considered to operationalise the variable. The structured schedule for measuring the same was prepared and score assigned as 'Male'-1 and 'Female'-2.

6.4.1.3. Education of student

Education may be operationalised as the amount of formal schooling attained by the respondent at the time of interview. Education is instrumental in building personality structure and helps in changing one's behaviour in social life. Education was measured with the help of structured schedule prepared for the purpose.

Level of Education	Score
'Class XI'	'11'
'Class XII'	'12'

6.4.1.4. Family Education Status

Family education status helps in providing the opportunities to the

students to be in contact with outside world and hence seek new ideas and information. Family education status was operationalised as the average educational score of the family. The method followed by Ray (1967) in computing the family education status was also followed in the present study. In this method the educational achievement of each member of the family was noted and scored, suggested by Pareek and Trivedi (1964) in the item 'education' of the socio-economic status scale (Rural). The total score of a family on education was then divided by the 'effective family size' to get the education status of the family. 'The effective family size' was obtained by subtracting the number of member up to 4 years of age from the total number of members in the family. The formula for computing family education status is:

$$\text{FES} = \frac{\text{Total educational score of a family}}{\text{Effective Family Size}}$$

6.4.1.5. Family size

Family size was operationalised as the number of members in the individual student's family. To quantify the family size the structured schedule was prepared and the score was given according to the number of the family members present in a family.

6.4.1.6. Educational Aspiration

In India, the ascribed status of a boy is generally higher than that of a girl. The respondents were therefore, asked to mention the level up to which they desired to educate. The educational aspiration was operationalised as the respondent's desire to educate himself. The variable was measured by the mean of scores obtained separately for boys and girls. The scoring was done according to Ray (1967) as follows:

Level of education up to which respondent desires to educate boys/girls	Score
'Primary level'	'1'
'Middle school level'	'2'
'High school level'	'3'
'Graduate'	'4'
'University (Post-Graduate)'	'5'
'Technical education'	'6'

6.4.1.7. Annual income

Annual income is the economic measurement of students' family status. It was operationally defined as the gross income from all the viable sources of income in a single year. It was measured in terms of rounded off rupees. The gross income was constituted by the total income generated from agriculture, dairy, poultry, fishery enterprises, business, and services. For the benefit of

analysis, the annual income is considered as the multiple of thousand.

6.4.1.8. Economic status

The economic status of the students' family was measured with the help of some components of the socio-economic status scale (Rural) developed by Pareek and Trivedi (1964). The socio-economic status scale (Rural) consisted of nine items and each of the nine items was scored separately. In the present study, four items (economic) out of nine were considered for measuring economic status. These were land holding, house type, farm power, and material possession. The score assigned as follows:

Land holding	House type	Farm power	Material possession
'No land' – '0'	'Kutchha' – '1'	'No drought animal' '0'	'Cycle'-'1'
'Upto 1 acre'-'1'	'Mixed'-'2'	'1-2 drought animal' '2'	'Radio/TV' –'1'
'Upto 5 acres' –'2'	'Pucca' –'3'	'Tractor/powertiller' '3'	'Improved agriculture implement' – '2'
'Above 5 acres'-'3'	'Mansion' - '4'	'3-4 drought animal /1 or more prestigious animal' '4'	'Motorbike'-'3'
'Upto 15 acres'-'4'	-	-	'Colour TV'-'4'
'Upto 20 acres'-'5'	-	-	'Car' – '5'
'Above 20 acres' – '6'	-	-	-

The summation of scores of all the four items indicated the economic

status of an individual students' family.

6.4.1.9. Scientific orientation

In the present study, scientific orientation was operationalised as the characteristic of individual, which made him to trust and rely on ideas and practices developed through scientific research. This variable was measured with the help of the slightly modified scale, developed by Supe (1969). Care was taken to see that the modification was minimal and the idea of each of the item remained unchanged. The modified scale was adopted for the present study after pre-testing. This scale had five response categories ranging from 'strongly agree' to 'strongly disagree'. The positive statements were given scores for 'strongly agree'-'7', 'agree'-'5', 'undecided' -'4', 'disagree'-'3' and 'strongly disagree'-'1'. The scoring was reversed for negative statements. The scale consisted of six statements and each statement was provided with a five-point continuum. The score for each respondent in scientific orientation scale was obtained by summing the scores for each statement.

6.4.1.10. Independency

In the present study, independency was operationalised as the extent of feeling of one's own ability and resourcefulness in carrying out any activity. It was measured with the help of the slightly modified independence scale, developed by Supe (1969). Care was taken to see that the modification was minimal and the idea of each of the item remained unchanged. The modified scale was adopted for the present study after pre-testing. This scale had five

response categories ranging from “most agree” to ‘strongly disagree’. The scale constituted of six statements and each statement was provided with a five-point continuum. The positive statements were given the scores for ‘most agree’-7, ‘agree’-5, ‘undecided’-4, ‘disagree’-3, ‘strongly disagree’-1. The scoring was reversed for the negative statements. The score of each individual in the independency was obtained by summing up the scores.

6.4.1.11. Orientation towards competition

Singh (1981) defined the variable as the degree to which an individual is oriented to place himself in a competitive situation in relation to others for projecting his excellence in activity. The variable was measured with the help of the slightly modified scale of Singh for the benefit of the present study. Care was taken to see that the modification was minimal and the idea of each of the item remained unchanged. The modified scale was adopted for the present study after pre-testing.

The orientation towards competition scale had four response categories. The criterion of scoring was conceptually unidirectional. The positive statements were given scores for ‘strongly agree’-‘4’, ‘agree’-‘3’, ‘disagree’-‘2’ and ‘strongly disagree’-‘1’. The scoring was reversed for the negative statements. The score for each individual in the orientation towards competition scale was obtained by summing up the scores.

The scale consisted of six statements and each statement was provided with a four-point continuum.

6.4.1.12. Students' knowledge in English

In this study, knowledge was operationalised as those behaviours and test situations, which emphasized the remembering by either recognition or recall of idea, material, and phenomenon. The variable indicated the extent of knowledge of the respondents about the grammar and comprehension of English language. It was measured with the help of prepared structured schedule, which consists of twenty items. The items were dichotomized type questions with 'yes' or 'no' type answer having score '1' and '0' respectively in case of positive items and reverse in case of negative items. The score of the variable for an individual was obtained by summing up the scores of the twenty items.

6.4.1.13. Social Participation of the family members

Operationally, it has been defined as the degree to which the respondent's family members are involved in formal organizations as members or office bearers. The scoring of the items was done according to socio-economic status scale (Rural) developed by Pareek and Trivedi (1964) slightly modified by Lokhande (1974). The modification was the inclusion of an item office bearer in more than one organization with score of '4'.

Items	Score
'No membership'	'0'
'Member in one organization'	'1'
'Member in more than one organization'	'2'
'Office bearer in one organizations'	'3'

‘Office bearer in more than one organization’ ‘4’

‘Distinctive features (M.L.A., M.P.)’ ‘6’

This scale was directly used to measure the social participation of the students’ family members for the benefit of the present study.

6.4.1.14. Utilization of sources of information

The utilization of sources of information refers to the use of information source(s) both from outside and within the community for getting information related to the learning of English by the learners.

The sources of information of a learner were determined by summing up the scores obtained from the cosmopolite and localite schedule developed by Singh (1993) was adopted for this study.

The cosmopolite sources schedule consisted of six statements. The statements were rated in four-point response categories: ‘very often’, ‘often’, ‘some times’ and ‘never’. The statements were given scores for ‘very often’-‘3’, ‘often’-‘2’, ‘sometimes’-‘1’ and ‘never’-‘0’.

For the localite sources of information, the respondents were asked to indicate his information source(s) he used in the previous years: ‘local agent’, ‘local leaders’, ‘friends/neighbours/relatives’ and ‘progressive/experienced teachers or persons’. Each respondents was asked to rate them on four-point response categories: ‘very often’-‘3’, ‘often’-‘2’, ‘sometimes’-‘1’, and ‘never’-‘0’.

A respondent’s total score of utilization of sources of information was determined by summing up the scores of cosmopolite and localite sources, he

used.

6.4.2. Dependent Variables

The appropriate operationalisation and measurement of the predicted variables help in concluding the study in a proper manner. This is a very interesting area of work in measuring the variables after conceptualizing them.

In the present study, the study gave insight into the contemplation and predisposition part of the student's psyche, which were very much important in case of second language acquisition. It considered the motivation and attitude of the student in case of acquisition of English as Second Language which is a single continuous contemplating process. For this reason the measurement of these variables had carried out in following manner.

6.4.2.1. Motivation to learn English

Motivation to learn English is operationalised and measured with the help of a slightly modified scale prepared by Benson (1991), Sarjit Kaur (1993) and Qashoa (2006) based on two scales of Gardner's (1985) Attitude/Motivation Test Battery (AMTB) (the instrumental and integrative orientation scales) and Cooper and Fishman's (1977) personal motivational construct. These reasons represented the three motivational constructs namely, instrumental motivation (items 1, 2, 3, and 4), integrative motivation (item 7) and personal motivation (items 5 and 6). It might be worth indicating that Gardner's instrumental and integrative types of motivation were adopted because such a classification offers "an impetus to the study of language attitudes and motivation that had

previously been lacking” (Benson, 1991). For the personal construct of motivation, it was included because it has been incorporated by some researchers such as Benson (1991), Sarjit Kaur (1993), and Shimizu (2000) when they investigated ESL/EFL learners’ motivation towards the English language.

6.4.2.2. Attitude towards learning English

Thurston (1946) defined attitude as the degree of positive or negative effect associated with psychological object like symbol, phrase, slogan, person, institution, ideal or ideas etc. towards which people can differ in varying degree.

The attitude towards learning English is operationalised for the study and measured with the help of slightly modified scale with fifteen items, adapted from Buschenhofen (1998), Al-Quyadi (2000) and Karahan (2007), for which they were requested to specify their responses by choosing any of the three alternatives provided, namely, agree, disagree, and do not know. The items were divided into four main categories: attitudes towards the use of English in the educational context (items 3, 4, 5, 6, 9, 10, 11, 13, 14 and 15), attitudes towards the use of English in the social context (items 1 and 2), attitudes towards the English language (item 7) and attitudes towards the culture of the English Speaking World (item 8 and 12).

6.4.2.2.1. Schematic representation of variables and their measurements

Independent Variables	
Variables	Empirical measurements
1. Age	Considered chronological age of the farmers

2. Sex (Gender)	Structured schedule developed
3. Education	Structured schedule developed
4. Family educational status	Modified scale developed by Ray (1967)
5. Family size	Structured schedule developed
6. Educational aspiration	Modified scale developed by Ray (1967)
7. Annual income	Structured schedule developed
8. Economic status	Socio-economic status scale (Rural), developed by Pareek and Trivedi (1964)
9. Scientific orientation	Modified scale developed by Supe (1969)
10. Independency	Modified scale developed by Supe (1969)
11. Orientation towards competition	Modified scale developed by Singh (1981)
12. Student's knowledge in English	Structured schedule developed
13. Social participation	Scale developed by Lokhande (1974)
14. Utilisation of sources of information	Modified scale developed by Singh (1993)

Dependent Variables	
Variables	Empirical measurements
1. Motivation to learn ESL	Slightly modified scale prepared by Benson (1991), Sarjit Kaur (1993) and Qashoa (2006) based on two scales of Gardner's (1985) Attitude/Motivation Test Battery (AMTB) (the instrumental and integrative orientation scales) and Cooper and Fishman's (1977) personal motivational construct.
2. Attitude towards learning ESL	Slightly modified scale with fifteen items, adapted from Buschenhofen (1998), Al-Quyadi (2000) and Karahan (2007)

6.5. Method of data collection

6.5.1. Construction of schedule after pre-testing

The draft schedule for collection of data, incorporating the tools and techniques of different variables was presented twice each time on contact learners. The quantification was done for each and every variable after operationalising them. Before final data collection, entire schedule was pre-tested for elimination, addition, and alteration with non-sample respondents of the study area. In pre-testing, care was taken not to include respondents who were selected as sample for final interview. On the basis of experiences in pre-

testing, appropriate changes in the construction of item and their sequence were made. The schedule was then finalized and multiplied. The final form of the schedule is given in the Appendix-III.

6.5.2. Field data collection

The data were collected during May 2011 to October 2011 with the help of the schedule constructed for the study. In each school, before starting the interview, a few hours were devoted to establish rapport with the respondents. The schedule was administered to the respondent in local language and the responses were recorded in English on the schedule. The interview was carried out by the researcher himself.

6.5.3. Method of Secondary Data Collection

The group discussion method was followed in case of secondary data generation for the present study.

6.5.4. Group Discussion Method

The group discussion is a method wherein two or more people are recognizing a common problem and exchange information and ideas to solve the particular problem. It occurs usually in a face-to-face or co-acting situation. Important group discussion methods are lecture, informal group discussion, panel discussion, colloquium, symposium, workshop, conference, brain storming, buzz session, video conferencing, experiential lecture, role playing, syndicate method, case study etc.

6.5.4.1. Purpose

- a) Solving a particular problem collectively.
- b) Exchanging information with each other.
- c) Planning an action programme.
- d) Developing desired attitude.
- e) Training the individual or groups.

6.5.4.2. Advantage

- a) The group discussion method involves two or more people for exchanging ideas to know problem critically.
- b) The evaluation of the problem is to be much realistic.
- c) It is a valuable educational method, which involves the sharing of ideas and thoughts among the participants.
- d) It arouses the problem solving behaviour among the participants.
- e) Discussion stimulates the attentive learning and listening.
- f) It also stimulates the straight process of thinking.
- g) It is a cooperative method wherein the knowledge of the individual is increasing by hearing other.
- h) It helps to get the opportunity to show the individual's ability in a particular learning situation.

6.6. Statistical Tools Used For Analysis of Data

The role of statistics in research is to function as a tool in designing research, analyzing its data and drawing conclusions. Most research studies

result in a large volume of raw data, which must be suitably reduced so that the same can be read easily and can be used for further analysis. Clearly, the science of statistics cannot be ignored by any research worker, even though he may not have occasion to use statistical method in all their details and ramifications.

The important statistical measures that are used to summarize the survey or research data are:

Mean, Standard deviation, Coefficient of variation, Coefficient of correlation, Linear regression Multiple regression, Cluster analysis and Factor analysis.

6.6.1. Mean

Measure of central tendency (or statistical averages) tells us the point about which items have a tendency to cluster. Such a measure is considered as the most representative figure for the entire mass of data. Measure of central tendency is also known as statistical average. Mean, median, and mode are the most popular averages. Mean, also known as arithmetic average, is the most common measure of central tendency and may be defined as the value, which we get by dividing the total of the values of various given items in a series by the total number of items. We can work it out as under:

$$\text{Mean or } (\bar{X}) = \frac{\sum X_i}{n} = \frac{X_1 + X_2 + \dots + X_n}{n}$$

Where, \bar{X} = The symbol we use for mean (pronounced as X bar)

Σ = Symbol for summation

X_i = Value of the i^{th} item X, $i = 1, 2, \dots, n$

n = total number of items

Mean is the simplest measurement of central tendency and is a widely used measure. Its chief use consists in summarizing the essential features of a series and in enabling data to be compared. It is amenable to algebraic treatment and is used in further statistical calculations. It is a relatively stable measure of central tendency. But it suffers from some limitations viz., it is unduly affected by extreme; it may not coincide with the actual value of an item in a series, and it may lead to strong impressions, particularly when the item values are not given with the average. However, mean is better than other averages, especially in economic and social studies where direct quantitative measurements are possible.

6.6.2. Standard deviation

Standard deviation is the most widely used measure of dispersion of a series and is commonly denoted by the symbol ' σ ' (pronounced as sigma). Standard deviation is defined as the square root of the average of squares of deviations, when such deviations for the values of individual items in a series are obtained from the arithmetic average. It is worked out as under.

$$\text{Standard deviation } (\sigma) = \sqrt{\frac{\sum(X_i - \bar{X})^2}{n}}$$

6.6.3. Coefficient of variation

When we divide the standard deviation by the arithmetic average of the series, the resulting quantity is known as coefficient of standard deviation, which happens to be a relative measure, and is often used for comparing with similar measure of other series. When this coefficient of standard deviation is multiplied by 100, the resulting figure is known as coefficient of variation. Sometimes, we work out the square of standard deviation, known as variance, which is frequently used in the context of analysis of variation.

The standard deviation (along with several related measures like variance, coefficient of variation, etc.) is used mostly in research studies and is regarded as a very satisfactory measure of dispersion in a series. It is amenable to mathematical manipulation because the algebraic signs are not ignored in its calculation (as we ignore in case of mean deviation). It is less affected by fluctuations of sampling. These advantages make standard deviation and its coefficient a very popular measure of the scattering of a series. It is popularly used in the context of estimation and testing of hypotheses.

6.6.4. Coefficient of correlation

So far we have dealt with those statistical measures that we use in context of univariate population i.e., the population consisting of measure of only one variable. In case of bivariate or multivariate populations, we often wish to know the relation of the two and/or more variables in the data to one another.

Karl Pearson's coefficient of correlation (or simple correlation) is the most

widely used method of measuring the degree of relationship between two variables. This coefficient assumes the following:

- (i) That there is linear relationship between the two variables;
- (ii) That the two variables are causally related which means that one of the variable is independent and the other one is dependent; and
- (iii) A large number of independent causes are operating in both variables to produce a normal distribution.

Karl Pearson's coefficient of correlation

$$r = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{n \cdot \sigma_x \cdot \sigma_y}$$

Where $X_i = i^{\text{th}}$ value of X variable

\bar{X} = mean of X

$Y_i = i^{\text{th}}$ value of Y variable

\bar{Y} = mean of Y

n = number of pairs of observations of X and Y

σ_x = Standard deviation of X

σ_y = standard deviation of Y.

Karl Pearson's coefficient of correlation is also known as the product moment correlation coefficient. The value of 'r' lies between ± 1 . Positive values of r indicate positive correlation between the two variables (i.e., changes in both variables take place in the same direction), whereas negative values of 'r' indicate negative correlation i.e., changes in the two variables taking place in the

opposite directions. A zero value of 'r' indicates that there is no association between the two variables. When $r (+) 1$, it indicates perfect positive correlation and when it is $(-) 1$, it indicates perfect negative correlation, meaning thereby that variations in independent variable (X) explain 100% of the variations in the dependent variable (Y). We can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of 'r' nearer to + 1 or – 1 indicates high degree of correlation between the two variables.

6.6.5. Linear Regression Analysis

Regression is the determination of a statistical relationship between two or more variables. In simple regression, we have only two variables, one variable (defined as independent) is the cause of the behaviour of another one (defined as dependent variable). Regression can only interpret what exists physically i.e., there must be a physical way in which independent variable X can affect dependent variable Y. The basic relationship between X and Y is given by

$$Y = a + bX$$

Where, the symbol Y denotes the estimated value of Y for a given value of X. This equation is known as the regression equation of Y on X (also represents the regression line of Y on X when drawn on a graph), which is positive for direct and negative for inverse relationships.

Thus, the regression analysis is a statistical method to deal with the

formulation of mathematical model depicting relationship amongst variables, which can be used for the purpose of prediction of the values of dependent variable, given the values of the independent variable.

6.6.6. Multiple Correlation and Regression

When there are two or more than two independent variables, the analysis concerning relationship is known as multiple correlations and the equation describing such relationship as the multiple regression equation. We here explain multiple correlation and regression taking only two independent variables and one dependent variable (convenient computer programmes exist for dealing with a great number of variables). In this situation, the results are interpreted as shown below:

Multiple regression equation assumes the form

$$Y = a + b_1X_1 + b_2X_2$$

Where, X_1 and X_2 are two independent variables, and Y is the dependent variable, the constants a , b_1 and b_2 can be solved by solving the following three normal equations:

$$\sum Y_i = na + b_1\sum X_{1i} + b_2\sum X_{2i}$$

$$\sum X_{1i}Y_i = a\sum X_{1i} + b_1\sum X_{1i}^2 + b_2\sum X_{1i}X_{2i}$$

$$\sum X_{2i}Y_i = a\sum X_{2i} + b_1\sum X_{1i}X_{2i} + b_2\sum X_{2i}^2$$

(It may be noted that the number of normal equations would depend upon the number of independent variables. If there are 2 independent variables, then 3 equations, if there are 3 independent variables then 4 equations and so on, are used).

In multiple regression analysis, the regression coefficients (viz., b_1 , b_2) become less reliable as the degree of correlation between the independent variables (viz., X_1 , X_2) increases. If there is a high degree of correlation between independent variables, we have a problem of what is commonly described as the problem of multicollinearity. In such a situation, we should use only one set of the independent variable to make our estimate. In fact, adding a second variable, say X_2 , that is correlated with the first variable, say X_1 , distorts the values of the regression coefficients. Nevertheless, the prediction for the dependent variable can be made even when multicollinearity is present, but in such a situation, enough care should be taken in selecting the independent variables to estimate a dependent variable to ensure that multicollinearity is reduced to the minimum.

With more than one independent variable, we may make a difference between the collective effect of the two independent variables and the individual effect of each of them taken separately. The collective effect is given by the coefficient of multiple correlations.

In multiple regressions, we form a linear composite of explanatory variables in such a way that it has maximum correlation with a criterion variable. The main objective in using this technique is to predict the variability of the dependent variable based on its covariance with all the independent variables. One can predict the level of the dependent phenomenon through multiple regression analysis model, given the levels of independent variables.

6.6.7. Cluster Analysis

Cluster analysis consists of methods of classifying variables into clusters.

Technically, a cluster consists of variables that correlate highly with one another and have comparatively low correlations with variables in other clusters. The basic objective of cluster analysis is to determine how many mutually and exhaustive groups or clusters, based on the similarities of profiles among entities, really exist in the population and then to state the composition of such groups. Various groups to be determined in cluster analysis are not predefined as happens to be the case in discriminate analysis.

6.6.8. Factor analysis

Factor analysis is by far the most often used multivariate technique of research studies, especially pertaining to social and behavioural sciences. It is a technique applicable when there is a systematic interdependence in finding out something more fundamental or latent, which creates this commonality. For instance, we might have data, say, about an individual's income, education, occupation and dwelling area and want to infer from these some factor (such as social class), which summarizes the commonality of all the said four variables. The technique used for such purpose is generally described as factor analysis. Factor analysis, thus, seeks to resolve a large set of measured variables in terms of relatively few categories, known as factors. This technique allows the researcher to group variables into factor (based on correlation between variables) and the factor so derived may be treated as new variables (often termed as latent variables) and their value derived by summing the values of the original variables which have been grouped into the factor. The meaning and name of such new variable is subjectively determined by the researcher. Since the factors

happen to be linear combinations of data, the coordinates of each observation or variable is measured to obtain what are called factor loadings. Such factor loadings represent the correlation between the particular variables and the factor and these are usually placed in a matrix of correlations between the variables and the factors.

The data collected in the present study were two types i.e. quantitative and qualitative. The quantitative data of the schedule were analyzed in terms of above-mentioned statistical tools by using Statistical Package for Social Sciences (SPSS) software. For analyzing the qualitative part of the data, on the other hand, group discussion method and descriptive method were used.