CHAPTER 3

RESEARCH DESIGN

Research in the field of Library and Information science is a methodical and systematic study of a subject with the aim to generate new information, verify the existing knowledge in that subject and reach a new understanding. The process of planning is a systematic study to seek probable answers to questions about libraries and information provider and retrieval systems. Research of any type commences with a problem, the answer to which the researcher seeks to find out with an array of techniques, methods, and theoretical perspectives. In other words, the research process begins with the selection of the research question, followed by the selection of an appropriate methodology (Saran, 1988). The sources a researcher taps will vary according to his interest, their accessibility and the type of study (Whyte 1991). The manner in which the investigation will be steered depends entirely on the actual unfolding of the research situation. What the research methodology literature contains is an account of the ‘most frequently encountered techniques’ of investigation (Pelto and Pelto 1978). To proceed with the study researcher has to design a research project. The formidable problem that follows the task of defining the research problem is the preparation of the design of the research project, called research design.

The term ‘design’ means ‘drawing an outline’ or planning or arranging details. It is a process of making decision before the situation arises in which the decision has to carried out. A research design is planning a strategy of constructing research. It is a detailed plan of how the goals of research will be achieved. According to Henry Manheim (1977), research design not only anticipates and specifies the seemingly countless decision connected with carrying out data collection, processing and analysis but it presents a logical basis for these decisions. William Zikmund (2000) has described research design as “a master plan specifying the methods and procedures for collecting and analyzing the needed information”. Martin Bulmer (1974) has said that “research design is the specification of the problem, conceptual definitions, derivation of hypotheses to test and defining the population to be studied.”
Russell Ackoff (1961) maintains that research design is “planning various phase and procedures relating to the formulation of research efforts”.

The word methodology is used to refer to the methods and general approach or technique/strategy employed to describe or to manipulate data and acquire knowledge. In a particular study, the methods chosen will be dependant upon a variety of considerations such as, the nature of the problem addressed, the theoretical stance, the time, and money available. These considerations operate as strong constraints on the choice of research methods. Debate on the quantitative and qualitative approaches has been fierce. Some researchers are committed to quantitative survey method and refuse to acknowledge the strengths and validity of other methods, while others whose preference is for qualitative methods refuse to countenance of quantitative techniques. As a part of research design, the researcher decides depending upon the research problem whether to gather new data rather than use available materials, take a larger sample rather than a few and the way in which the techniques and methods are to be administered and in what combinations.

3.1 Statement of the Problem and Scope of the Study

Before independence, the erstwhile combined state of Punjab had only one university, i.e., Panjab University, Lahore. After Independence and before reorganization of East Punjab, Panjab University had jurisdiction to present day states of Haryana, Punjab and Himachal Pradesh. Later on more universities were established as sister universities to cater to the increasing academic needs of the areas under their jurisdiction.

It is known that the Indian Library Association, IASLIC, and NISSAT jointly help academic libraries in the choice of software and hardware, and in manpower training. Their full impact on libraries and library resources will be known in the course of time. INFLIBNET, DELNET, and other metropolitan networks are providing training facilities for computer applications. Every year, INFLIBNET organizes a conference - CALIBER (Convention of Automation in Libraries) - to discuss issues related to the computerization of academic libraries. Review of literature reveals that automation and networking of libraries are still in their formative stages in India. From this background feedback, the present study envisages
that university libraries in this region are presently at the various stages of automation. It may be no exaggeration to say that it requires time to fully adopt new technologies and to adapt these keeping in view the local needs. Due to multiplicity of available technologies and their varied cost, libraries are adopting different ways to build their collections and to offer services to the end users depending upon their budgetary provisions. To effectively meet the demands of end users, university libraries need to identify and adopt good practices and benchmarks. An effort has been made to study the technologies used and the levels of automation achieved in various components of the libraries of this region. However, the emphasis has been on the following facets:

- Hardware
- Software
- Manpower
- Databases/Databases
- Digitization
- Exploitation of e-resources/e-journals

The study of above components was not being limited at macro level; rather an effort was made to analyze things at micro level. The results deduced will be beneficial to the libraries, which are yet to exploit the might of information technology. An effort was also made to work out various means of resource sharing amongst the libraries under reference. The final recommendations of this venture would help the planners and policy makers in strengthening the university library system in this part of the country.

3.2 Objectives of the Study

The study was designed and carried out with a view to achieve the following objectives.

(i) To study the levels of automation and digitization achieved by the libraries in the region
(ii) To study the specifications of servers used and details of operational workstations installed in these libraries

(iii) To evaluate the status, choices of the users towards various types of information resources and modes of information accessibility and potentialities of online journals in teaching and research on the basis of responses from user respondents

(iv) To explore the status and nature of resource sharing amongst the libraries under reference

(v) To know the viewpoints of library users about the services provided by the libraries and their views about their satisfaction levels

(vi) To explore the possibilities of further improvement in the existing components and tools of automation, digitization and various services provided by the university libraries from the feedback received from library professionals

(vii) To ascertain: whether there is any specified policy to remove hindrances in implementing library automation and digitization in a time-bound framework, the ICT infrastructure in place to enhance digitization of these libraries, the extent of funding to enhance digitization, the level of training of library staff in ICTs and user education/digital literacy programmes available to facilitate users’ access to resources and services provided by the university libraries.

3.3 Formulation of Hypotheses

A hypothesis is “a proposition, condition or principle which is assumed, perhaps without belief, in order to draw out its logical consequences and by this method to test its accord with facts which are known or may be determined” (Webster’s New International Dictionary of the English Language, Second Edition, unbridged, 1958). It is thus a proposition, generalization or justification which is put to test its validity. A hypothesis could be a tentative statement or a research question, an assumption or supposition that proposes a possible explanation to some phenomenon or event. A useful hypothesis is a testable statement which may include a prediction. A hypothesis should not be confused with a theory. Theories are general explanations
based on a large amount of data. To focus and guide the directions of the study, the following preliminary questions along with their explanations were framed as hypotheses for testing on the basis of primary data generated in this study:

(i) What is the status of automation and digitization? University libraries adopting automation and digitization of their services and functions are at various transitional stages due to existing dilemmas and administrative bottlenecks resulting of their being still followers of some traditional systems.

(ii) Are the services of the existing professional staff adequately utilized? Services of existing trained professionals are not being fully utilized towards automation and digitization.

(iii) What is the effect of inadequacy of the resources? Scarcity of resources results in resource sharing among libraries.

(iv) What is the real time professional response to provide quality information in a cost-effective way? Emergence of Library Consortia is an optimistic development for Resource sharing. Library consortia are a strategic professional response to develop policies and strategies to ensure massive real time access to quality information in a cost-effective manner to set-off the effects of increased cost of library resources, growing universe of users and documents.

(v) Are the acquired software modules fully exploited by the libraries? The potentialities of the available software modules are generally not fully exploited by library and information scientists.

(vi) Is there any clear policy for providing in-service training to the existing professional staff? Due to lack of clear policies and resources, universities do not encourage appropriate in-service-training in the field of automation and digitization to library professional staff.

(vii) Is there any effect of providing internet connect to the faculty in resulting decreased visits to the university library? A fewer faculty members may be found at any given time during the day in the university library making use of services provided than the other categories of users due to internet connections provided to the faculty members in their rooms or respective departments.
3.4 Methods of Data Collection

The task of data collection begins after a research problem has been defined and research design/plan has been made. In the collection of data, one has to be systematic. Any haphazardly collected data will be difficult to answer the research questions in a conclusive way. For the present study both primary and secondary sources were chosen. The primary sources are those which are chosen by researcher for the first time and are studied by the researcher on his or her own and information gathered from them is original in character. The secondary sources, on the other hand, are those which are collected from references sources like the i) public documents and official records, ii) private documents, iii) mass media, iv) physical, non-verbal materials; or it is also defined as a material which have already been collected by someone else and have passed through the statistical process.

The data for the present study was collected both from primary and secondary sources. Various data collection techniques followed in this study are:

- Case Studies
- Administering written questionnaires
- Available information from secondary sources

Case-studies

The case-study usually refers to a fairly intensive examination of a single unit such as a person, a small group of people, or a single company. Case-studies involve measuring what is there and how it got there. From this perspective, it is historical. It enables the researcher to explore, unravel and understand problems, issues and relationships. It cannot, however, allow the researcher to generalise, that is, to argue that from one case-study the results, findings or theory developed apply to other similar case-studies. The case-study approach is often done to make practical improvements. Contributions to general knowledge are incidental. The case-study enables rich information to be gathered from which potentially useful hypotheses can be generated. It can be a time-consuming process. It is also inefficient in researching situations which are already well structured and where the important variables have
been identified. They lack utility when attempting to reach rigorous conclusions or determining precise relationships between variables.

The case-study method has four steps:

1. Determine the present situation.
2. Gather background information about the past and key variables.
3. Test hypotheses. The background information collected will have been analyzed for possible hypotheses. In this step, specific evidence about each hypothesis can be gathered. This step aims to eliminate possibilities which conflict with the evidence collected and to gain confidence for the important hypotheses. The culmination of this step might be the development of an experimental design to test out more rigorously the hypotheses developed, or it might be to take action to remedy the problem.
4. Take remedial action. The aim is to check that the hypotheses tested actually work out in practice. Some action, correction or improvement is made and a re-check carried out on the situation to see what effect the change has brought about.

**Questionnaire**

A written questionnaire (also referred to as self-administered questionnaire) is a data collection tool in which written questions are presented that are to be answered by the respondents in written form. Questions should be written in a way that require as little effort as possible on the part of respondents in answering these and facilitate the investigator in organizing and recovering the information readily. The questions can be closed-ended (limited to choosing an answer from those listed on the form) or open-ended (given a blank line to write any response). If most questions are closed-ended, survey administration is easier, consumes lesser time and less costly, and tabulations can be done efficiently and consistently. The closed-ended questions have fixed, pre-established answer categories for selection by respondents, the quality of the information elicited depends on how well questions and response categories are crafted. Good questions are generally simple, clear, short, and unbiased. According to the American Statistical Association, “The style of the questionnaire must not get in the way of respondents’ providing their information; otherwise the results could be
incomplete or misleading data, item refusals, respondent fatigue effects—even the respondent’s refusal to complete the questionnaire.” (American Statistical Association 1999, p. 11)

In the present study, mostly closed-ended questions were put to library users, requiring answer in just yes or no, because open ended questions are best suited when administered to experts having good knowledge of technicalities. There were some open-ended questions as every respondent had their own particular response to that question and hence these can be useful to include some open-ended questions. Before delivering the questionnaires to the user respondents for filling, they were explained the terms and questions to enable them to interpret and process the questions. A written questionnaire can be administered in different ways, such as by: 1) Sending questionnaires by mail with clear instructions on how to answer the questions and asking for mailed responses; 2) Gathering all or part of the respondents in one place at one time, giving oral or written instructions, and letting the respondents fill out the questionnaires; or 3) Hand-delivering questionnaires to respondents and collecting them later. From the above, the second approach was used in this study.

**Pilot Survey and Pre-Testing**

In research, it is considered advisable to do some field observation and as such the researcher may undertake some sort of a preliminary survey or what is called pilot survey. Field pre-testing is a survey instrument that is tried on a small sample of persons from the area of study. Pilot surveys and pre-testing in the field are necessary for framing a questionnaire. A pilot survey was undertaken before a questionnaire was drafted and a pre-test was taken after it had been completed. It is the preliminary study of the universe in question to get an early idea about it. It may be taken without any hypothesis or with provisional hypothesis. It gives an idea of different variables involved, nature of problem, possible difficulties in administering questionnaire and kind of response likely to be available, etc. It is on the basis of this information that the actual questionnaire is formed. When the questionnaire had been prepared it was tested once again to find if any discrepancies had been left out. It is known as pre-testing. After the pilot survey, the researcher was able to find out the drawbacks of the questionnaire i.e. which questions were to be deleted and which were to be added or
modified. An idea about the extent of response or non-response was also formed. Necessary corrections and modifications were made keeping in view the objectives of the study. In order to check that whether the respondents understand the questions and the context, a pre-testing was done.

A pre-test is a trial test of a specific aspect of the study such as method of data collection or data collection tools i.e. schedule, mailed questionnaire or measurement scale. So pre-testing means trial administration of the instrument to a sample of respondents before finalizing it. It has several purposes like to test whether the instrument would elicit responses required to achieve the research objectives, the contents of the instrument are relevant and adequate, and the wording of question is clear and suited to the understanding of the respondents.

It also checks other qualitative aspects of the instrument like question structure and question sequence and also to develop appropriate procedure for administering the instrument with reference to field conditions. During the pre-testing some problems were observed. The response to open ended questions was poor. There were certain questions which respondents were not able to understand. So the language of these technical questions was changed in a way that even the respondents with no knowledge of technical terms may also comfortably respond with little help from the researcher and most of the directed questions were made close-ended requiring just yes or no answer. Even then, there were some open-ended questions as every respondent had their own particular response to that question. So the pilot survey turned out to be very useful for the researcher in field study because it enabled her to achieve the desired objectives set for the study to great extent.

3.5 Data Collection

Primary Sources

A structured questionnaire was used as the tool for the survey. Data for the present study was collected on seven university libraries in the Northwest Indian States. Deemed universities (educational institutions with high excellence which is deemed to be equal to a university), special university libraries like that of Engineering, Medical and Agricultural Universities were not included in the study.
because their libraries cannot be compared on a par with the regular university libraries. So the inclusive criteria were that it should be a general library and should have at least 30 years of existence. Though the library systems of universities include Central libraries and Department libraries, the present study is confined only to the central libraries of universities because significant progress has not been made in the automation of departmental libraries. Two sets of questionnaires were designed, one for users and the other for librarians to collect the data. The second questionnaire was sent to the Chief Librarian/Librarian-in-charge of the automation program of the library and the response rate was 100%.

The library users' questionnaire was administered to the users present on any working day when their library was personally visited. The users were explained the purpose of the study and those who readily agreed to participate in the study were chosen from different categories of users: faculty members, research scholars, postgraduate and undergraduate students. A total sample of 322 respondent users was chosen at random for this study from the users of seven university libraries. A very few faculty members were present in the library halls on any given day, consequently their number were small. Sampling is generally used in quantitative studies. Random selection of the sample enables you to confidently generalize results from a small sample to a larger population. However, sometimes it is desirable to purposively choose the respondents for a specific purpose. For example, in the university library, users may be undergraduate-, postgraduate-, research- students besides faculty members and one would have to choose them according to the requirements of the study. If the number of a particular category were small, all of them were included in the study. The power of purposive sampling lies in selecting information rich-cases for in-depth analysis related to the central issues being studied.

The primary data for the purpose of present study was collected from the seven university libraries; namely,

- Panjab University Chandigarh
- Punjabi University, Patiala
- Guru Nanak Dev University, Amritsar
- Kurukshetra University, Kurukshetra
Secondary Sources

Secondary data means data that are already available i.e. the data which have already been collected and analyzed by someone else or is collected from reference sources like the library, etc. The secondary data for the said study was obtained from the published books, journals of library and information science, periodicals, seminars and conference proceedings, annual reports of University Libraries, Information and Library Network (INFLIBNET) reports, official records of university libraries, reports of various committees and commissions, research papers, e-journals, internet and CD-ROM databases.

3.6 Analysis and Interpretation of Data

The data analysis is ordering of data into constituent parts in order to obtain answers to research questions. The data, after collection, have to be processed and analyzed in accordance with the research design laid down for the purpose of developing the research plans. This is essential for a scientific study and for ensuring that one has all relevant data for making contemplated comparisons and analysis. In the present study, data analysis was followed in following steps: after collecting the data, the processing of data analysis is started which includes editing of the errors, such as entry in the wrong place or any writing error was corrected. Once through with the editing part, the responses for each question was given a score value to facilitate statistical analysis. Tabulation is essential to represent a particular result of enquiry of investigation. The Statistical analysis of data serves several major purposes like it summarizes large mass of data into understandable and meaningful form, statistics brings exact descriptions possible. The different responses of the respondent users in different universities were compared by Chi-Square method.

The data was also presented in the form of bar diagrams, pie-charts etc. to depict data for better understanding. The instances of cases reinforced the inferences drawn from the quantitative data.
3.7 Outline of Chapters

The subject matter of the present study has been divided into eight chapters.

Chapter 1: Introduction, Development of Automation and Digitization in University Libraries

This chapter gives the outlines of the problem in terms automation and digitization and their necessity because of changed scenario due to innovations in the field of information technology. The basic concepts of automation, digitization and digital library, its need and application in university libraries have also been discussed.

Chapter 2: Review of Literature

Review of the literature pertaining to the topic of the research is given in this chapter.

Chapter 3: Research Design

A research design is planning a strategy of constructing research. Statement of the problem, scope of the study, objectives of the study, list of hypotheses for testing, an overview of the research design and data collection used for the present study are given in this chapter.

Chapter 4: University Libraries and Library Networks in India: An Overview

This chapter describes the concept, history and growth of higher education in India, traces the growth of University Libraries and role of UGC in their development, growth of library networks in India and role of consortium, etc.

Chapter 5: Automation and Digitization of University Libraries: a Comparative Study

In this chapter, general background of the seven universities chosen for the study and their libraries has been given. Later a comparative study of these libraries
has been made wherein general characteristics, automation, digitization collection, staff, budgets, users, software, information services, constraints faced by them in automation have been discussed.

Chapter 6: User Respondents Data Analysis and Interpretation

This chapter reports the results of the statistical analysis performed on the data gathered through questionnaire administered to the respondent users of the seven libraries chosen for the study.

Chapter 7: Validity of the Formulated Hypotheses, Findings and Suggestions

In this chapter, the findings of the study are given in brief along with the results on the validity of the formulated hypotheses. This chapter also offers suggestions on the basis of interactions with the librarians of these libraries and user respondents.

References and Appendices

APA style have been followed for writing references. Two appendices have been added at the end after giving references of the literature cited.

Appendix-I is a sample of the questionnaire used to collect data from the libraries of the universities under study.

Appendix - II is a sample of a questionnaire provided to the respondent users to collect the data pertaining to the library facilities and services available to them.