CHAPTER -5
RESEARCH METHODOLOGY
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5.1 Introduction

The present attempt is a fact-finding survey based study to assess the contribution of information technology towards Pune University affiliated college libraries. The jurisdiction of Pune University is spread over three districts of western Maharashtra namely Pune, Ahmednagar and Nashik. The entire study is based on scientific principles of research methodology as well as various assumptions of different theories validated from time to time. Proper care has been taken to bring clarity, completeness, unbiasedness, reliability, confidentiality, practicability and acceptability on the ground of common sense. The step wise research methodology technique with due justification has been taken during the course of study.

5.2 Study Area

The geographical area of the proposed study was jurisdiction of Pune University, three districts viz; Pune, Ahmednagar and Nashik. The district maps of Pune, Ahmednagar and Nashik districts are given in map 1 to 3. Out of 433 colleges (2005-06) 224 colleges were established up to the year 2000 and those were considered for the study. The district wise number of colleges selected were 121 from Pune, 50 from Ahmednagar and 53 from Nashik. The libraries of Arts, Commerce, Science, Engineering, Law, Education, Physical Education, Pharmacy and Architecture colleges were selected.
Map - 1 Colleges Affiliated To Pune University, Pune District
Map - 2 Colleges Affiliated To Pune University, Ahmednagar District
Map - 3 Colleges Affiliated To Pune University, Nashik District

LOCATION OF COLLEGES
5.3 Research Design

The present study has been initiated with well-defined structure and hierarchical plan covering the various steps of data collection, data presentation, statistical analysis techniques, results and discussion followed by findings, conclusions and suggestions.

The diagram depicting the detailed plan of research is given in figure 5.1
Figure 5.1 Diagram of Research Design

Research Design

Quantitative Method

Questionnaire

Librarian

Interview

Library

Observation

Internet

Literature search

Data Presentation and Analysis

Presentation Techniques

Classification

Tabulation

Graphical Presentation

Diagrammatic Presentation

Analysis Techniques

Percentage

Chi-square Test

Large sample Z-Test

Results and Discussion

Findings, Conclusions and Suggestions
5.4 Research Method

The researcher has made use of mainly survey method for the present study. The survey method of research was very useful and helpful in collecting the reliable and useful data. There are many surveys in different disciplines such as social, economic, political, agricultural, psychological, population and library and information science. The concepts of library survey according to different researchers were reported in literature. The most common and widely acceptable, thought-provoking description of library survey is given below.

According to Line (1967), “The library survey is interpreted as a systematic collection of data concerning libraries, their activities, operations, staff, use and users at a given time or moreover a given period”. Library survey is a systematic in-depth examination of libraries, library system or networks of libraries. Comparisons were made in these surveys among various libraries, or units thereof and established professional standards.

Busha and Harter (1980), described survey research as “Random samples from a large or small population to obtain empirical knowledge of a contemporary nature”. Thus complete enumeration is not necessary.

Sample is capable of extracting the information about the target population if it is truly representative of the population. When it is difficult for the investigator to interview the entire group sampling is necessary. Thus “Survey research technique can save time and money without sacrificing efficiency, accuracy and information adequacy in the research process.”
5.5 Data Collection

The expected information for the underline study includes the review of literatures, the information of various college libraries within the selected area. For the systematic, scientific and comprehensive study information was collected through primary and secondary sources. Primary data was collected through interview technique and observation of college libraries through personal visits. The secondary source of data collection includes journal articles, books, annual reports, souvenirs and internet.

5.5.1 Interview Technique

The researcher discussed with Librarians, library staff, Principals, faculties, students and other library users of the selected libraries for collection of supported valuable information related to the subject of the study.

5.5.2 Observation of College Libraries

The researcher personally visited some of the selected libraries to observe the library house-keeping operations, impact of information technology in library administration and library services.

5.5.3 Review of Literature

Literature was searched from various college libraries as well as Information and Library Network (INFLIBNET) Ahmedabad, National Social Science Documentation Centre (NASSDOC) New Delhi and Library and Information Science Abstract (LISA). Possible use of e-mail and internet was also made for literature survey.
5.5.4 Internet

Use of e-mail facilitated the necessary correspondence with many experts to seek the information from them. Browsing through various search engines also gave a list of various research articles explaining the application of information technology in library services. The advent of internet must be acknowledged for the research article from the journals rarely available.

5.5.5 Questionnaire

On the basis of literature survey and information received from various sources, the closed and structured questionnaire was designed considering the objectives of the study. The questionnaire consisting of thirty two broad questions, each classified further on an average four to five sub questions, was revised in the light of appropriate suggestions from various experts. Questionnaire was designed to cover the information on general status of library, library users, information sources, physical and IT infrastructure, budget, technology, technical processing and services, attitude of service provider and service users, internet, networking, impact of information technology and problems in application of IT.

The questionnaires were distributed among the college librarians of selected 224 college libraries. The distribution was made personally, by under post certificate/registered post with a request to fill and send the same. The follow-up was done through telephone and e-mail. The response received there after nearly in four months. Out of 224 college libraries, the 185 college libraries have actually responded to the survey. The response received was 83 per cent. In detail, 100 college libraries out of 121 college libraries of Pune district, 42 college libraries
out of 50 college libraries of Ahmednagar district and 43 college libraries out of 53 college libraries of Nashik district responded to the survey. Out of 146 college libraries of Arts, Commerce and Science the responded college libraries were 128. Out of 11 law college libraries 7 college libraries gave response. Among 15 education college libraries 11 college libraries co-operated by giving response. Out of 6 physical education college libraries only 2 gave the response. Among 12 Pharmacy college libraries 9 shown the affirmative attitude towards the study. There were 25 engineering college libraries out of which 21 gave response. Among the 9 Architecture college libraries 7 responded by filling the questionnaire.

The table 5.1 gives faculty and district wise colleges extending the response to the questionnaire.
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Type of colleges</th>
<th>No. of college libraries</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>P  A  N  Total</td>
<td>P  A  N  Total  Percent</td>
</tr>
<tr>
<td>1</td>
<td>Arts, Commerce and Science</td>
<td>73 34 39 146</td>
<td>64 30 34 128      87.67</td>
</tr>
<tr>
<td>2</td>
<td>Law</td>
<td>05 03 03 11</td>
<td>04 02 01 07       63.63</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td>08 04 03 15</td>
<td>06 03 02 11       73.33</td>
</tr>
<tr>
<td>4</td>
<td>Physical Education</td>
<td>03 02 01 06</td>
<td>01 01 - 02        33.33</td>
</tr>
<tr>
<td>5</td>
<td>Pharmacy</td>
<td>07 02 03 12</td>
<td>06 01 02 09       75.00</td>
</tr>
<tr>
<td>6</td>
<td>Engineering</td>
<td>18 04 03 25</td>
<td>14 04 03 21       84.00</td>
</tr>
<tr>
<td>7</td>
<td>Architecture</td>
<td>07 01 01 09</td>
<td>05 01 01 07       77.78</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>121 50 53 224</td>
<td>100 42 43 185     82.59</td>
</tr>
</tbody>
</table>

P- Pune, A-Ahmednagar, N-Nashik
5.6 Data Presentation

The collected information was quite voluminous and it was very necessary to summaries this information in a compact and comprehensive form. Therefore, information of quantitative nature was expressed with the help of classification and that of qualitative nature was presented in the form of table.

5.6.1 Classification

It is a simple and easy tool by which quantitative information was classified into various groups. Such a classified information is comprehensive and comparable. The classified information was very useful to depict the overall situation of the study undertaken. To decide the number of classes Strutge’s rule as a function of number of observation was used.

Strutge’s rule is

Number of classes = 1 + Log (N) x 3.322

where N- No. of observations

5.6.2 Tabulation and Graphical Presentation

It is an art as well as science of presenting the information in terms of rows and columns with suitable heading to each row and columns. The technique of tabulation was generally applied for qualitative or categorical information. Table also facilitates to express the huge and scattered information in neat, clean, compact, complete and comprehensive form. Tables were also used for comparative study and they provide much more information which is otherwise hidden. Number of qualitative characters use for expressing the information in table
defines the order of the table. During the entire data, tables presented were of different order one way, two way and three way.

Apart from figurative approach of data presentation graphical presentation is also very popular and widely used. Graphical presentation gives bird’s eye-view of the information. It is easy to understand even for a layman. It is attractive and comparable. Graphical presentation has memorising effect. Due to these qualities of graphical presentation major quantum of information in the present study was also expressed using various graphical techniques. Different graphical techniques used in the study were histogram, simple vertical and horizontal bar diagram, multiple bar diagram, subdivided bar diagram, percentage bar diagram, pie chart and X-Y plot.

5.7 Data Processing

For the analysis, the data was processed using MINITAB software. For graphical presentation Microsoft Excel was used.

5.8 Data Analysis

Analysis of the data was carried out in two levels. In the first level simple percentages were computed for the sake of comparison. In the second level two way cross tables were constructed and Chi-square test was applied to investigate the association between two categorical characteristics in appropriate cases. Various hypotheses were tested at 5% level of significance. The analysis of the data was carried out in four ways i.e. 1. Overall 2. Type of colleges viz; Arts, Commerce, Science, Engineering, Law, Education, Physical Education, Pharmacy and Architecture 3. Districts viz; Pune, Ahmednagar, Nashik and 4. Year of establishment viz; colleges established before 1980 and after 1980 were
carried out. Two way cross table includes type of colleges, district and year of establishment with other categorical information.

The chi-square test statistics was used to test the hypothesis of independence. The test statistic is:

$$\chi^2_{cal} = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{ij}-E_{ij})^2}{E_{ij}} \sim \chi^2 (r-1)(c-1)$$

Where, $\chi^2 =$ Chi square, $\sum =$ Sum over all classes, $O =$ Observed frequencies $E =$ Expected frequencies.

Table value of chi-square distribution at 5 % level of significance for $(r-1)x(c-1)$ degree of freedom was obtained and the decision was taken using following rule:

Decision Rules

1. If $\chi^2_{cal} < \chi^2_{tab}$ accept the hypothesis of independence.
2. If $\chi^2_{cal} > \chi^2_{tab}$ reject the hypothesis of independence.