CHAPTER 3
METODOLOGY

3.1 Introduction

The rapid innovations and developments in the field of information and communication technology (ICT) have changed the work environment in the library all over the globe. These technological innovations and advanced approaches have transformed library services. New concepts such as hybrid library, digital library, virtual library, internet public library, paperless library etc have emerged over a period of time. The information resources are available in electronic form. The users can avail the benefit of retrieval and deliverance of documents as and when required on round the clock basis. The 21st century digital library is commonly defined as a well selected collection of units of documentary resources spread everywhere and accessible always to the mankind regardless of geographical boundaries and professional affinities. The library professionals are required to race against the time and rise to the occasion in order to provide need based and efficient services to the users in the virtual corporate libraries. This chapter enumerates the virtual corporate library research, hypotheses of the study, study variables, study area and selection of sample, research design, development of tools, primary data collection techniques, secondary data collection techniques, computation of data, statistical analysis, reliability and validity of data, limitations of the study and definitions of the terms used in the study.

3.2 ICT Centered Library Research

Basic research in library and information science creates knowledge that cuts across organizational information and communication situations in modern society. It is required to examine the underlying processes and construct theories that explain the virtual corporate library process, functions and effects. Introspective research also examines the field of library and information science systematically in very many ways. Applied research examines specific practical issues and that it is done to solve a specific problem. Strategic research tells modern organizations as to where they should be in the future and how to get there. Evaluation research is done to assess the effectiveness of library and information services and practices in virtual corporate libraries.
New communication technologies provide the benefit of access to individuals and groups such as authors, publishers, vendors and readers who are linked through hyperlink technology across the global electronic network. The ICTs are easily obtainable and available in their full version in view of satisfying multiple cultural exigencies. This revolution has led to the evolution of librarians’ roles all over the world. Virtual corporate library strategy is designed to not only interest modern information users but also to cultivate a positive reputation among users and other stakeholders within the corporate world. The ICTs have brought about revolutionary changes in the development of virtual corporate library which provides all round access to information resources and services.

The trend toward ICTs research is continuing across the world. Researchers have commonly agreed that scientific evaluation is an integral part of the management of ICTs in modern virtual corporate library environment. Systematic evaluation of the intervention of ICTs for the management of modern library enables the policy makers and professionals to adopt the tested and tried practices which benefit the service providers and users of information services in this age of competitive business management. Several studies have revealed that virtual corporate library services and practices should be perfected on the basis of meaningful basic and applied research techniques. Today, several methods such as historical study, survey research, observation, content analysis, experimental research, case study etc., are widely employed in the field of library and information science.

In the modern society different research methods such as surveys, personal interviews, participant observation, content analysis and focus groups are prominently used for the purpose of modern library research. Scientific evaluations are primarily made to improve the Information Communication Technology skills among the Library professionals and enable better customer relationship management in modern libraries. Formal and informal research methods are used to study the effectiveness of ICTs in modern library. The more formal methods of research provide objective and systematic information from representative samples. These methods include the familiar survey, tracking study, content analysis, secondary analysis of existing data and panel studies. Some more common informal methods used in library and information research are personal contacts, expert opinion, focus groups, community forums, call-in telephone lines, mail analysis and examination of media contents. The
major problem associated with these informal techniques lies in the selection of the respondents. The representativeness of the samples is often questionable.

The application of ICTs for modern library management is also scientifically investigated. Such studies are used to measure the library’s standing in the information and communication environment concerned. The consumers constitute the important segment of modern library research. The communication audits evaluate the internal and external means of communication used by the modern libraries. The social audit is a small scale environmental monitoring program designed to measure an organization’s social performance - i.e., how well it is living up to its public expectations, obligations and responsibilities. Evaluation research refers to the process of judging the effectiveness of programming, planning, implementation and impact. Modern library professionals are relying more on the techniques of social science in their evaluation efforts. In this age of competitiveness, modern libraries cannot achieve their goals without effective application of ICTs for the management of information resources and services. The manpower also requires proper training and orientation on the development of ICT skills. Hence, these modern libraries are relying upon library professionals to reach out to constituent publics, to enter into the good books of constituent publics, to enlist active participation of constituent publics in the process of organizational development and sustain organizational development by obtaining the patronage of constituent publics. The effectiveness of modern library is measured by the extent of Information Communication Technology skill development among the library professionals. Systematic research is the foundation of effective modern library management. Hence, modern library research assumes great significance in the present times since it provides scientific insight and inputs which would ultimately enrich the identity and facilitate the progress of modern libraries through effective ICT skill development and satisfaction of the growing needs and demands of modern customers.

ICT skills of the LIS professionals refers to:

- Subscriptions and access to online journals.
- Access and retrieval of web based information resources.
- CD-ROM browsing and search services.
- Access to digital libraries and online databases.
• Use of library automation software packages to discharge the library functions including OPAC.

• Web designing, creation and maintenance of library website and library blogs.

• Creation and maintenance of databases using RDBMS / Oracle software.

• Skills pertaining to hardware and networking.

• Knowledge and skills pertaining to operating systems, programming languages, library automation and other library application software.

3.3 Research Universe

Visveswaraya Technological University (VTU) is the largest engineering institutions in the country and it has four regional centers at Belagavi, Mysuru, Bengaluru and Kalburgi. It offers UG, PG and PhD program and has recognized 80 research centers across Karnataka State. The first category of the respondents primarily comprised of chief librarians of various engineering colleges of Karnataka State. Total 194 chief librarians of all the engineering colleges and about 550 LIS professionals from all the four regional centers of VTU have been covered under the study. In reality, there are more number of engineering colleges in the Bengaluru and Mysuru regions when compared to Belagavi and Gulbarga regions.

3.4. Design of study and tools employed

The major objective of the present study being understanding the status, problems and prospects of INFORMATION COMMUNICATION TECHNOLOGY SKILLS AMONG THE LIBRARY PROFESSIONALS OF ENGINEERING COLLEGES IN KARNATAKA.

The study is based on two aspects:

1. Survey of existing Information Technology infrastructure facilities available in the libraries of engineering colleges.

2. Survey of ICT skills among the LIS professionals including semi-professional staff.
In the first stage, a well structured questionnaire was designed to elucidate relevant data about the existing IT infrastructure available in the engineering college libraries that come under VTU in Karnataka. The researcher has personally visited the engineering college libraries under the study and observed the IT infrastructure facilities and services extended by the libraries to the users. The chief librarians of the engineering college libraries have responded about the IT infrastructure facilities and services available in their respective libraries.

In the second stage, the researcher adopted relevant tools and techniques to collect data from the LIS professionals and semi-professionals (Chief Librarians, Assistant Librarians and Library Assistants). An appropriate online survey tool (kwiksurreys) was designed and customized by adopting skill mapping techniques, to assess the ICT skills and competency levels of the professionals and semi-professionals LIS staff working in these libraries. This ‘competency mapping technique’ is, by and large in use, in industrial and management sectors to analyze the strengths and weaknesses of the employees to produce the most effective teams and the highest quality work. The online tool is a user friendly JAVA based application hosted by a US based web-server for two years, with a subscription fee. This online survey tool adopted by the researcher for data collection was latest and innovative in the field of Library and Information Science and has become a base for further scope of research.

This technique of data capturing method is in use in United Kingdom, Japan, China and Malaysia, the countries that enjoy advanced technologies. In India, corporate sectors have adopted such tools and techniques to evaluate the competency/performance levels of their employees, to suggest measures for continual improvements in their professional development.

The data thus obtained was systematically tabulated analyzed and interpreted to arrive at valid findings and conclusions. Appropriate statistical techniques are adopted to test the validity of the hypothesis. The relevant graphs and charts are also provided in order to make findings of the study clear and easy to understand.
KwikSurveys is a free to use online survey builder, which has been specifically designed so that it is quick and easy to use for people of all experience levels. Kwik Surveys was founded in 2008 it has rapidly expanded ever since to attract many international clients.

3.5. Other Methods of Study

Besides survey method, non-participant observation, informal discussions and secondary data analysis were also followed by the researcher. Several ideas which emerged during the course of discussion and consultation with the policy makers, library professionals, non-library professionals, academicians and researchers interested in the application of ICTs for modern library management were suitably incorporated into the research design. Therefore, research methods were designed on the basis of flexibility, appropriateness, feasibility, adaptability, empirical evidences and professional considerations.
### 3.6. Field of Study and Distribution of Sample

**Table showing the region-wise and year-wise number of engineering colleges in Karnataka**

<table>
<thead>
<tr>
<th>Sl. no.</th>
<th>Region</th>
<th>No. of college libraries in 2011-12</th>
<th>No of college libraries in 2012-13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Belagavi</td>
<td>28</td>
<td>NIL</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Kalburgi</td>
<td>17</td>
<td>NIL</td>
<td>17</td>
</tr>
<tr>
<td>3</td>
<td>Bengaluru</td>
<td>96</td>
<td>02</td>
<td>98</td>
</tr>
<tr>
<td>4</td>
<td>Mysuru</td>
<td>51</td>
<td>NIL</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>194</strong></td>
</tr>
</tbody>
</table>

**PART I - EXISTING IT INFRASTRUCTURE FACILITIES IN THE ENGINEERING COLLEGE LIBRARIES.**

**Table showing the no. of engineering college libraries of Karnataka covered under the study**

<table>
<thead>
<tr>
<th>Total no. of Engineering Colleges</th>
<th>Total no. of Chief Librarians responded</th>
<th>Percentage Of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>194</td>
<td><strong>133</strong></td>
<td>68.5%</td>
</tr>
</tbody>
</table>

A structured questionnaire was designed and distributed to the Chief Librarians of VTU engineering college libraries to assess the available IT infrastructure, under the scope of the study. Out of 194 engineering college library Chief Librarians, 133 (68.5%) responses were received related to the available IT infrastructure facilities in their libraries. Hence in all case the total number of respondents will be 133.
PART II – ASSESSING ICT SKILLS OF ENGINEERING COLLEGE LIBRARY PROFESSIONALS

Table showing the no of library professionals covered under the study

<table>
<thead>
<tr>
<th>Total no. of LIS Professionals (including Semi - professionals)</th>
<th>Total no. of LIS Professionals responded</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>446</td>
<td>81.1%</td>
</tr>
</tbody>
</table>

A customized online survey tool (kwiksveys) was designed and sent via email to measure the ICT skill levels with ratings, to the LIS professionals of VTU engineering college libraries. Out of 550 LIS professionals 446 (81.1%) of them responded with filled in questionnaires related to their ICT skill levels. Hence in all case the total number of respondents will be 446.

3.7. Variables Selected For the Study

Keeping the objectives and the hypotheses in view, the following variables were selected for the present study on the basis of review of literature and discussion with subject experts.

**Independent Variables**

i. Government engineering colleges  
ii. Aided engineering colleges  
iii. Private engineering colleges  
iv. Year of establishment of engineering colleges  
v. Gender of LIS professionals  
vi. Age of LIS professionals  
vii. Qualification of LIS professionals  
viii. Designation of LIS professionals  
ix. Experience of LIS professionals.

**Dependent Variables**

i. Availability of IT infrastructural facilities in the college libraries  
ii. Existence of Library Committees in the college libraries  
iii. Allocation of library budget  
iv. ICT based services extended in the college libraries
v. Automation of college library activities
vi. Familiarity/expertise of LIS professionals to ICTs
vii. Constraints in procuring the ICT based equipments
viii. Constraints in rendering ICT based library services
ix. Training and orientation for LIS professionals
x. Constraints of LIS professionals for attending trainings/workshops.

The core areas to decide the level of ICT skills were measured with definite parameters and ratings as indicated below:

<table>
<thead>
<tr>
<th>Sl.no</th>
<th>Core ICT areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic ICT concepts</td>
</tr>
<tr>
<td>2</td>
<td>Basics of hardware and networking</td>
</tr>
<tr>
<td>3</td>
<td>Internet browsing</td>
</tr>
<tr>
<td>4</td>
<td>Installation and operation of library automation and other software (OS/AS)</td>
</tr>
<tr>
<td>5</td>
<td>Subscription and access to online journals and databases</td>
</tr>
<tr>
<td>6</td>
<td>CD search services</td>
</tr>
<tr>
<td>7</td>
<td>Online Public Access Catalogue and Bar-coding</td>
</tr>
<tr>
<td>8</td>
<td>Creation of Websites, Web blogs and Web designing/Web 2.0</td>
</tr>
<tr>
<td>9</td>
<td>Digitization of documents / Institutional Repositories</td>
</tr>
<tr>
<td>10</td>
<td>Knowledge of subject databases and search strategies</td>
</tr>
<tr>
<td>11</td>
<td>Knowledge of IPR issues and trends</td>
</tr>
</tbody>
</table>

The Parameters (performance levels) were decided based on 01 to 10 scorings as scale.

<table>
<thead>
<tr>
<th></th>
<th>Excellent performance (E)</th>
<th>8-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Good performance (G)</td>
<td>6-7</td>
</tr>
<tr>
<td>3</td>
<td>Moderate performance (M)</td>
<td>4-5</td>
</tr>
<tr>
<td>4</td>
<td>Poor performance (P)</td>
<td>1-3</td>
</tr>
</tbody>
</table>

ISO certified companies have adopted the above parameters to determine the level of employee performance.
3.8 Procedure of Data Collection

The researcher personally visited all the engineering college libraries in order to obtain additional data and information through observation of available IT infrastructure/Gadgets and also informal discussions were held with the LIS professionals who directly dealt with application of ICTs for modern library management. Since an appropriate customized online survey (kwiksveys) tool was designed to collect the data of individual LIS professionals, the researcher had to put in continuous efforts to see to that the LIS professionals of even remotely located college libraries took the online survey. Technical constraints, lack of IT infrastructure, and lack of ICT skills were the barriers in getting the online responses as expected.

3.9. Validity of the Questionnaire

The validity of the questionnaire was ensured with the pilot test, which represented the variables in the study and reliability for reproducible measures. The questionnaire was restructured to reach out to wider target population. Some of the first part of the questionnaire (conventional) was administered and collected in person and some by post. The second part of the questionnaire (online tool) was administered and collected via email.

3.10 Pilot Study

Before administering the interview schedule to the final respondents of the study, a pre-test was conducted in Hyderabad Central University Library, Hyderabad and Osmania University Library, Secundrabad, State of Andhra Pradesh. The contents of the interview schedule were subjected to suitable changes and modifications in order to avoid ambiguity and inconvenience in the light of pre-test.

3.11 Computation of Data

The primary data gathered from the survey on the ICT infrastructural facilities and ICT skills among the LIS professionals of engineering college libraries in Karnataka State were consolidated and computed by using descriptive analysis which consisted of frequency counts and percentage distribution which revealed the relationship between the independent and dependent variables considered in the study.
3.12 Statistical Methods Applied

Descriptive statistics

The Descriptive procedure displays univariate summary statistics for several variables in a single table and calculates standardized values (z scores). Variables can be ordered by the size of their means (in ascending or descending order), alphabetically, or by the order in which the researcher specifies.

Frequencies and percentages

The Frequencies procedure provides statistics and graphical displays that are useful for describing many types of variables. For a first look at your data, the Frequencies procedure is a good place to start.

Contingency Coefficient analysis (Cross tabulation)

The Crosstabs procedure forms two-way and multi way tables and provides a variety of tests and measures of association for two-way tables. The structure of the table and whether categories are ordered determine what test or measure to use. Contingency coefficient analysis was employed in the present study. All the statistical methods were carried out through the SPSS for Windows (version 16.0)

3.13 Period of the Study

The study was conducted between 2009 to 2014. The actual data collection from the Institutions/ Chief Librarians (conventional questionnaire method) and the LIS professionals (online survey tool) in the sample area was collected between 2010 to 2013.

3.14 Scope and Limitations of the Study

The usual limitations of the survey method and case study, namely time, human inadequacies, resource constraints, recollection and communication were experienced by the researcher. It was practically not possible to contact all the Chief Librarians in person due to time constraint, unavailability and during the period of survey. Though online survey was sent via email to each LIS professional individually, due to technical constraints, some have not taken the survey.
The scope of the study encompasses the Information Communication Technology skills of Library professionals working in engineering colleges of Karnataka. However the study has following limitations.

i. The study is limited to Karnataka state only.

ii. The study includes only the engineering colleges (Government, Aided & Private) of Karnataka, which are affiliated under Vishweshwariah Technology University (VTU), Karnataka, approved by AICTE (excluding Mysuru Government Tool Room & Training Center).

iii. The study covers only LIS professionals and the Semi-Professionals but not any other category of staff of these engineering colleges.

iv. Finally, among various aspects of LIS professionals, the study is limited to ICT skills only.

3.15 Summary

The modern librarians are called upon to develop professional skills and competence in this age of competitive library management. The academic librarians of the new millennium must be more dynamic since the professional environment has shifted from print sources to electronic resources and services. The LIS professionals are also required to facilitate wider access to information for their clients through systematic application of ICTs in their day to day operations. They need constant training and orientation on all the components of the library automation, networking and digitization. Professional organizations and national bodies are indeed striving on the providing of needed ICT based training programs. It is up to the LIS professionals and the institutions to utilize the opportunities with self interest and enthusiasm. The present study examined the Information Communication Technology skills among the Library professionals of engineering colleges in Karnataka State on the basis of systematic survey research method. The primary data were gathered in two parts. First one to study the Information Technology infrastructure of the college libraries (133 institutions). The second from 446 respondents (LIS professionals) working at the VTU engineering college libraries in Karnataka State. Besides survey method, non-participant observation, informal discussion and secondary sources of information were also used as other methods to study the status, problems and prospects of Information Communication Technology skills among the Library professionals of engineering colleges in Karnataka State.