CHAPTER - IV
RESEARCH METHODOLOGY AND PROFILE OF THE STUDY AREA

4.1 INTRODUCTION

The third chapter described the concept evolved for this study. The present study emerged out from the concepts discussed earlier. In this chapter IV, the researcher has attempted to proceed with this study following a definite procedure to analyze the data gathered, employing appropriate statistical tools to obtain the required result.

The design of a suitable methodology and the selection of the proper analytical tools are important for a meaningful and useful analysis in any research undertaken. In this section, an attempt has been made to describe the procedure how the study was undertaken. It includes the sample design, the construction of interview schedule, validation, the collection of data, the period of study, and the statistical tools used for.

4.2 DESIGN OF THE STUDY

The researcher has employed “descriptive research design” to examine the association between profile variables of the participants and various organizational climate dimensions as the driving force for quality higher education. Profile variables are considered as independent variables and the ten dimensions of the organizational climate were treated as Criteria or dependent factors. The study is also in the nature of exploratory research design. The participants who had already involved in the process of delivering a quality higher education were considered for the analysis.

4.3 SAMPLING DESIGN

“A sample is a part of the target population, carefully selected to represent the population (Cooper and Schindler 2008, p.72). “Sampling is that by selecting some of the elements in a population, we may draw conclusions about the entire population. A population element is the individual participant or object on which the measurement is taken. It is the unit of study. A population is the total collection of elements about which we wish to make some inferences (Cooper and Schindler 2008, p.402).
There are several compelling reasons for sampling, including (1) Lower cost, (2) Greater accuracy of results, (3) Greater speed of data collection and (4) Availability of population elements.

The ultimate test of a sample design is how well it represents the characteristics of the population it purports to represent. In measurement terms, the sample must be valid and the validity depends on two considerations: accuracy and precision. The convenient stratified sampling procedure on the basis of probability sampling has been adapted in this study.

“A sample is a small portion of population selected for analysis. By observing the samples, certain inferences may be made about the population (Best 1977, p.268).

The size of the sample is an important problem to be decided in case of sampling. This is because, the size has a direct bearing upon accuracy, time, cost and administration of the survey. Large samples are generally hard to manage and are unsuitable for detailed study, but that may be essential for representative. Parten viewed that an optimum sample in survey is one, which fulfills the requirements of efficiency, representativeness, reliability and flexibility. The sample should be small enough to avoid unnecessary expenses and large enough to avoid tolerable sample error.

The size of the sample of the study constitutes 650 students and 150 faculty members of the selected professional and non-professional colleges in Bangalore.

### TABLE 4.1

**DISTRIBUTION OF SAMPLES**

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Category of samples</th>
<th>Professional Colleges</th>
<th>Non-Professional Colleges</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Students</td>
<td>456</td>
<td>194</td>
<td>650</td>
</tr>
<tr>
<td>2</td>
<td>Faculty Members</td>
<td>105</td>
<td>45</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>561</td>
<td>239</td>
<td>800</td>
</tr>
</tbody>
</table>
4.4 SAMPLING TECHNIQUES

Most population can be segregated into several mutually exclusive sub-populations, or strata. The process by which the sample is constrained to include elements from each of the segment is called stratified random sampling (Cooper and Schindler 2008, p.416). The reasons to choose this technique are (1) to increase a samples statistical efficiency (2) to provide adequate data for analyzing the various sub-population or strata and (3) to enable different research methods and procedures to be used for different strata (Kish, Leslie 1965).

At times, it is advisable to sub-divide the population into smaller homogeneous groups in order to get more accurate representation. Within each sub-group a random selection should be used (Best 1977, p.270-271).

The sampling technique employed in this study was “Convenience Stratified Random” sampling technique, since the students and the faculty could be classified on the basis of Gender, Age, Experience, and so on according to the profile factors.

4.5 SAMPLING FRAME:

For the purpose of the sampling frame of the study, it was decided to follow the rules of thumb of Roscoe (1975) as stated by Uma Sekaran 2007, p. 294-295, where he has emphasized that the sample size should be higher than 30 and lower than 500. Too large a sample (say over 500) will be a problem as it will also be prone to type II errors (Uma Sekaran 2007, p.318-324). The sampling frame is closely related to the population. It is the list of elements from which the sample is actually drawn. Ideally, it is a complete and correct list of population members only. In the present study, the researcher considered all the students and faculty of the professional and non-professional colleges in Bangalore. With regard to drawing out samples, he has considered only 500 students and faculty.

4.6 RESEARCH TOOLS

This section deals with the development of tools of research employed in this study. “Early in the planning stage of the research project, an investigator weighs the merits and de-merits of various procedures for collecting evidence. After determining
which approach yields the form and the kind of data necessary to test the hypothesis adequately, the researcher examines the available tools and chooses the one that is most appropriate for the purpose. If the existing research tool does not meet the requisite specific needs, the researcher supplements or modifies them or construct his/her own (Van Dalen 1966).

Considering the conformity of needs, specifically to this study, the researcher, after going through various procedures and previous studies, attempted to construct his own tool for this study. In order to make the tool more effective and purposeful, he has incorporated some of the important relevant demographic and other criteria factors in the research tool.

4.7 INSTRUMENTATION

The researcher employed the following two tools for this study.

1. The research tool to collect data from the students – Organizational Climate Students’ Questionnaire (OCSQ)

2. The research tool to collect data from the faculty - Organizational Climate Faculty Questionnaire (OCFQ).

a. Construction of Questionnaires

The researcher attempted to investigate the presence of Organizational Climate in the professional and non-professional colleges in Bangalore through the perception of students and the faculty of the above colleges. Therefore he constructed two questionnaires, one to distribute among students and another one to be disbursed among faculty.

b. Organizational Climate Students’ Questionnaire (OCSQ)

To proceed with the investigation, the researcher constructed the questionnaire to obtain response from the students. This OCSQ was incorporated with ten selected criteria (Dimensions), under which 65 predictor variables were distributed.
### Table 4.2

**Distribution of Predictors Under OCSQ and OCFQ**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Criterion Factors</th>
<th>No.of Predictors OCSQ</th>
<th>No.of Predictors OCFQ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Profile Variables</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>Job Satisfaction</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Rewards</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Organizational Clarity</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Warmth and Support</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Leadership</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Motivation</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Communication</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Decision Making</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Organization Goals</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>Control</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>73</strong></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

Table 4.2 exhibits the predictors distributed in the two questionnaires, namely, OCSQ and OCFQ. There are 5 and 10 predictors under the dimension “Job Satisfaction” in OCSQ and OCFQ respectively. The dimension “Reward” was supported by 6 variables each in OCSQ and OCFQ. The dimension “Organizational Clarity” included with 6 predictors in OCSQ and 7 in OCFQ. There are 7 predictor variables under the dimension “Warmth and Support in OCSQ and 5 in OCFQ. The dimensions “Leadership”, “Motivation”, were supported by 6 predictors each in OCSQ and OCFQ. “Communication” in both the questionnaires were supported by 8 predictors. and “Decision Making” was supported by 7 predictors and 9 predictors in OCSQ and OCFQ respectively. The dimensions “Organization Goals” was supported by 5 and 7 predictors in OCSQ and OCFQ respectively. The dimension “Control” was supported by 9 predictors each in both the questionnaires.

c. **Organizational Climate Faculty Questionnaire (OCFQ)**

The procedure that was followed for structuring questionnaire for students was strictly observed while formatting questionnaire for faculty, since the criterion factors...
were the same as that of students. However, slight modifications were carried out while coining the sentences of the predictor variables, to suit the faculty.

It was observed that the students and the faculty found that both the questionnaires were devoid of ambiguity, packed with clarity of purpose, and easy to understand and respond quickly consuming minimum time.

d. Format of the Questionnaires

The questionnaire related to the students (OCSQ) was constructed with 73 statements. The first one being the name of the student, which was given as option either “to answer” or “not to answer”. Other seven statements (Sl.Nos 2 – 8) related to the details regarding profile of the students. The next 65 statements were pertaining to ten criteria. The profile variables were further categorized into groups and sub-groups, and boxes were provided to respond with marking a ‘tick’ in the box. Boxes were also provided to all the statements under the criteria. The same format was adapted to the OCFQ, but there were 73 statements regarding O.C and 7 statements with regard to profiles.

4.8 SCORING (SCALING) PROCEDURE

Scaling is the procedure for the assignment of numbers (or other symbols) to a property of objects, in order to impart some of the characteristics of numbers to the properties in question (Phillips S. Bernard 1971). To measure the intensity of the responses in respect of the statements pertaining to each of the criteria five point Likert scale was preferred, since “the Likert scale has many advantages that accounts for its popularity. It is easy and quick to construct (Thurstone and Kenney 1946). The scale defined was between, and inclusive of 1 – 5. ‘1’ denotes the lowest intensity and highest negative response or strongly disagree, ‘2’ for disagree, the scale’3’ for “neither agree” or “disagree”, ‘4’ for “agree” and ‘5’ to show the highest positive intensity of the response that is “strongly agree”. All the statements were presented with readymade answers to make only a ‘tick’ mark.
4.9 VALIDATION OF THE TOOL

“Validity is a characteristic of measurement concerned with the extent that a test measures what the researcher actually wishes to measure, and that differences found with a measurement tool reflect true differences among participants drawn from the population” (Cooper and Schindler 2008, p.729).

There are three major criteria for evaluating a measurement tool. They are:

1. **Validity** is the extent to which a test measures what we actually wish to measure.

2. **Reliability** has to do with the accuracy and precision of a measurement tool.

3. **Practicality** is concerned with a wide range of factors of economy, convenience and interpretability (Thorndike et al 1969).

4.10 VALIDATION OF THE QUESTIONNAIRE

In this study, the researcher validated the two questionnaires by means of content validity.

a. **Content Validity**

It is important to see whether a measuring instrument is the extent to which it provides adequate coverage of the investigative questions guiding the study. A determination of content validity involves judgment. A second way is to use a panel of persons to judge how well the instrument meets the standards. “Content Validity is primarily concerned with inferences about test construction, rather than test scores” (Ciscio 1982). Three experts, one from members of faculty who is liaising management and students’ welfare, another an executive looking after the portfolio related to HR implementation of a large organization and the third expert being a Post Graduate occupied a decent higher job in the public enterprises handling personnel and quality department were requested to go through the relevance of statements for measuring the variables in the form of statements. The agreement of their judgment on the relevance of statements were taken as an index of the content validity. Their suggestions for refinement of words, phrases and statements were duly incorporated in
the questionnaire. The content validity was established for the two types of questionnaires.

b. Criterion Related Validity

Criterion related validity reflects the success of measures used for prediction or estimation. It is being employed to predict an outcome or estimate, the existence of a current behavior or time perspective. Any criterion measure must be judged in terms of four qualities: (1) Relevance (2) Freedom from bias (3) Reliability and (4) Availability.

A criterion is relevant if it is defined and scored in the terms we judge to be proper measure of success in implementation of OC. Freedom from bias is attained when the criterion gives each respondents an equal opportunity to score well. A reliable criterion is stable or reproducible. Finally, the information specified by the criterion must be available. Thus the criterion-related validity was established.

c. Construct Validity

Both theory and the measuring instrument being used, have to be considered to evaluate construct validity. If the researcher is interested knowing about the concept of OC and its result after implementation and other general relevant information, these had to be operationally defined and would have to correspond to an empirically grounded theory. If a known measure of OC was available, the results derived from the new instrument could be correlated with the known measure, to establish convergent validity. But in this study, with non availability of such known measure except some studies which point out different criteria in different situations and environment, the researcher was compelled to consider the scale ‘5’ being the highest in order.

d. Reliability

Reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error. Reliable instrument can be used with confidence that transient and situational factors are not interfering. Reliable instruments are robust, they work well at different times under different conditions. This distinction of time and condition as the basis for frequently used perspectives on reliability are: stability, equivalence and internal consistency.
e. Stability

A measure is said to possess stability if consistent results were secured with repeated measurements of the same person when repeated in one or more times. Test-Retest method would be of great help, subject to the conditions that external factors should not contaminate the measurement or the individual and distort the stability score. Thus test-retest method was adapted in processing the pilot study among the students and faculty and the results were correlated to establish the stability.

f. Equivalence

A second perspective on reliability considers how much error may be introduced by different investigators (in observation) or different samples of items being studied (in questioning or scales). Thus the equivalence is concerned with variations at one point of time among observers and samples of items. A good way to test the equivalence of measurements by different observers is to compare their scoring of the same event.

The major interest with equivalence is typically not how respondents differ from item to item, but how well a given set of items will categorize themselves. There may be differences in response between two samples of items, but if a person is classified the same way, by each test, then the test has good equivalence. By following the above perspective, the equivalence was established in the two instruments.

g. Internal Consistency

A third approach to reliability uses only one administration of an instrument or test to assess the internal consistency or homogeneity among items. The split-half technique or by obtaining Cronbach’s Alpha, can be used to establish the reliability. In this study, the researcher obtained the values of Cronbach’s Alpha to each item of the criteria. The researcher considered the items having the value of Cronbach’s Alpha between 0.60 and 0.89 could be included in the questionnaires. All the ten criterion factors satisfied the above condition; hence they were taken into consideration to be included in the questionnaires.
Table 4.3 shows that the values of Cronbach’s Alpha of all the ten criterion factors are within the prescribed value. Hence the reliability was established.

4.11 PRACTICALITY

The scientific requirements of a project call for the measurement process to be reliable and valid, while the operational requirements call for it to be practical. “Practicality has been defined as, economy, convenience and interpretability” (Thordike and Hagens 1969).

a. Economy

Some trade-off usually occurs between the ideal research project and the budget. To limit the observation time (and therefore costs) the measurement question was limited. The other expenses and the data collection were also limited, since, most of the data were collected mainly by using electronic mails. Thus the researcher could undertake the project without spending lot of money and time unnecessarily.
b. Convenience

A measurement device should pass the convenience test by easy administer action of the questionnaire. The questionnaires were administered with a set of detail but clear instructions with examples to make it easier to complete the questionnaire correctly. Accordingly, the design and layout of the questionnaires were purposefully designed for convenience.

c. Interpretability

This aspect of practicality is relevant when persons other than the test designer, must be able to interpret the result. Therefore, the researcher has given the detailed instructions of administration of the questionnaire along with scoring keys and other relevant guidelines.

Both the questionnaires were constructed by the researcher himself and subjected to the process of validity, reliability and practicality and the instrument was integrated into the above process statistically and practically, thus the standard of the instrument was then established.

4.12 DATA COLLECTION

Primary data were used for the present study through the primary source, namely, students and faculty of the professional and non-professional colleges in Bangalore. The primary data were collected with the help of questionnaires (vide appendix).

a. Method of Data Collection

The researcher visited all the selected professional and non-professional colleges in Bangalore and met the Heads of the institutions and requested them to permit him to distribute the questionnaires among students and faculty. Also he met the Heads of the departments and members of the faculty and discussed and explained the project for accuracy of responses and to see that no statement is left unanswered and also for easy handling of the affairs. In some colleges, he waited even the whole day and collected the completed questionnaires. But most of the colleges took time to return the duly filled in questionnaires. The filled in questionnaires were then collected and arranged to college wise for easy input of data. The Microsoft Excel program was used to give the data input.
b. Constraints in Data Collection

The researcher had to face so many challenges and hardships in administering the questionnaires in the colleges in spite of assurance given to the respondents that the information would be kept as confidential and the study would be for the betterment of the institution and the respondents. Except a few, most of the institution’s heads showed non-cooperation. Some have summarily refused to entertain the researcher and rejected his pleas and request, by saying so many reasons which were known to them only. The main reasons may be that in those colleges, the OC may be in lowest level and fearing divulgence of the real fact to the researcher may cause adverse effect to the career opportunities of the faculty. The students had the doubt and fear of consequent actions from their higher authorities. In some institutions, there were heads, but name sake, they had to get permission from their Chairman of the college. One thing the researcher noted was that large the students and faculty were more interested in giving response. Even though there were large numbers of colleges in Bangalore city, only a few came forward to assist and help the researcher for this good cause. The researcher felt that the members of faculty except in the Government and Aided institutions naturally have fear to depose the details of the OC in the colleges and many of them requested not to mention their name and the name of the college.

c. Survey Period

Due to the above constraints, it took lot of time to collect the required data. The primary data were collected during the months of January to September 2012. The reference period of the survey was 2011-2012.

4.13 METHODS OF ANALYSIS

To analyze the relationship of the profile factors with the criterion factors a master chart was prepared for entering the responses of each respondent and small cross tables were made from the master chart for analysis. The data in the master chart were then subjected to the SPSS package (version 5) for detailed analysis employing various appropriate statistical tools that were required. The results were tabulated accordingly and interpreted appropriately.
4.14 STATISTICAL TOOLS OF ANALYSIS

In order to examine the relationship between the employee’s socio–economic background and their levels of agreement, in respect of the predictor variables, following statistical tools were employed.

a. Frequency Analysis

The frequency distribution was calculated and ordered according to the subgroups under each profile variables. The percentage of the presence of samples in subgroups was also calculated and the number is given in parentheses.

b. Factor Analysis

The multivariate statistical technique of factor analysis has wide applications in various social researches. Factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is data reduction and summarization. In the present study, the factor analysis has been applied to narrate the variables related to a particular object into a smaller set of new composite dimension with a minimum loss of information.

“There are several methods of factor analysis, but they do not necessarily give the same results. As such factor analysis is not a single unique method but a set of techniques” (Kothari; p.323)

The Principal Component Method of Factor Analysis, developed by H. Hotelling, seeks to maximize the sum of squared loadings of each factor extracted in turn. Accordingly principal component factor explains more variance than would the loadings obtained from any other method of factoring.

“The aim of the principal component method is the construction out of a given set of variables Xjs (j=1,2……k) of new variables (pi ), called principal components which are linear combinations of the Xs.”(Kothari; p.323)

The principal component method of factor analysis was used in this study to group the factors of both students and faculty.
c. ‘t’ Test

“The ‘t’ test is based on ‘t’ distribution and is considered an appropriate test for judging the significance of sample mean or for judging the significance of difference between the means of two samples in case of a small sample(s) when population variance is not known (in case, variance of the sample as an estimate of the population variance used). The relevant test statistics “‘t’ is calculated from the sample data and then compared with its probable value based on ‘t’ distribution at a specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypotheses.”(Kothari; p.196)

The ‘t’ test was used to test the mean difference of perception between two sub groups of the same group in this study.

d. One Way ANOVA.

The basic principle of ANOVA is to test differences among the means of the populations by examining the amount of variation within each of the sample, related to the amount of variation between the samples. In terms of variation within the population it is assumed that the values of $(X_{ij})$ differ from the mean of this population only because of random effects, that is, there are influences $(x_{ij})$ which are unexplainable, where as in examining differences between populations it is assumed that the difference between the mean of the $j^{th}$ population and the grand mean is attributable to what is called a “specific factor” or what is technically described as treatment effect.(Kothari p.257)

One-way ANOVA has been applied to find out the difference of perception among three or more sub – groups of a same group with regard to the predictor variables of each dimension. For this purpose, mean scores, ‘F’ ratio and ‘F’ probability were calculated.

e. Discriminant Analysis

Through discriminant analysis technique, researcher may classify individuals or objects into one of two or more mutually exclusive and exhaustive groups on the basis of set of independent variables. Discriminant analysis requires interval independent variables and a nominal dependent variable.(Kothari p.319). The objective in discriminant
analysis happens to predict an object likely to be belonging to a particular group, based on several independent variables. If the dependent variable is in more than two groups, then it calls for multiple discriminant analysis. In this study, this was applied in random to find out the discriminant factors.

The model is:

\[ Z_1 = b_0 + b_1x_{1i} + b_2x_{2i} + \ldots + b_nx_{ni}. \]

Where

\[ x_{ji} = \text{the } i^{th} \text{ individual's value of the } j^{th} \text{ independent variable} \]

\[ b_j = \text{the discriminant co-efficient of the } j^{th} \text{ variable} \]

\[ z_i = \text{the } i^{th} \text{ individual discriminant score} \]

\[ z_{crit} = \text{the critical value for the discriminant score} \]

“The commonest use for discriminant analysis is to classify persons (respondents) or objects into various groups, and it can also be used to analyze known groups to determine the relative influence of specific factors for deciding which group various cases fall” into (Cooper and Schindler 2008, p.579). The conclusion is arrived at through the coefficients that motivate the respondents.

Several significance tests also may be applied. One, Wilk’s Lambda, has a Chi-Square transformation for testing the significance of the discriminant function. Next one is canonical discriminant function in which, the standardized values of the discriminant variables are calculated. Another one is by employing Fishers’ linear discriminant function, the coefficients values of the variables perceived by the sub-groups are found out to arrive at a conclusion.

In this study, the researcher has employed the statistical techniques namely, the U statistics, to find out the Wilks’ Lamda and Fishers’ linear discriminate function to determine the coefficient values of the variables as perceived by the three different subgroups namely production department, quality control department and human resource department under the main group of departments.
4.15 **CANONICAL CORRELATION ANALYSIS**

This technique was applied in this study to predict a set of criterion variables from their joint co-variance with a set of explanatory variables. The procedure followed is to obtain a set of weighs for the dependent and independent variables in such a way that linear composite of the criterion variables has a maximum correlation with the linear composite of the explanatory variables.

The variables \( x = a_1x_1 + a_2x_2 + \ldots + a_kx_k + a \) and \( y = y_1^{1/2} + y_2^{1/2} + \ldots + y_j^{1/2} + y \)

The resulting canonical correlation solution then gives an overall description of the presence or observance of a relationship between the two sets of variables.

4.16 **SUMMARY**

The method adapted in this study created a strong base to proceed further for analyzing the data in proper manner to get accurate results. Therefore the researcher with no hesitation proceeded to the analysis part.
REFERENCES


