CHAPTER 5
RESEARCH DESIGN

After carrying out the literature survey or review and formulating the objectives and the hypothesis in the previous chapter, the next natural course of action is to design or plan research suitably to meet the set goals. The following are the essential components of any such exercise.

1. Choice and Details of the methods;

2. Sample for the study;

3. Data collection tools;

4. Method of data collection; and

5. Analysis of data.

As The first four steps will be dealt within this chapter and fifth in the next.

5.1 Choice and Details of the Methods

The choice of method is driven by the problem on hand. A microscopic look at the objectives and the hypothesis suggest that, in essence, the problem is to find out about the needs of the user group in terms of their information seeking behaviour and how information centre or library plans to meet these needs. This
apparently simple sentence has several aspects built in it. As the wise adage goes, Rome was not built in a day. It includes several inter-related activities, a number of critical decisions to be made regarding the suitability of the processes employed followed by any possibility to improve them. A strict schedule has to be followed for implementation.

In this investigation the concept of Reengineering discussed in the third chapter has three different and distinct roles to play at a time.

a. It is a specialised technique employed in this study;

b. It was meant to be an extension of the literature review; and above all,

c. It is a main subject of the project, although the title implicitly encompasses it.

Therefore, this was dealt separately as the third chapter, giving the fundamentals of reengineering. But, it is necessary to know what processes need to be reengineered, how and where to identify them. Hence, it would be ideal to understand the following methods being the components of the research design, as a prelude to the application of reengineering.
In other words, the present study is a blend of a descriptive survey, experimental method, case-study and Process Reengineering skills outlined in the third Chapter. The following section gives a brief description and justification for the choice of the methods employed.

5.1.1 Descriptive Survey

Survey is the most frequently used method in social sciences in general and library science in particular. Surveys are concerned with systematic and in-depth analysis of libraries, library systems, library networks and the library users. Disregard of what is being covered, the process of survey itself has certain objectives.

Generally surveys are used to understand and comprehend complex situations. The complexity of any situation is result of many factors. Surveys, if planned and executed properly, can even measure the magnitude of the influence of different factors. Such understanding, just for the sake of it, is of no specific consequence. But, why one wants to understand these situations is more important. Surveys are used for the following select reasons in librarianship.
- To understand the influence of certain factors on any given sphere/ activity
- To give information or to report
- To get the management support
- To plan and evaluate library services
- To attend / anticipate grievances or needs of the users.

In the present study, the survey is being used to understand the information seeking behaviour of the users, to assess or evaluate their information needs and to meet some of the requirements by process reengineering. This broad target can be further sharpened.

The survey is aimed at the following two main purposes in this study.

A. To identify the processes to be reengineered.

B. To support the above choice by finding their information seeking behaviour of the end-users.

Thus, the object of the survey in this case are the end-users of the library attached to Graphite India Ltd. (More details under the section 5.2 Sample.) Thus, the scientists and the engineers at the Graphite India Ltd., will be subjected to the survey.
5.1.2 Experimental Method

Experiments are conducted in physical sciences to collect data to test hypothesis. This method is the most rigorous of all methods. In social sciences, however, experimental method is used to find any cause and effect relationship. It measures the influence or the magnitude of the effect of any independent variable. It can also show association among the variables.

In social sciences, there are four types of experimental methods.

a. After-Only or Post-Test Only Design

This design is used where the conditions are not humanly possible to manipulate. Thus, when the phenomenon is not under physical or natural control, two similar groups are chosen, say A and B. The group A is exposed to a causal variable say x, and B remains unaffected. Group A is referred as Experimental Group and B is called the Control Group. The effect on A is measured to be y. Now, the values of measure of x and y show the strength of causal relationship.

The method is not very reliable, as one cannot confirmatively say that y is not influenced by any factor other than x.
b. **Before-After or Pretest-Posttest Design**

This method may use one or more groups. But each group is measured before and after introduction of the causal variable. This method is better than the previous one. However, one has to take care that no other external factor influences any group in the midst of an experiment.

c. **Ex-Post Facto Experimental Design**

Two or more groups are selected and some external factor has already influenced one of the groups. The other group is unaffected. The comparison is made from present to past and the influence of the specific factor is measured.

A serious limitation of this method is the inability to measure the events of the past.

While the earlier two methods studied future from the past, this probes the past from present.

d. **Panel Study**

Here a particular subject or a variable studied over a time by using different types of data. In this method variation is
attributed to a real change in the phenomenon. In other words, a dependent variable is studied to know which independent variable has influenced the change.

In the present study 'Before-After' or 'Pretest-Posttest' concept is used. Each process is mapped and the process-time is measured before and after applying reengineering. Thus, the saving in the process-time is considered to be the effect of reengineering.

5.1.3 Case-Study

Case-study is a comprehensive examination of a single object which may be a group or an institution or a locality which is representative of the entire class. Thus, by studying a single object in depth, certain characteristics about the class to which it belongs, can be determined. In this sense, the idea is application of inductive logic.

This method is selected particularly when extensive data is required about a single research object.

As this study focuses its attention exclusively on the library attached to the Graphite India Ltd., it is a case-study. (More about this under section 5.2 Sample.)

Besides being a case-study, it is also an evaluation study. According to Ronald Powell,
evaluation study is "... a specific type of applied research whose primary goal is not discovery of knowledge but rather testing of the application of knowledge within a specific program or project."

Generally, evaluation studies aim at measuring the extent of achievement of a particular application. This study aims at application of reengineering and to evaluate its effect.

Although these methods have some demerits, these were essentially selected for want of any better substitute. Besides, some of the errors arising out of these defects were prevented by careful selection of sample and designing of tools for collecting data. These two aspect are covered in the following sections.

In view of the above, the area of the present work can be illustrated by the shaded portion of the Venn Diagram on the next page.

5.2. Sample for the Study

As the objective is to identify an environment or a library and identify problem-areas or the processes that need to be reengineered, the sample comprises of the following entities.

a. Descriptive Survey
b. Experimental Method
c. Case-Study
d. Evaluation Studies
e. Business Process Reengineering (BPR)

Figure S. Area of the Present Research: A Venn Diagram
The institute selected to be the base for the study was the library attached to Graphite India Ltd., Bangalore, India. The choice was purposive because of the familiarity of the investigator with the organization. (Please see Appendix 2, p.176 for a note about the Graphite Industries in India and Graphite India Ltd.)

The Library has a collection of over 6,000 books and subscribes to over 30 journals. It is part of the Research and Development Division. There is only one trained librarian and he can get some secretarial assistance from the R & D's common pool. R & D is not on the Company LAN. This is a typical one-person library.

In this regard, it is better to note a brief profile of one-person libraries to understand the context.

Profile of one-person libraries/librarians

<table>
<thead>
<tr>
<th>Collection</th>
<th>Books</th>
<th>1000 to 15,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodicals</td>
<td>20 to 75</td>
<td></td>
</tr>
<tr>
<td>Other Materials</td>
<td>occasional</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Services</th>
<th>Bibliographic Services/Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Referral</td>
</tr>
<tr>
<td></td>
<td>Telephone Enquiries</td>
</tr>
</tbody>
</table>

Users 5-150
Parent Bodies
- Colleges/Polytechnics
- Research Institutes
- Advertisement Agencies/Business Firms
- Manufacturing Firms (R & D)
- Cultural Organizations

Status of Librarian
- Middle Management Occasionally attend staff meetings

Features of Work

Positive Aspects
- Organising one’s own time
- Autonomy
- Can try out any useful new idea
- Recognition/appreciation for good work
  (Well, you don’t have any one else to blame!)
- Variety of work / all-rounder
- Knowledge about users
- Security of job

Negative Aspects
- Clerical, Administrative Routine
- Lack of status
- Limited time for planning
- No exposure to new professional literature
- Lack of continuing professional training
- Lack of time for social contact
- Problem for taking leave
- Low salary
Mixed Aspects

- Not in a position to delegate skilled work (Can't be a boss to anyone.)
- management support or lack of it
- knowing (or not knowing) what is going on in the organisation
- No growth
- poor physical working conditions

After knowing the characteristics of one-person libraries, the processes of the library must respond to the actual information needs of the end-users.

After choosing the institution for study, the next component of the sample is that of the end-users of the library. All the scientists and engineers inclusive of technicians were approached. In India, all the three units of Graphite Industries put together there are 142 such potential users of the Graphite India Ltd., Library services system. However, only 115 out of 142 contacted responded. (80.99% response)

5.3 Data Collection Tools

The data was collected with a carefully designed questionnaire. (See Appendix 3, p.181)

It was known at the outset that a mere questionnaire may not serve the purpose. Therefore,
care was taken to see that no question directly seeking the behaviour component was asked.

5.4 Method of Data Collection

The questionnaire was sent to the individual scientists and engineers spread over in the three Synthetic Graphite industries, along with a covering letter and a note explaining the broad objective of the study. After 20 days these responses were collected. A few individuals who were not at the Institute at that time and some who were busy were reminded and persuaded. However, within one and half month the responses were available. It took nearly two months to process these responses.

With these preliminary findings, the respondents were approached for the interview where their justifications for choice of shortcomings was discussed. Everyday not more than three persons were contacted.

The responses were analysed and the results are presented in the next chapter.