4.1. Introduction

The importance of library and information center in academic institutions needs no explanation. It is the center for selection, organization and dissemination of information in order to cater to the varying information requirements of the user community. It is known that traditional methods of management of libraries will not be able to tackle the impact of modern trends like advent of the World Wide Web, advances in telecommunication networks, unprecedented proliferation and exponential growth of information and literature. A pragmatic solution to address the above issues is to go for resource sharing through library consortia. The purpose of the present study was to assess the status of engineering college libraries in Kerala in terms of availability of resources, their financial conditions, automation and application of information technology, provision of electronic resources etc. The study also aimed to develop a library consortium for engineering colleges in Kerala.

This chapter includes objectives of the study, hypotheses formulated, scope and limitations of the study, data collection methods, selection of sample and data collection, and methods of data analysis and its presentation.

4.2. Objectives of the study

The aim of the study was development of a library consortium for engineering colleges in Kerala. The following specific objectives are identified to achieve the above aim.
1. To assess the information resources and services available in the Engineering College Libraries in Kerala
2. To analyse the technical organization of the collection of the libraries of Engineering Colleges in Kerala
3. To ascertain the manpower and professional expertise available in the libraries of Engineering Colleges in Kerala
4. To evaluate the fiscal condition of the Engineering College libraries in Kerala
5. To assess the demands of the user community for the provision of additional services in the libraries of Engineering Colleges in Kerala
6. To examine the current status of the automation in the libraries of Engineering Colleges in Kerala
7. To evaluate the status of application of Information Technology in the libraries of Engineering Colleges in Kerala
8. To ascertain whether the users prefer electronic resources and to what extent they are familiar with electronic resources pertaining to Engineering and Technology
9. To suggest a workable model of a Consortium for interlinking the libraries of Engineering Colleges in Kerala
10. To suggest measures for betterment of existing information resources and services and to enhance the resource base of the libraries of Engineering Colleges in Kerala through the formation of a Consortium

4.3. Hypotheses

The following hypotheses are formulated for the present study.

1. The information resources and services of Engineering College Libraries in Kerala are below the expected level
2. The technical organization of the collection of the libraries of Engineering Colleges in Kerala is not satisfactory
3. The libraries of Engineering Colleges in Kerala are under-staffed and facing the problem of lack of professional expertise
4. The fiscal condition of the libraries of Engineering Colleges in Kerala is inadequate to meet the requirements of users
5. Users are not satisfied with the present library and information services and they are demanding for new services
6. The current status of automation and application of Information Technology in the libraries of Engineering Colleges in Kerala are not satisfactory
7. The libraries of Engineering Colleges in Kerala do not provide electronic information resources and services adequately
8. The libraries of Engineering Colleges in Kerala do not participate in any of the library consortia initiatives
9. The Academic community and the librarians of Engineering Colleges in Kerala are in favour of the formation of a library consortium for Engineering Colleges in Kerala for resource sharing and collaboration

4.4. Scope and Limitations of the Study

The proposed study is aimed at the development of a library consortium for engineering colleges in Kerala. It also examines the current status of the automation and application of information technology in the libraries under study. Out of the 76 engineering colleges in Kerala, 14 colleges were selected for the present study. A thorough and in-depth study of the libraries of these engineering colleges of the state was conducted. These colleges can be divided into three categories; (1) Government Colleges, (2) Government Aided Colleges and (3) Self-financing Colleges. All these colleges, except one (University College of Engineering, Thodupuzha), were selected by the Government of Kerala for
granting academic autonomy and it was a clear indication that all these colleges possess basic infrastructure and other facilities like qualified staff etc. In order to participate in the consortium and to share their resources the participating libraries must have some basic infrastructure like internet connectivity, automated library services etc. It was keeping this point in mind the 14 colleges were identified for conducting the study. The list of selected colleges is given as Appendix II. The study proposes a framework for a library consortium for engineering colleges in Kerala and this framework does not incorporate a detailed cost based technical brief and implementation of the consortium.

4.5. Data Collection Methods

In order to meet the specific objectives of the study, the investigator has employed the following methods of data collection; (1) Survey Method, (2) Semi-structured interviews and (3) Observation.

4.5.1. Survey Method – Questionnaire

Under this method, structured questionnaires were designed and administered to chief librarians and users of the libraries under study. The purpose of the questionnaires addressed to chief librarians/library in charges was to collect data regarding institutional details, library collection, technical organization, library automation and networking, library services, library personnel and physical facilities. The questionnaire consists of seven sections.

Section A is meant for collecting general information regarding the institution and library. There are eleven questions in this section such as name and address of the institution, courses offered, name, designation and qualification of the librarian and annual budget. Section B consists of four questions intended to collect details regarding library collection in terms of books, journals, CD ROMs and other print and non-print materials. Section C
dealt with technical organization of the library and explores the standards used for technical processing of the collection. Section D is meant for collecting details of library automation and networking. This section consists of twenty two questions such as details of campus intranet, details of network used, website details, system administration, internet connectivity, detail of bandwidth and service providers, details of library automation software, hardware details, digital library details, library consortia initiatives, electronic resources subscribed, future plans etc. Section E is intended to collect information regarding library services and this section consists of twelve questions; working hours of the library, privileges given to members, charging system followed, specific services offered, electronic resources available, OPAC facility etc. Section F is meant for seeking data regarding the number and qualification of library personnel and last section G is intended to collect data regarding physical facilities of the library. It consists of four questions aimed at collecting details of equipment available in the library. Specimen of the questionnaire is provided as Appendix III.

The questionnaire addressed to the users were to collect information regarding the adequacy of library collection, helpfulness of library staff, range of services offered, familiarity with electronic information sources, attitude towards consortia formation and users comments on the formation of a consortium of engineering college libraries in Kerala. This questionnaire has four sections. Section A is meant for collecting general information about the user. It consists of six questions like name of the user, designation/class, department, name of institution, qualification and duration of library membership. Section B consists of three questions to ascertain the adequacy of library collection in terms of books and journals and preference of electronic resources. Section C is intended to assess the performance of library staff and this section consists of four questions. Section D is meant to collect details regarding the services of the
library and this section has fifteen questions. First three questions seek the satisfaction of users regarding the loan period of books and their availability; next two questions collect information on the availability of internet services and purpose of using internet. Next two questions are to seek the opinion of users about internet based resources and services of the library. Tenth question explores the provision of a range of services from a given list. Next question provides space for mentioning new services sought. Thirteenth question gives a list of electronic information resources and asks the user about the awareness of these resources. Last three questions are meant for collecting details like awareness of users about consortia initiatives of the country, whether they support the formation of a library consortium and provide space for user’s comments/suggestions for the formation of a library consortium for engineering colleges in Kerala. Specimen of the questionnaire is given as Appendix IV.

4.5.2. Interviews

The purpose of interview with chief librarians was to supplement the data collected through the questionnaires. The interview schedule has two parts. First part is meant to collect general information like name of the librarian, designation, name of the institution and years of experience. Second part contains ten questions and collects information to substantiate the details collected through the questionnaire. Interview gives opportunity for the chief librarians to share their experience and to provide personal advice/comments/suggestions regarding the formation of a library consortium for engineering colleges in Kerala. A specimen of interview schedule is given as Appendix V.

4.5.3. Observation of the Libraries

The investigator has personally visited all the libraries selected for the study in order to observe the status of automation, availability of professional
staff, standardization followed in the organization of the library collection, provision of electronic resources and services etc. Information collected through observation was utilized to supplement the data collected through questionnaires and interviews.

4.6. Selection of Sample and Data Collection

In order to sharpen and fine tune the questionnaires some sample questionnaires were distributed among the selected users as a pilot study. Based on this pilot study the questionnaires were finalized. The first questionnaire discussed above was administered to the chief librarians/in charge of libraries at 14 colleges selected for study and all questionnaires were collected back. Questionnaires for users were administered among the users of 14 colleges covering all categories of users. A total of 1800 questionnaires were distributed among different categories of users and 1441 filled in questionnaires were received back achieving a response rate of 80 per cent. The details of population and sample are given in Table 4.1.

Table 4.1
Details of User Population and Sample of Engineering College Libraries

<table>
<thead>
<tr>
<th>Category of Organization</th>
<th>Number of Colleges</th>
<th>Population</th>
<th>Sample</th>
<th>Percentage of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. Colleges</td>
<td>4</td>
<td>6800</td>
<td>500</td>
<td>34 %</td>
</tr>
<tr>
<td>Govt. Aided Colleges</td>
<td>3</td>
<td>5600</td>
<td>500</td>
<td>28 %</td>
</tr>
<tr>
<td>Self-financing Colleges</td>
<td>7</td>
<td>7500</td>
<td>800</td>
<td>38 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>19,900</strong></td>
<td><strong>1800</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>
The above table shows that out of the total population of 19,900 users, 6800 users (34 per cent) were from Government Colleges, 5600 users (28 per cent) from Government Aided Colleges, and 7500 users (38 per cent) were from Self-financing Colleges. A schematic representation of size of population and sample is given in figure 4.1.

![Diagram](image-url)

**Figure 4.1. Size of Population and Sample of Engineering College Libraries**
The figure shows that 9 colleges constitute the population of Government Colleges and out of these 9 colleges, 4 colleges were selected as the sample. Under the category of Government Aided Colleges there are 3 colleges and all these 3 colleges were selected as the sample. Self-financing College category consists of 64 colleges and 7 colleges were identified from this category. Majority of the self-financing colleges are in their infancy stage and it is too early to assess their libraries. From the above three categories, 14 colleges were selected altogether. All these colleges, except one (University College of Engineering, Thodupuzha), were selected by the Government of Kerala for granting academic autonomy and it was a clear indication that all these colleges possess basic infrastructure and other facilities.

4.7. Methods of Data Analysis

The collected data were processed by using MS Excel and SPSS Software. Quantitative study and percentage analysis along with Chi-square test, Cluster Analysis and ANOVA wherever necessary, were employed to analyze the obtained data. The analysis was presented and interpreted by using Tables, Charts and Figures.

4.7.1. Chi-Square Test

The Chi-square test is used for testing the association between two attributes wherever necessary. Chi-square test of independence is used in this study. Chi-Square is a measure of actual divergence of the observed and expected frequencies (or values). If there is no difference between actual and observed frequencies, the value of the Chi-Square is zero. The greater the discrepancy between observed and expected frequencies, the greater is the value of $\chi^2$. If the calculated value of chi-square is less than the table value, it indicates that the difference between actual and observed frequencies may have arisen due to chance of fluctuations and can be ignored. The quantity $\chi^2$ is defined as
$\chi^2 = \sum \frac{(O-E)^2}{E}$

Where O refers to the observed frequencies and E refers to the expected frequencies. Steps to determine the value of $\chi^2$ are:

I. Calculate the expected frequencies
II. Take the difference between observed and expected frequencies and obtain the square of these differences i.e, obtain the value of $(O-E)^2$.
III. Divide the quantity $(O-E)^2$ obtained in step (ii) by the expected frequency and obtain the sum over all cells $\sum \frac{(O-E)^2}{E}$.

This gives the value of $\chi^2$ and is compared with the table value of $\chi^2$ for given degree of freedom at a certain specified level of significance. If the calculated value of $\chi^2$ is more than table value of $\chi^2$ the difference between theory and observation is considered to be significant, i.e, it could not have arisen due to fluctuations of simple sampling. If, on the other hand, the calculated value of $\chi^2$ is less than the table value, the difference between theory and observation is not considered as significant. i.e., it is regarded as due to fluctuations of simple sampling and hence ignored.

4.7.2. Cluster Analysis

The cluster analysis is one of the methods of grouping large sums of data. It is a classificatory procedure. The objective is to group either the data units or the variables into clusters so that the elements within a cluster have a high degree of ‘natural association’ among themselves, while the clusters are ‘relatively distinct’ from one another. According to Aldemderfer and Blashfied a clustering method is a multivariable statistical procedure that starts with data set
containing information about a sample of entities and attempts to reorganize these entities into relatively homogenous groups.³

The first phase of any clustering technique is to work out the relationships among the \( n \) samples expressed in terms of some distance measure obtained between every pair of samples. The distance measure used may depend on the scale of measurement. Usually Euclidean distance or correlation coefficients are used with interval scale. Association coefficients are used with nominal scale. The method then consists of a way of sorting the samples that determines clusters for a series of increased distance thresholds. This analysis using weighted arithmetic average method, groups the variable or observations into pairs of clusters. If correlation coefficient is the basis for combining such pair, then the pairs having high correlation are clustered. If, on the other hand, distance coefficient is the basis, then the pairs having small differences (distances) are combined in clusters.

The cluster is done on the basis of such similarity as may be indicated by the small distance coefficients or high correlation coefficients. The coefficients are used in the construction of tree diagram or dendrogram or linkage tree. This diagram is based to reduce hierarchy. Basically the variables or cases are clustered on the basis of correlation coefficient or like measures of association or Euclidean distance. Though there are various similarity measures available, Euclidean distance is generally preferred for cluster analysis.

4.7.3. Analysis of Variance (ANOVA)

ANOVA is concerned with the analysis of variance. In a between-groups ANOVA, the focus of interest is on the variance between the groups. However, this between-groups variance can only be understood in the context of the variance that occurs within each group⁴. In the analysis, a two-way Analysis
of variance (ANOVA) was done for comparing the budget amount allotted to each type of institution and also between year with type of institution and year as two factors. Transformation of data would be done if it is found necessary for normalizing.

4.8. Conclusion

Having discussed the objectives and hypotheses of the study, scope and limitations of the study, sources of data, population and sample of the study, and techniques used for data analysis here, the next chapter contains analysis and interpretations of data by employing statistical techniques discussed above.
References


