# RESOURCE SHARING AMONG ENGINEERING COLLEGE LIBRARIES AFFILIATED TO MAHATMA GANDHI UNIVERSITY, KERALA: A PROPOSED MODEL

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# *Resource Sharing Among Engineering College Libraries Affiliated To Mahatma Gandhi University, Kerala: A Proposed Model*

## PhD Thesis


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# Certificate

*Certified that the work presented in this thesis entitled "**Resource Sharing Among Engineering College Libraries Affiliated To Mahatma Gandhi University, Kerala: A Proposed Model"** is based on the bonafide research work done by Archana S.N. under my guidance and supervision at the Department of Computer Applications, Cochin University of Science and Technology, Kochi – 682 022 and has not been included in any other work for the award of any degree. All the relevant corrections and modifications suggested by the audience during the Pre-synopsis seminar and recommended by the Doctoral Committee of the candidate have been incorporated in the thesis.*

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# Declaration

*I hereby declare that the thesis entitled "**Resource Sharing Among Engineering College Libraries Affiliated To Mahatma Gandhi University, Kerala: A Proposed Model"** is the authentic record of the original research done by me under the guidance and supervision of Dr. Humayoon Kabir S. at the Department of Computer Applications, Cochin University of Science and Technology, Kochi – 682 022 and that no part thereof has been included in any other work for the award of any degree.*

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## ABSTRACT

There are around 150 engineering colleges (ECs) in Kerala under the government, aided and self financing (S.F.) sectors. While the college libraries in the government and aided sectors receive several grants, the libraries of S.F. colleges are solely run by their own funds. The rising costs of scholarly publications and strict AICTE stipulations regarding libraries and their collection, pose great difficulties to the libraries in all sectors in finding adequate budgets to provide quality services. Library cooperation/resource sharing helps to overcome this problem to a considerable extent.

The present study analysed the facilities and services of the ECs affiliated to M.G.University, Kerala to identify whether there is a need for resource sharing (RS) among these libraries. The satisfaction of the users with their library resources and services were also ascertained. The study put forward a model for RS and the opinion of the librarians and users regarding the same were collected. Structured questionnaires were used to collect the required data.

The study revealed that a wide gap exist between the libraries with respect to their facilities and services and many of the S.F. libraries have better infrastructure when compared to the government and aided college libraries. Majority of the respondents opined that RS is necessary to satisfy their information needs. The model of RS proposed by the study was widely accepted by the librarians and users. Based on the opinions and suggestions of the respondents, the study developed the potential model for resource sharing- the Virtual Resource Sharing Centre (VRSC).

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# ABBREVIATIONS

| | |
|---|---|
| AICTE | All India Council for Technical Education |
| DDS | Document Delivery Service |
| DELNET | Developing Library Network |
| DL | Digital Library |
| EC | Engineering College |
| E-DB | Electronic Database |
| E-JL | Electronic Journal |
| ETD | Electronic Thesis and Dissertation |
| FAC | Faculty |
| GOVT. | Government |
| ICT | Information Communication Technology |
| ILL | Inter Library Loan |
| ILMS | Integrated Library Management System |
| INDEST | Indian National Digital Library in Engineering Science and Technology |
| INFLIBNET | Information and Library Network |
| IR | Institutional Repository |
| M.G.University | Mahatma Gandhi University |
| NPTEL | National Programme on Technology Enhanced Learning |
| OPAC | Online Public Access Catalog |
| OSS | Open Source Software |
| PG | Post Graduate |
| RS | Resource Sharing |
| SF | Self Financing |
| UC | Union Catalog |
| UG | Under Graduate |
| VL | Virtual Library |
| VRSC | Virtual Resource Sharing Centre |

# Chapter 1

# INTRODUCTION

## 1.0 Introduction

Academic libraries are centres of knowledge resources that support the teaching and learning process. A well equipped library system is fundamental to an efficient academic environment. Advances in computers and communication technologies made a remarkable impact on the information generation and dissemination process. Knowledge acquisition and management particularly in academic libraries have largely been revolutionalised by these advancements. But present day academic libraries especially those attached to science and technology institutions face a lot of problems towards effective collection building to satisfy their user needs. The escalating costs of publications, exponential growth of information, varieties of forms and formats of publications and diverse user needs are the main reasons behind this. Libraries all over the time have faced this challenge and cooperation proved to be the most effective solution to this problem.

Library Cooperation/Resource sharing (RS) among libraries can be traced back to 200 B.C., when materials from the great Alexandria library were borrowed by the library of Pergamum. Libraries over the centuries practiced RS in the form of *inter library loan* either formally or informally. Planned library cooperation started in Germany around the year 1770 when G.H.Lessing, librarian in Wolfenbuttel formulated a plan for the exchange of duplicate materials between libraries (Dhiman and Rani, 2007). Technological advancements made a considerable impact on the concept and practice of RS.

The system of library cooperation as we see today began in the second half of the twentieth century with the establishment of Online Computer Library Centre (OCLC), USA in 1967. The interest in RS rose among the libraries around the world in the next decades. Library cooperation in the 20th century was mainly concentrated on the compilation of union catalogs of holdings of participating libraries. With the infusion of information technology into libraries, the mode of cooperation took a new pace. In the 21st century, library cooperation took a diversified impetus in the form of cooperative content acquisition, catalog sharing, continuing education, cooperative digitization and storage, etc. The advances in internet technologies, the new forms and formats of digital documents and new modes of scholarly communication make a great impact on the RS activities of libraries round the globe. Resource sharing, which used to be a side business in the librarianship trade, is now becoming the flagship operation in the library projects (Jaswal, 2005).

## 1.1 Resource Sharing

Resource sharing is concerned with the sharing of library resources by certain participating libraries among themselves on the basis of the principle of cooperation. The term 'resource' represents three entities in a library viz; 'man, material and money'. By means of RS the library resources and functions are shared in common by a group of libraries. RS facilitates the provision of access to more resources and services and the optimum utilization of budgets. Library resource sharing, library cooperation, library network and library consortium are the various terms used interchangeably to represent the same activity.

### 1.1.1 Forms of RS

The different conventional forms of RS being practiced world wide are:

- Inter-Library Loan
- Cooperative Acquisition
- Cooperative Processing
- Cooperative Storage
- Union Catalogs
- Union Lists
- Document Delivery Service
- Exchange of Personnel and Training

The advent of electronic resources radically changed the modes of RS. Shared acquisition of electronic content and electronic document delivery have now become the most common form of RS in the world.

### 1.1.2 Library Consortium

The term consortium refers to a group of organizations which come together to fulfill a common objective. This requires cooperation and sharing of resources. Library consortium is an association of a group of libraries for delivering better facilities and services by means of cooperation. Library consortia are usually constituted by a group of libraries, preferably with some homogeneous characteristics like same subject field, institutional affiliation, affiliation to funding authorities, etc. The primary objective of such an effort is providing expanded access to information resources and services to their user communities with due adherence to copyright compliances. Other major objectives of library consortium are as follows:

- To support RS by means of cooperative acquisition of print and electronic resources

- Enhance Inter Library Loan (ILL) and Document Delivery Service (DDS).
- Rational utilization of funds
- Reduce the subscription costs and maximize the utilization of resources
- Enhance the technical skills of library professionals

**1.1.2a Consortia Models**

Various models of consortia are being adopted by libraries as discussed below.

- ❖ Open Consortia
- ❖ Closed Group Consortia
- ❖ Centrally Funded Consortia
- ❖ Shared Budget Consortia
- ❖ National Consortia
- ❖ Regional Consortia

The successful operation of any RS activity or consortia largely depends upon the policies, plan of action and willingness to share the resources.

## 1.2 Engineering Colleges in Kerala

The first Engineering College (EC) in Kerala, College of Engineering Trivandrum (CET) was established in 1936 by Sree Chithira Thirunal Balarama Varma, the then Maharaj of Travancore (College of Engineering Trivandrum, 2013). Until 2000, the engineering education in the state was mainly public funded. The increased demand for technically qualified professionals by the industrial sectors along with the introduction of economic liberalization and privatization policies by the governments, resulted in the establishment of self financing ECs in Kerala. This in turn changed the technical education

scenario of the state. At present there are 150 ECs in the state. Out of these 150 colleges, one is the NIT, Calicut and all the other 149 colleges are run by different groups as mentioned below:

- Colleges run directly by the government of Kerala
- Colleges run by different managements and aided by the state government
- Colleges run by Kerala Agricultural University
- Self Financing colleges run by state-owned autonomous bodies such as Institute of Human Resources Development (IHRD), Co-operative Academy of Professional Education (CAPE), and Lal Bahadur Shastri Centre for Science & Technology (LBS)
- Self Financing colleges run by different universities in Kerala such as University of Kerala, Mahatma Gandhi University, Cochin University of Science and Technology and University of Calicut
- Self Financing college run by the Centre for Continuing Education (CCE), Kerala
- Self Financing colleges run by different private managements.

All these colleges are affiliated to the six different universities in Kerala. The Mahatma Gandhi (M.G.) University gives affiliation to 41 ECs (until 2012) under the government, aided and self financing sectors that are located at Kottayam, Ernakulam, Pathanamthitta and Idukki districts. The university offers BTech degree in 8 branches of engineering and MTech degree in 6 branches (M.G.University, 2013).

### 1.2.1 Engineering College Libraries in Kerala

A well equipped library is mandatory for the establishment of a college in India. The EC libraries in Kerala are established and maintained according to the norms put forth by the All India Council for Technical Education (AICTE). All the libraries are supposed to have adequate collection, facilities and qualified manpower for handling the information needs of the academics. These libraries are having a great responsibility of collecting, organizing and disseminating the information related to engineering, produced in various forms and formats for the academic needs of its clientele. The advent of electronic resources made the scenario more complex. It has become necessary for the libraries to properly collect and manage the electronic resources produced both within and outside the institutions. A huge investment in terms of money, technically capable human resource and infrastructure facilities are required for this. In such a situation it has become difficult for most of the EC libraries in Kerala for being self sufficient.

## 1.3 Significance of the Study

Resource sharing is a much talked about and less acted upon area (Sridhar, 2002). The last decade witnessed the rise and success of several academic library consortia in India mainly at national level. The INDEST-AICTE and the UGC-INFONET consortia drastically changed the availability and accessibility of electronic resources in the higher education institutions in the country. But the benefits of these consortia could be reaped only by centrally funded institutions and selected universities. On the other end, the colleges under all sectors, especially the engineering and technology institutions are denied of the benefits of such efforts. The need of the hour is to form effective regional consortia

to ensure feasible RS activities. Along with this the possibilities and benefits of electronic resources and their sharing are also to be explored. Studying the status quo of the resources of all the colleges under a particular university helps to formulate policies to build up a regional consortium at university level.

## 1.4 Problem Statement and Title of the Study

Around 90 percent (%) of the ECs in Kerala are under the self financing (S.F.) sector and a previous study (Azeez, 2007) conducted in this area revealed that the library facilities of self financing ECs are not satisfactory. While the college libraries in the government and aided sectors receive several grants, the libraries of S.F. colleges are solely run by their own funds. The escalating costs of scholarly publications and strict AICTE stipulations regarding libraries and their collection, pose greater difficulties to the libraries in all sectors in finding budgets to provide quality services.

In this juncture the present study aims to identify whether the libraries of S.F. colleges actually lag behind the other two types of libraries, whether the resources in the libraries are adequate to satisfy their users, and to ascertain whether there is a need for proper resource sharing among the colleges. To make a clear examination of the aforesaid issues, the title of the study is stated as:

"**Resource Sharing Among Engineering College Libraries Affiliated To Mahatma Gandhi University, Kerala: A Proposed Model"**

## 1.5 Definition of Key Terms

### Resource Sharing

According to Encyclopedia of Library and Information Science, the term "resource" applies to any thing, person, or action to which one turns for aid in time of need. The word "sharing" connotes apportioning, allotting, or contributing something that is owned, to benefit others. "Resource Sharing" in its most positive aspects entails reciprocity, implying a partnership in which each member has something useful to contribute to others and which each is willing and able to make available when needed (Kent, Lancour and Daily, 1978).

Ali (2006) defines Resource Sharing as "the activities that result from an agreement, formal or informal, among a group of libraries (usually a consortium or network) to share collections, data, facilities, personnel, etc., for the benefit of their users and to reduce the expense of collection development".

### Engineering College

The New Encyclopaedia Britannica (2010) defines College as "an institution that offers post-secondary education."

Engineering College in this study refers to "an institution that offers teaching and professional practice for becoming an engineer and that offers advanced education in engineering."

### Library

The New Standard Encyclopedia (1987) defines library as an "organized collection of books and other materials used for study, research and recreation; also, the room or building that houses such a collection. The word is from the Latin *liber* (book)".

According to The New Encyclopaedia Britannica (2010), "library is a collection of books used for reading or study, or the building or room in which such a collection is kept."

**Affiliated College**

According to Wikipedia(2014), "an affiliated school or affiliated college is an educational institution that operates independently, but also has a formal collaborative agreement with another, usually larger institution that may have some level of control or influence over its academic policies, standards or programs."

**Mahatma Gandhi University**

"Mahatma Gandhi University, Kottayam is one of the affiliating universities in Kerala state established on 2nd October 1983 and has a jurisdiction over the revenue districts of Kottayam, Ernakulam, Idukki and parts of Pathanamthitta and Alappuzha." (Government of Kerala, 1985)

**Kerala**

"Constituent state of India, located on the Malabar Coast on the southwestern side of the Indian peninsula. It is bounded by the Indian state of Karnataka to the north, the state of Tamil Nadu to the east, and the Arabian sea to the west."(The New Encyclopaedia Britannica, 2010)

**Propose**

"Put forward (a plan or suggestion) for consideration by others." (Oxford Dictionaries, 2014)

**Model**

Model in this study refers to "a schematic description of a system that can be used for implementation or for further study".

## 1.6 Research Questions

The present study addresses the following research questions:

- What is the current status of the resources and services offered by the libraries of ECs affiliated to M.G.University?
- Whether these libraries are involved in any cooperative activity?
- Whether the user communities are satisfied with their library resources and services?
- Is there a need for proper resource sharing among these libraries?

## 1.7 Objectives of the Study

Based on the research questions enumerated under section 1.6, the objectives of the study are formulated as :

1) To analyse the status of the print resources, services and Information Communication Technology (ICT) infrastructure of the libraries of ECs affiliated to M.G.University.
2) To identify the extent of availability of e-resources in these libraries.
3) To identify digital library initiatives and study the functions, services and problems of established digital libraries.
4) To ascertain the staff strength in the libraries and their ICT skills.
5) To identify and study the existing system of cooperation among these libraries.
6) To examine the problems felt by the librarians towards effective cooperation.
7) To propose a model for resource sharing - the virtual resource sharing centre (VRSC).

8) To analyse the awareness and use of e-resources by the students and faculty members.
9) To ascertain the level of satisfaction of the users with their current library facilities and services.
10) To analyse user's attitude towards the VRSC.

## 1.8 Hypotheses

**H1** There is a significant gap between the colleges with respect to their library facilities.

**H2** There is no uniform pattern for staff strength and salary among these libraries.

**H3** There is no effective means of co-operation among these libraries.

**H4** Usage and user satisfaction regarding e-resources are dependent on their category and status of institution.

**H5** Majority of the users are dissatisfied with their library resources.

**H6** Satisfaction of users with their library resources is dependent on category and status of institution.

**H7** Users have a positive attitude towards the VRSC.

## 1.9 Nature and Scope of the Study

The study is of an exploratory nature making an exhaustive coverage of the library facilities and services of all the ECs (established before 2009) affiliated to M.G. University. The findings of this study have a wider scope and larger implications on the ECs affiliated to the different universities in Kerala. The findings will also be useful for the

librarians and authorities of the ECs for identifying their strengths and weaknesses and improve their activities.

## 1.10 Limitations of the Study

The study is limited to the 22 ECs affiliated to M.G. University which are established before the year 2009. The colleges established on or after 2009 under the university were exempted from the study since these colleges are at the initial stage of their development and at the time of conducting this study (ie; in 2012), the first batch of students reached only their third year. The study is also limited to the final year B.Tech students, M.Tech students and faculty members of the colleges.

## 1.11 Organization of the thesis

The thesis is organized into seven chapters. A brief account of each chapter is given below:

**Chapter1- Introduction**

The chapter introduces the research problem, defines the key terms, states the significance, objectives and hypotheses of the study. It also includes the scope and limitations of the study and chapterization of the thesis.

**Chapter 2- Review of Literature**

The chapter provides the review of literature related to the topic of investigation. More than sixty national and international studies were reviewed and are presented under three categories- *use of electronic resources and services, resource sharing and consortia, & virtual libraries/digital libraries.*

**Chapter 3- Engineering Education in Kerala**

The chapter gives an overview of the technical education scenario in India, the growth of ECs in Kerala, engineering education under Mahatma Gandhi University Kerala, and a brief outline of the colleges under study. The chapter also discusses the different types of online resources available for engineering academics in India and consortial efforts undertaken by the EC libraries in the country.

**Chapter 4- The Methodology**

The chapter briefly describes the methodology employed in the study. It includes the population covered, the samples taken, instruments used for data collection, tools and techniques used for data analysis, etc.

**Chapter 5- Analysis and Interpretation**

The chapter deals with the detailed statistical analysis of the data collected by the investigator. Descriptive and inferential statistics are used to reach conclusions.

**Chapter 6- Virtual Resource Sharing Centre: a Model**

The chapter presents the potential model of resource sharing proposed by the study. The system and network architectures, technical infrastructure, organizational set up, etc are discussed in the chapter.

**Chapter 7- Findings and Conclusion**

The chapter reports the major findings of the study, presents the testing of hypotheses, conclusion drawn and the recommendations.

## 1.12 Citation Style

The citation and bibliographic references presented in the thesis follows American Psychological Association (APA) Style (6th edition) with slight variations.

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# Chapter 2

# REVIEW OF LITERATURE

## 2.0 Introduction

Review of literature is the most essential step in a research process. An exhaustive survey of the relevant literature related to the topic of research is the backbone of a successful research design. Review of related studies helps the researcher to understand the different dimensions of the problem selected for study, identify gaps or unexplored areas and develop an awareness of what has been done and what has to be done in that specific area. It provides a deep insight into the various tools, techniques and methods employed by similar studies and empower the researcher to formulate his strategies, procedures and methods for conducting the study. In this chapter, an attempt is made to identify, locate, analyse and review previous studies related to the topic, published in national and international peer-reviewed journals, books, theses and conference proceedings. For identifying previous studies, the researcher primarily consulted the Library and Information Science Abstract (LISA) and Google Scholar. The identified items are located from various electronic databases like Emerald Insight, Elsevier Science Direct, Wiley Online journals, Taylor & Francis Online journals; various print and online journals; various electronic theses and dissertations (ETD) databases like VIDYANIDHI, SHODHGANGA and a lot of institutional repositories and web portals.

The studies are grouped into three sections as follows and are arranged chronologically.

- Use of electronic resources and services

- ❖ Resource Sharing and Consortia
- ❖ Virtual libraries/Digital libraries

## 2.1 Use of Electronic Resources and Services

Electronic resources (e-resources) and services have become an integral part of present day academic library system. Application of Information Communication Technologies (ICT) is evident in the resources and services of an academic institution. In the last decade we saw a revolution in the application of ICT in the academic libraries around the globe. Electronic databases, electronic journals(e-journals), electronic theses and dissertations (ETDs), digital libraries, virtual libraries, online public access catalogs (OPAC), electronic books (e-books), etc are the widely available e-resources in present day academic libraries. A lot of studies have been conducted around the world to identify the availability, usability, user satisfaction and problems related to e-resources and services. In this section, literature on the use of e-resources and services collected from different print and online sources are reviewed. A careful attempt has been made to include national and international studies conducted among engineering academics and institutions along with other disciplines and institutions. Some studies related to the Information Technology (IT) infrastructure of the libraries are also reviewed in this section.

The reviews in this section are presented under the following categories.

- ➢ **International Studies**
- ➢ **National Studies**
  - Conducted in Engineering & Technology Libraries
  - Conducted in other academic libraries

### 2.1.1 International Studies

The information needs and information seeking behaviour of undergraduate computer engineering students at Nanyang Technological University (NTU), Singapore was studied by **Majid and Tan (2002)**. The purpose was to investigate the types of information sources used by the students, their preferred information formats, the importance of and reasons for using certain information sources and the use of various electronic information sources. Data was collected using questionnaire, which was distributed to 200 randomly selected students with a response rate of 51%. The study found that printed materials were the most preferred information format among the students. The top five most preferred information sources, in the order of importance, were books, lecturers, the Internet, friends and manuals. Unexpectedly, the use of databases and electronic periodicals was quite low among the computer engineering students. The study recommended a promotional campaign for introducing electronic information sources to the library users.

**Tenopir (2003)** reviewed around 200 research publications on the use of electronic resources that were published between 1995 and 2003. Literature were reviewed from the point of view of different aspects like information seeking behaviour and preferences, perceived advantages of e-resources, problems with e-resources, library policies, financial concerns, etc. It was found that the researchers used a variety of methods like observations, interviews, surveys, transaction logs and experiments. Some valid conclusions drawn from the review were as follows:

- Print remained as the popular medium for books.
- Use patterns of experts varied between different disciplines.
- Personal subscriptions to journals decreased due to the availability of e-journals.
- A decrease in browsing by titles was found while searching by topic increased.
- Convenience and speed of access were the perceived advantages of e-resources.
- Problems with the e-resources identified were unawareness about the availability, discomfort of reading from screen and too much of retrieved information.
- Visits to the physical library by users decreased with the increase in the accessibility of e-resources.

The use of electronic journals by the academic staff of the universities belonging to the Consortium of Academic Libraries of Catalonia (CBUC), Spain was analysed by **Borrego and others (2007)**. Questionnaire method was used to collect data which was distributed to the entire population of academic staff with a response rate of 18.05%. The results showed that almost all the respondents were aware of the e-journals and more than 52% of them used exclusively e-journals, where as 28% preferred both the media- print and electronic. It was found that the use of e-journals showed a statistically significant relationship with age, discipline and the respondent's academic positions. Respondents in the disciplines of Biomedicine and Engineering were found to be the exclusive users of e-journals whereas those belonging to Social Sciences and Humanities used mainly print journals. Lack of familiarity with e-

journals and absence of e-journals in certain disciplines were the main reasons for the non-use of e-journals. It was reported that 76% of the respondents were ready to stop the print journals if their electronic versions were available. The study also revealed that research was the main purpose for consulting e-journals. A strong correlation was identified between age of respondent and use of e-journals and the format was preferred by almost all of the younger respondents. Regardless of discipline and age, a vast majority of respondents opined that their use of e-journals would increase in the coming years.

**Dilek-Kayaoglu's (2008)** study presented the results of a survey conducted among the faculty members of Istanbul University, Turkey to examine their use of electronic journals. An online questionnaire survey among a selected sample of 590 academics was taken. An overall, 75.6% respondents were reported as frequent users of e-journals. The study pointed out that the association between frequency of use and the age of respondents was highly significant. The Chi-square test conducted to examine the association of frequency and discipline, produced highly significant results showing that the very frequent users were from health science followed by natural science. Anyhow respondents belonging to all the discipline preferred the electronic format and around 73% of the respondents were in support of the shift from print to e-only journals. Another major finding was that 59.7% of respondents irrespective of their disciplines pointed out that a major barrier for their use of e-journals was the lack of sufficient subscription in their subject area.

Chinese university students' use of digital libraries was studied by **Liu and Luo (2011).** The authors analysed the extent of the difference between graduate and undergraduate students in China in their use of digital libraries. 400 questionnaires were distributed to the students of different disciplines of 3 universitites in China and received a response rate of 70%. It was found that on an overall, factors for using digital libraries were quite similar among undergraduate and graduate students. Factors such as "remote access," "24-hr. access," and "faster access" were among the most important factors identified by both user groups. Non-use factors, perceived influences, and degree of satisfaction were found to be quite different between undergraduate and graduate students due to their differing emphases and expectations for information. The authors opined that librarians had to explore creative ways to increase the visibility of digital resources and to work with faculty members to promote the use of digital resources.

### 2.1.2 National Studies

#### 2.1.2.1 Conducted in Engineering & Technology Libraries

The level of effort taken by the engineering college libraries in Karnataka, India in building electronic resources and services was examined by **Mulla and Chandrasekhara (2006)**. It was found that the availability of electronic resources was high among one fifth of the libraries and a low level availability was identified in 34% of the libraries. The reasons behind the non availability were identified as (i) lack of awareness among the academics regarding e-resources in their subject, (ii) absence of library collection development committees having a complete inventory of authorized online resources, (iii) lack of demand

from the users and (iv) lack of proper ICT facilities. The study concluded that the collection and service infrastructure of the libraries were not satisfactory due to the following factors: lack of ICT infrastructure; lack of IT trained manpower; lack of awareness of the digital resources; lack of user demand; lack of financial support; lack of knowledge about the digital preservation methods; and lack of training for the digital access.

Majority (95%) of the library users of IIT Delhi were found to be aware of electronic information resources provided by their library, according to a study conducted by **Ali (2006)** to investigate the awareness and utilization of e-resources among the users of IIT Delhi. It was observed that 65% users utilize this service regularly. Tools used for data collection were questionnaires, observation and informal interviews. About 325 questionnaires were distributed among the users and 300 filled questionnaires were collected back. Regarding the difficulties faced by the users while accessing e-resources, 41% responded that they face "no problem". 20% users were facing a lack of knowledge about resources. Other difficulties identified were lack of technical assistance and slow downloading. With respect to the infrastructure facilities, 57% users opined that the number of nodes for accessing e-resources were inadequate.

A questionnaire survey was conducted by **Gunasekharan, Balasubramani and Sivaraj (2008)** among 200 students and faculty members of Bannari Amman Institute of Technology, Tamil Nadu to study the usage of electronic journals subscribed through INDEST-AICTE consortia. Over a response rate of 100%, it was found that all the

respondents were aware of the e-resources and opined that these resources were very useful due to various reasons like currency, time saving, more number and variety of information resources, etc. Proper instruction/orientation provided by the library was identified as the main reason for the awareness and usage. Most of the users used e-resources for course work and for getting latest information resources. The factors that hindered the effective use of electronic resources were identified as lack of time and slow internet speed. The authors suggested increasing the speed of internet access. The study concluded by stating that "in order to motivate the engineering students for research, other e-databases like ACM Digital Library, Elsevier's Science Direct, Compendex plus and INSPEC may also be added to the library collection."

An increase in the usage of e-journals in IIT Delhi was reported by **Kaur and Verma (2009).** The study was intended to investigate the use of electronic resources and services provided by the central library of IIT Delhi by means of a structured questionnaire distributed among the undergraduates, postgraduates, research scholars and faculty members. The study identified the potential users of electronic information services, the frequency of their use and the place where the information was accessed. User's awareness about the library e-resources and services as well the accessibility available at various places in the institute, like hostels and departments were found to be the reasons behind the increased use of e-resources. The study also revealed that the number of users visiting the library has decreased due to the availability of the resources in the campus.

The awareness, access, and utilization of open courseware [published by Massachusetts Institute of Technology(MIT), Tokyo Institute of Technology(TITECH) and Utah State University(USU)] and e-learning course materials of Visvesvaraya Technological University(VTU) among the computer science and engineering academics of engineering colleges in Mysore city was explored by **Ghalib, and Talawar (2009)**. The paper gave a brief outline of Open Source e-Learning Courseware (OSeLCW) movement. The results of the study reflected maximum awareness, access and utilisation of the open courseware from the VTU followed by MIT, TITECH, and USU websites respectively by respondents. A significant observation was that unlike students, educators download more files from MIT open courseware than VTU e-learning courseware since MIT offers highly sophisticated scholarly materials. The study suggested that adapting OSeLCWs by higher education institutions will lead to improvement in the teaching and learning process and thereby produce globally competitive graduates and post graduates. The authors also suggested that in order to increase the awareness and utilization of OSeLCWs, sensitization and information literacy programmes have to be made by libraries and information centres cooperatively with educational administrators.

The impact of electronic resources in engineering and technological institutions in India was examined by **Kaur (2009)**. A questionnaire survey was conducted among the faculty members, research scholars, undergraduate & postgraduate students in 4 institutions including two IITs, one university and one college. It was found that majority of the users from IITs were aware of electronic resources and services whereas most of the users from the other 2 institutes were unaware of the

service. Internet and online catalogs were the widely used and accepted e-resource which is followed by e-journals. Whereas the use of e-books, CD-ROMs and video cassettes were found to be comparatively low. Users preferred both the formats of resources-print and electronic. Only a few number of users were of the view that e-resources can replace the print resource. The study recommended that while subscribing e-resources, user preferences and priorities need to be considered for better usage. The study also suggested to impart proper training to enhance staff skills to assist users efficiently.

**Handa and Singh (2010)** conducted an evaluative survey to assess the management, resources and services of engineering colleges affiliated to the Punjab Technical University. Questionnaires were distributed to all the 82 colleges affiliated to the university. It was found that 71.09% of libraries had a book selection policy. The paper presented a thorough discussion of the resources, organization and services of the libraries under study. The authors opined that there was a scarcity of adequate professional staff. With respect to the IT infrastructure, the study pointed out that there was a wide gap among the colleges. Some libraries had made substantial growth in this direction while some others were planning or in the early stage of implementation. The study suggested to improve the collection development policy and the extent of IT application in the libraries.

The computer infrastructure facilities and the status of computer-based library services offered by the 20 National Institutes of Technology (NIT) libraries in India were analysed by **Rao and Choudhury (2010).** The major findings of the study were that majority of the libraries have

got sufficient number of computers and other electronic equipments like scanners, printers, etc. Almost all the libraries got good communication facilities. Regarding services, 90% of the NIT libraries provided online journals and e-books. Nearly 70% of the libraries provided orientation programme and training to the users and staff. The provision of virtual reference, e-current awareness, electronic/web-based document delivery, electronic theses and dissertations, and e-publishing services among NIT libraries were comparatively less and no library under the study provided videotext/teletext and video/teleconferencing facilities. The authors concluded that, many NIT libraries could expand their infrastructure capacities to offer better services to students, researchers, faculty, and staff.

E-databases and e-journals were the most used e-resources by the faculty members of C.V.Raman College of Engineering (CVRCE), Bhubaneswar as reported by **Satpathy and Rout (2010).** The authors analysed the faculty members' awareness and use of e-resources by means of a structured questionnaire survey. Upon a response rate of 80%, it was found that faculty members were aware of e-resources and knowledgeable about copyright/IPR issues. E-databases and e-journals were followed by e-books and ETDs with respect to their popularity. The main purposes for using these resources were identified as study and teaching followed by research works. The study pointed out some dissatisfaction among the respondents regarding the available resources. Non availability of the needed e-resource was the main reason behind this followed by lack of sufficient infrastructure. Majority of the respondents opined that e-resources were useful to a great extent. Less time in searching, simultaneous usage, downloading facility and

early availability of journals were the main advantages as mentioned by the respondents. Finally the investigators suggested to improve the access facilities with high Internet speed and subscription to more e-resources by the Central Library of CVRCE.

The engineering faculty members' perception and preferences of electronic resources were studied by **Sharma and Sharma (2010).** The results of a structured questionnaire distributed to 62 randomly selected faculty members of NIT Kurukshethra showed that most of the respondents used e-resources. E-journals were the most popular e-resources among the respondents. ETDs and e-books had comparatively less number of users. Majority of the respondents used their library websites as a gateway for e-resources. Further, the study pointed out that majority of the faculty members preferred e-resources to traditional resources and most of them had got formal training in the use of e-resources. The study recommended conducting training and orientation programmes to make the faculty members more aware of the resources in their concerned fields for the optimum utilization of the available resources.

**Kumar and Kumar (2010)** examined the perception and use of e-resources and the internet by the engineering, medical and management academics in Bangalore City, India. Data were collected from 300 students and faculty members in selected engineering, medical and management colleges of Bangalore City by means of questionnaire method. The results showed that 70% of the respondents were aware of electronic resources with the engineering academics being more aware as compared to other disciplines. The main purposes for using e-

resources were study and teaching where as one third of the respondents used e-resources for their project work. An important finding was that even though the e-resources were much popular among the respondents, 65% of them still prefer the print format along with e-resources. Regarding internet use, it was found that all the respondents used the internet for different purposes that included study, teaching, collecting general information, updating subject knowledge, etc.

The use of e-resources by the academic staff of engineering colleges of Rajasthan was analysed and evaluated by **Bhatt and Rana (2011)**. The study considered various factors of e-resources usage such as purpose, impact, importance, problems, acceptance, and satisfaction with e-resources. The study revealed that all the respondents used World Wide Web service. E-journals were the next preferred resource by most of the respondents followed by ETDs. It was also found that academic staffs were using other types of e-resources like e-groups, virtual conferences, etc. The major purpose for using these resources was academic and research activities. 68% of the respondents incorporated e-resources with teaching methodology to some extent and majority of the respondents opined that e-resources have a considerable impact on educational activities. The academics preferred both versions of documents for their students. The study also revealed that most of the respondents got information about e-resources from their library staff.

IEL online was found to be the highly preferred database by the academics of Krishnaswamy College of Engineering & Technology Library, Cuddalore. **Dhanavandan, Esmail and Nagarajan (2012)**

investigated the extent of use of e-journals in the college library by means of a questionnaire survey among 150 library users including faculties and students. The study revealed that majority of the users was aware of electronic resources in their library. The preferred items were e-journals and e-books. Around 60% of the users rated the e-resources available at their library as good. Slow speed in connectivity and downloading, lack of training in using the resources and overload of information were identified as the problems encountered by the users. Most of the users were satisfied with the e-resources available in their library.

#### 2.1.2.2 Conducted in Other Academic Libraries

The pattern of use and extent of satisfaction of digital resources among the PG students and faculty members of Dental colleges was studied by **Kumar and Lohar (2008)**. Data was collected using a structured questionnaire distributed among 217 faculty members and students in 3 dental colleges in Karnataka with a response rate of 80.72%. The study identified the purposes of using digital resources and found that the students consulted digital resources mainly for their research activities, whereas faculty members used it for keeping abreast with the subject, article preparation and to prepare teaching aids. The most used digital resources were the e-journals followed by CDs/DVDs. The study revealed that the users were almost successful in finding required information in internet and CD-ROMs. Further the study recommended to create awareness among the users to use digital resources by organizing training programmes and maintaining an update OPAC of the available digital resources in the library portal.

"Science research scholars prefer e-resources to print resources", revealed a survey conducted by **Gowda and Shivalingaiah (2009)** to analyse the attitude of research scholars towards usage of electronic information resources in the universities in Karnataka. The authors identified a gap in the need and availability of e-resources and a decrease in the use of print resources for research purpose as compared to the use of e-resources. Majority of the respondents favoured the usefulness of e-resources and agreed that ICT and e-resources have greatly benefited the quality of research in their field. The study identified that lack of awareness of e-resources and inefficiency in finding relevant information were the factors corresponding to the less usage. The authors suggested conducting proper training and information literacy programmes at regular intervals to promote the usage of e-resources.

Teachers used e-resources for the preparation of teaching aids and for the purpose of research. The use of electronic resources among college teachers in Guntur District of Andhra Pradesh was analysed by **Sivaprasad, Dhana Lakshmi and Rao(2009)** by means of a survey based on a stratified random sample of 80 teachers. The purpose of using e-resources, the frequency of use, preferences for different formats, hindrances of use and the impact of e-resources in their teaching were brought under the purview of the study. Google was the most familiar search engine among the teachers and the preferred format was PDF. The most preferred e-resource was internet followed by e-journals. Another important finding was that OPAC was the least used e-resource by the respondents. Regarding the hindrances of using

e-information resources, most of the respondents pointed out that too much of information retrieved hinder their effective use of e-resources.

A case study regarding the use of electronic resources by the faculty members and research scholars in eight different faculties of Annamalai University was made by **Natarajan et al. (2010)**. For collecting data and analysing the awareness, use and user perception of electronic resources, a questionnaire survey along with observation and interview methods was conducted in November 2008. A total number of 350 questionnaires were distributed and received a response rate of 65.25%. It was found that majority of the users were aware of e-journals, e-books, e-newspapers, e-theses and e-databases whereas most of the users were unaware about other resources like e-dictionaries, e-encyclopedia, etc. E-journals were the most accessed item followed by e-newspapers and e-theses. The study revealed that despite the availability of wide range of e-resources, the frequency of their use was low. The reasons identified for this were slow downloading, lack of subject coverage, lack of time, lack of training, etc. The authors concluded by suggesting that wide publicity and training were necessary for maximising the use of the available resources.

## 2.2 Resource Sharing and Consortia

Resource sharing (RS) is an age old concept that has successfully supported the libraries all over the world for catering the information needs of its clientele. Earlier form of RS was mainly the inter library loan (ILL) of books between co-operating libraries. From there, the concept has expanded to sharing of expertise & infrastructure, collection sharing, consortia and document delivery services. The emergence of

different resource sharing consortia since the 1990s changed the scenario of RS in academic libraries. Many learned journals, conferences and seminars discussed the new environment and a lot of literature dealing with the success stories, problems and prospects of RS and consortia have come out. Here an attempt is being made to cover this literature published since 2002.

The reviews in this section are presented under

- International Studies &
- National Studies

### 2.2.1 International Studies

The literature published from 1960s to 2000 on academic library consortia was reviewed by **Nfila and Darko-Ampem (2002).** For this two bibliographic sources were consulted: the Library and Information Science Abstracts (LISA), and the Information Science Abstracts (ISA). The review gave a correct picture of the background describing why this phenomenon occurred, the reasons for forming consortia, the phases of this process and the benefits that the libraries accrued through consortia; together with world-wide examples of existing practice in Africa, Australia, Europe and North America. The paper highlighted that libraries through consortia arrangements have been able to withstand the twin evils of budget cuts and high prices of information resources. The authors stated that technological advancements coupled with the willingness to meet the challenges of coexisting together, consortia hold a big promise for the library world. According to the authors the development of library consortia showed a shift from a peripheral and limited RS to an integrated system-wide and formalized RS.

The RS initiatives in Pakistan were described by **Jaswal (2005)**. The changes that the technology revolution has brought to RS activities were briefly discussed. The author stressed the need for developing interoperable online catalogs that support federated searching instead of centralized union catalogs. The author opined that digital library technology can compliment to the existing scholarly publishing model with an innovative publishing structure which enables faster online distribution facility as well as the systematic documents management.

**Sharif (2006)** discussed the methods followed in Pakistan for RS and pointed out that RS was mostly informally practiced in the country. The paper pointed out some of the formal RS projects in the country and discussed their objectives, functions, products, etc. The paper suggested that the library professionals and library associations should take initiatives in framing policies, procedures and standards for effective RS. The paper also suggested some models for resource sharing among Lahore libraries as follows:

**Model 1 (Inter type-RS)** different types of libraries in the city, regardless of their scope, resources, and clientele, can share their resources.
**Model 2 (Intra type-RS**) where a library can share its resources with another library of the same kind.
**Model 3 (RS through consortia)** in which resources (selected print and electronic) can be housed at a central place and access can be provided to the institutions/organizations.

**Rotich and Munge (2007)** examined the success and failures of different RS initiatives among Kenyan universities. The paper briefly

discussed the objectives and activities of different RS efforts in the country like the African Virtual Library-Kenya Chapter (AVL-K), Kenya Education Network (KENET), Program for Enhancement of Research Information (PERI), Electronic Supply of Academic Publications (eSAP) project, Database of African Theses and Dissertations (DATAD) initiative, East African Network of University Libraries (EANUL), Kenya Libraries and Information Services Consortium (KLISC), etc. The authors analysed the success achieved by these consortia efforts on the basis of certain checkpoints as follows:

- Assisting libraries to automate as a prerequisite for online information sharing;
- Facilitating the provision of, and access to the collective bibliographic and other electronic information resources held by partner institutions;
- Supporting collaboration and networking among participating institutions; and
- Developing ICTs skills for personnel in member institutions

It was observed that these initiatives have played a big role in laying the groundwork for automation of a good number of the libraries and information centres in Kenyan universities. It was also observed that these initiatives succeeded in providing sufficient platforms like portals, directories, etc for facilitating easy information access. The initiatives were found to be interested in supporting collaboration and networking as well as imparting training for developing the ICT skills of personnel. Lack of sufficient internet connectivity in the participating institutions due to the high tariffs for bandwidth was found to be the major problem towards the successful implementation of resource sharing in the

country. Lack of funds especially for public funded institutions was another problem. Lack of clear cut policies and scarcity of sufficient information resources particularly digital resources also hindered the effective RS among the institutions.

The developments in French academic inter library loan network (ILL) was discussed by **Gillet (2008).** The author gave an outline of how the Institute for Scientific and Technical Information (INIST-CNRS), the French leader in the document delivery market, works with a broad national and international network of some 200 libraries. The author pointed out that the possibilities for accessing electronic collections have a direct impact on document demand. The pricing system for document delivery and different factors affecting the document supply were discussed in detail. It provided an overview of French copyright legislation, as well as information on negotiations with publishers on secure electronic delivery. The findings stated that RS and networking in document delivery on a national and international level have become essential to maintain good quality library services.

**Ameen (2008)** made a qualitative survey to explore the barriers in collection sharing among well established university libraries in Pakistan using interview method. The major objectives of the study were to identify the status of collection sharing among the university libraries, to identify the reasons for non participation in collection sharing and to propose a possible way for collection sharing. It was found that only 13% of the libraries were involved in some collection sharing in the form of interlibrary loan whereas the majority (87%) was not involved in any formal collection sharing programs. The study

identified two types of barriers in collection sharing- 'Technical and procedural barrier' and 'Psychological and behavioural barrier'. The absence of automated catalogs, union catalogs and webopacs were the major items under the first barrier. The feelings of the librarians that they do not have the authority to develop formal plans for sharing as well as their fear about loss of materials while sharing were the major barriers under the second type. The study suggested that government authorities, librarians and library organizations should seriously take up this matter and should explore the possibility of resource sharing at local, national and international level. Development of webopacs should be taken as a matter of priority and electronic media should be used to share the collection efficiently and safely. The study recommended that the library associations should frame the protocols and procedures for effective sharing at local and national level.

**Lawal, Bassey and Ani (2008)** investigated the resource sharing activities among law libraries in Nigerian universities by means of a questionnaire survey. All the respondent librarians opined that RS is desirable for their libraries and majority of the respondents replied that they share their resources among themselves. The most common forms of RS were reported as admittance followed by donation/gift. The least common modes of RS were exchange of personnel and cooperative classification. A major finding was that majority of the respondents were not having a written policy for RS and 60% of the respondents were found to be satisfied with their current mode of RS activities. The study identified the obstacles towards proper RS. The major obstacles were insufficient copies of resources and lack of fund. The study put forwarded certain solutions to overcome the obstacles and collected the

opinions of the librarians. It was found that increased awareness about the need for RS among law libraries as a major way for carrying out effective RS.

The development and functioning of the Anatolian University Libraries Consortium (ANKOS), Turkey was described by **Erdogan and Karasozen (2009)** and opined that ANKOS made a positive impact towards the research and publication outputs. An important peculiarity of the consortia highlighted was that it was not a purchasing consortium and only a negotiator and hence the consortium was not a funded body. The individual members could make the subscriptions on the negotiated rates from their own funds. The authors opined that the newly founded universities with lesser collections benefitted from the consortium than the older ones. The functioning of the consortium was carried out by its different working groups in which librarians from different university libraries worked voluntarily. The authors pointed out an enormous download of full-text articles through the consortium which was in turn positively correlated with the publication output of the academics.

The success factors behind Library and Information Web Access (LIWA), the interlibrary cooperative activity among three United Arab Emirates (UAE) universities were discussed by **Taha(2010)**. The consortium's primary aim was interlibrary lending and for this a union catalogue of the three participating institutions were developed. The paper discussed the circulation policies of the consortia and the statistics of interlending. It was found that the consortium handled 983 transactions during the period from 2007 to 2010. Further the author made a SWOT analysis of the project. The success factors identified

were stable budgets, well equipped libraries with computers and network infrastructure, rich variety of resources, use of standard rules and formats, and use of similar OPAC software. The identified weaknesses were the different acquisition policies of member libraries, institutional circulation policies that restricts certain items from being lended out, and exclusion of digital resources from sharing. The author concluded by proposing a model for a fully developed consortium that handles e-resource sharing also.

USA was identified to be one of the few countries in the world where interlending and document supply continue to increase. The factors that led to this increase were examined by **Mak (2011)**. The Association of Research Libraries (ARL) ILL borrowing statistics showed that increase in interlending is 660% over a period of 35years. Similar trends of increase in interlending were also reported by various other co-operative efforts of the country. The paper discussed the factors behind the success stories of different interlending and RS programmes in USA. It was found that the effectiveness of RS facilitated by intra and inter-state cooperatives using OCLC as a framework was a major factor behind the success. Other factors pointed out in the study were the improvement in discovery tools, requesting processes and the more recent improvements in the delivery process.

**Owolabi et al. (2011)** examined the current state of RS in Nigerian university libraries by means of a survey using questionnaires and interviews. Questionnaires were distributed among 104 university librarians in the country and a response rate of 65% was received. The findings revealed that majority of Nigerian university librarians agreed

that RS was important and exchange of publications was the most common mode of RS. Majority of the respondents were satisfied with the current RS arrangements. Some major hindrances to RS identified were lack of security of materials and lack of funding. The study recommended conducting seminars and conferences to improve the awareness about RS among professionals. The authors recommended the government and National Universities Commission of Nigeria to allocate proper funds and promote the effective sharing and networking of libraries in the country.

The Ohio Library and Information Network (OhioLINK) shared catalog service handled about 800,000 requests annually. **Cook and Smith (2011)** described the development and implementation of the OhioLINK shared catalog and patron-initiated online borrowing process. The procedures of document delivery to patrons along with OhioLINK's experience with missing and lost materials, including lessons learned regarding lost materials and billing were discussed in detail. An analysis of the usage statistics of OhioLINK services represented the growth of the service. The article summarized the success of this unmediated borrowing process.

**Williams and Woolwine (2011)** conducted a questionnaire survey among the American academic libraries participating in the ILL system of OCLC to study the ILL activity and practices, licensing agreements and the effect of digitally held full-text articles on ILL rates. A second focus was an examination of how the size of print journals and monograph collections affected ILL activity. The study gathered ILL statistics for the period from 1997–2008 and found out that there was a

general increase in ILL activity since the 1990s. The study reported a strong correlation between print journal and monograph collection size versus ILL activity. A major finding was that the presence of licensed databases with full-text content did not seem to have adversely affected interlibrary loan activity. The presence of a link resolver was also correlated with increased ILL activity. Finally, the study found that there was no overall reduction in ILL department personnel in the last 5 years and the presence of a professional librarian as head of the department was also positively correlated with ILL.

The potential impact of e-resources on RS was reviewed by **Hales (2012)**. The paper gave a brief description of the growth of library co-operation around the world and opined that after over a century of work by library professionals and technological developments, inter library loan has now become a prevalent and essential library service. Further the paper discussed the legal barriers of sharing electronic resources especially the licensed content. The author pointed out that libraries are discouraged or even prohibited from sharing their electronic resources unless they have negotiated for ILL in their license agreement. The case of purchased e-books were also discussed, where the author highlighted that most of the license agreements of e-book purchases impose restrictions in sharing the document in electronic format. The author remarked that the growing prevalence of electronic resources in the libraries and their copyright restrictions would create a great threat to the ILL in the future. The paper suggested that the library professionals should adopt new resource sharing models like demand driven acquisition and consortium short-term-leases to overcome this barrier.

"RS continue to grow as a critical information service in libraries around the world" opined **Goldner and Birch (2012)** by providing an overview of the historical developments in RS and ILL around the world. The paper discussed the impact of the changes in technology and publishing on RS in the digital age. The authors conducted a PEST (Political, Economical, Social and Technological) analysis of the factors affecting present day RS and pointed out certain challenges for effective RS in the digital age such as distributed knowledge bases, incompatible systems, and electronic formats which often prohibit sharing of materials between libraries. The authors remarked that the librarians need to work together with all players in the industry, to garner for libraries the same rights to e-journals and e-books that had been available for physical materials for decades. The paper stressed that the librarians also need to raise their voice within the political systems of their countries in order to promote copyright legislation that serves the interest of information seekers and civic populations as well as publishers. The authors concluded by stating that "open systems that support data sharing and reuse should be encouraged, as they represent a form of 'meta resource sharing' in themselves."

### 2.2.2 National Studies

The need for RS among academic libraries was discussed by **Sridhar (2002)**. According to him, 'co-operation is the more talked and less acted area". The author explained some psychological and egoistic facts that hurdled effective RS. The involvement of more people in decision making related to RS activities created practical difficulties in achieving the goals. Fear of centralization and autonomy were other hurdles

identified by the author. Further the paper discussed the cost considerations of RS and substantiated that the cost per use of a document received on ILL was less than its acquisition and circulation costs. The author suggested that development of basic infrastructure facilities, proper management of ILL and quick document delivery were necessary for effective resource sharing. For enhancing the RS activities in future, the author recommended to develop databases of project reports, textbooks, table of contents services, user orientation modules, etc and strategies to harness the web resources.

The role of internet in enhancing the RS activities of special libraries in India was investigated by **Sreekumar (2005)**. Structured questionnaires were used to collect the required data from a stratified sample of libraries and librarians and a cluster sample of users. It was found that the advent of the electronic information environment widened the gap between the information rich and the information poor libraries at an alarming rate. The author stressed the importance of open source software in the current era and pointed out that E-Publishing, Open Archives Initiative (OAI) and the Open Access (OA) movement gave a face lift and a paradigm shift to the scholarly information systems. Based on his observations and experience, a working model of an ideal digital information system (the IIMK library portal) that integrates their library website with the IIM Library Consortium, digital library(DL) and their institutional repository(IR) was developed.

"In India, the process of resource sharing is shifting from print to electronic resources", pointed out **Ghosh, Biswas and Jeevan (2006).**

The authors analysed the state of libraries in India and summarised the strategic cooperative initiatives undertaken by these libraries to improve user access to electronic information services. Data was collected by means of literature searches, personal interviews and e-mail interaction. The study pointed out that there is tremendous potential for information technology enabled information access in the country. The paper provided a list of top ten issues to be tackled by the Indian libraries for streamlining the consortial efforts. The authors suggested the need for a viable and sustainable model that can use local capabilities and provide high quality services at lesser cost.

**Jayakanth, Sharada, and Minj (2007)** stressed the importance of having a union catalog (a centralized database) of the participating libraries to make the inter library loan service more efficient. For this, the authors suggested to implement OAI-PMH for building and maintaining union catalog of OPACs, wherein, the participating libraries expose their metadata, which are harvested and ingested into the union catalogs thereby eliminating human intervention in maintaining currency in union catalogs. Based on this the authors proposed a centralized model of an OAI based union catalog wherein a single centralized database will hold all the bibliographic data from the heterogeneous, distributed OPACs. The authors also mentioned some of the open tools that facilitate the OPACs to be OAI-compliant. Once the individual OPACs are made OAI-compliant, the base URLs of such OPACs are to be registered with an OAI-based service provider. The service provider will then periodically harvests metadata from the registered OPACs and update their central index.

The status of engineering college libraries in Kerala with respect to their collection, financial position, IT infrastructure, staff, etc was analysed by **Azeez (2007)**. Out of the 76 colleges in the state, a random sample of 14 colleges under government, aided and self-financing sectors were selected and data was collected by means of structured questionnaires, interviews and observations. 1800 questionnaires were distributed among the library users and a response of 80% was received. The analysis showed that most of government and self-financing colleges lacked a considerable subscription of foreign journals. Few libraries were having a subscription of online journals and cd-rom databases and most of these libraries were in the aided and self-financing sectors. About 50% of the librarians opined that their information resources are inadequate owing to the lack of sufficient budgets, adequate library personnel and modern infrastructure. Majority of the library users were satisfied with their collection of books and journals irrespective of the type of colleges. Where as they were not satisfied with the provision of inter library loan, internet facilities and other e-resources. A good majority of the users and librarians preferred electronic documents to print and IEL online was the most popular e-resource followed by Science direct. Only a few colleges had a membership in consortia (DELNET) and a huge majority of them supported the formation of a consortium of engineering colleges in the state. Finally the investigator proposed a model for the consortium of engineering college libraries in Kerala.

A design for networking engineering college libraries in Tamil Nadu, India, called Tamil Nadu Engineering College Libraries Network (TECLIBNET) was proposed by **Sivaraj, Esmail and Kanakaraj**

**(2008).** The study stressed the need to bridge the information divide in engineering college (EC) libraries, owing to the growth of engineering literature, increasing costs of publications, and declining budgets. The authors opined that the proposed network would improve resource sharing and information access for the academic community in Tamil Nadu. The paper discussed three models suitable for the network:

**Model 1**- Linking of homepages of all EC libraries in TamilNadu.

**Model 2**- Creating an integrated library database.

**Model 3**- Establishing connectivity using search-engine architecture.

The paper concluded by stating that "It is necessary to establish a library network among all engineering college libraries in Tamil Nadu for maximum use of resources for the benefit of the students, faculty, and research scholars, and to improve the quality of education".

**Satija and Kaur (2009)** explained briefly the concepts of RS and consortia & pointed out that interlibrary networking and a strong communication system along with staff training and information literacy programmes are the core of successful RS. The paper discussed the trends in RS and gave a brief description of various RS initiatives in India. Further, it discussed the benefits of collaborations and analysed the use of e-resources in different technological institutes in North India. The major finding of the study was that the use of resources was low in comparison with the subscription cost and users find a lower percentage of relevant journals they needed since they were not consulted about inclusion or exclusion of any resources. Another important finding was that the state run and private institutes lack adequate funds and infrastructure to access and use e-resources and the users had to visit IITs and NITs to have access to resources that were

not available to them. The author concluded by stating that the INDEST- AICTE and UGC-INFONET, both open-ended consortia, have brought about a revolution in the field of RS.

The possibilities of developing a state wide consortia of engineering colleges in Maharashtra, India was explored by **Ghosh (2009)**. The study revealed that more than half of the respondents were engaged in some sort of RS activities. The most popular activity was the joint subscription of e-resources followed by interlibrary lending, digital preservation and cooperative cataloging. Informal cooperation using the librarians' personal networks was also prominent among the libraries. 53% respondents indicated a lack of satisfaction with the present level of cooperation. The reasons behind this dissatisfaction as pointed out by the respondents were the unaccessibility of catalogs of participating libraries and reluctance of unaided engineering libraries to help each other owing to the competitions among these institutions. The study identified some major obstacles towards cooperation. Absence of RS agreement between libraries, lack of uniform standards in cataloging, absence of a strong leadership to steer the programme were some among them. Based on the observations, the author suggested the formation of the Maharashtra Engineering Libraries consortium (MELC) with an architecture for developing a union catalog for the MELC that involved 3 components- a client, master catalog and member library catalog. The prototype developed by the author envisaged 2 models:

**Model 1**- Master union catalog: The participating institutions catalog their material to the central database and then load to the local databases the new or modified records.

**Model 2**- Individual libraries' union catalogs: The participating institutions catalog their material at first locally and then load the new or modified records to the central database.

The author concluded by stating that "the proposed MELC will generate optimum user satisfaction and save users considerable time when searching for resources".

"The accessibility to international journals in Indian universities and technical institutions has improved to a great extent with the setting-up of a few Government-funded library consortia", stated **Arora and Trivedi (2010)**. The authors described the major activities, operations and services of the UGC-INFONET Digital Library Consortium which was set up in 2004. A clear overview of subscribed resources, different categories of memberships, licensing agreements, governing structures etc was made. While describing the economics of the consortium, the authors pointed out that the membership, intensity of usage, successful migration from print to electronic version (with discontinuation of print) and cost avoidance were the factors that determined the economic viability and cost-effectiveness of a consortia-based subscription. The authors presented the comparative usage of various resources through 2005 to 2008 and found out a consistent increase in usage from 2005 to 2008 for all e-resources. The paper also mentioned that one of its future endeavours is to launch college model of the Consortium under a joint project entitled "National Library and Information Services Infrastructure for Scholarly Content (N-LIST)". The authors concluded by stating that "access to e-resources would invariably make qualitative difference on research, learning, scholarly and R&D activities of faculty and researchers."

The success story of DELNET- resource sharing network in India was described by **Kaul (2010)** and presented the results of a survey conducted by the author to study the utilization of DELNET services among its member libraries. An analysis of the data showed that 91.8% of the users were aware about the services of DELNET and majority of the users frequently used the services. An important finding of the study was that private institutions were the major and frequent users of DELNET owing to the higher membership charges and rigid policies of other consortia like INDEST and UGC-INFONET in the country. The survey results highlighted that 86% of member libraries found DELNET union catalogs useful. The DELNET Inter library loan and Document delivery service (ILL/DDS) was the most popular service.

The major functions, activities and services of the INDEST-AICTE Consortium which was launched in 2003 were described by **Arora and Trivedi (2010)** and stated that it provided differential access to 12,000 electronic journals and six bibliographic databases from a number of publishers and aggregators to 48 centrally-funded technical institutions, 60 government and government-aided engineering colleges and 820 private engineering colleges, and other organisations. The authors opined that launching of INDEST-AICTE Consortium and UGC-INFONET Digital Library Consortium resulted in the increased availability and accessibility of e-resources in centrally-funded technical institutions (IITs, IISc, IIMs, IIITs, etc.) and universities, which in turn resulted in the setting up of a new culture of electronic access and browsing in academic institutions. The article gave a brief overview of its resources subscribed, terms of licenses, policies and practices for archival backups, membership programmes including core members,

AICTE-supported institutions and self-supported category of membership, etc. The paper outlined the governing structure of consortium and their roles. An analysis of the usage statistics reflected a consistent increase in the use of all types of e-resources in all categories of institutions. The authors pointed out that the subscription cost for IEL online and ASCE online came down drastically as more number of members joined the consortium where as some other publishers did not charge additional amount for the next year's renewal. The paper concluded with a mentioning of some of its future plans such as developing interoperable institutional repositories in member institutions, web-based union catalogs of journals and books, co-operative cataloging of internet resources, etc.

**Siddanagouda (2013)** investigated the needs for RS and networking of college libraries affiliated to Gulbarga University, Karnataka. A questionnaire survey along with interview of selected college librarians was made and received a response rate of 81%. A vast majority of the respondents supported the formation of a state-wide network and expressed their willingness to share their resources. It was found that the respondents had a positive attitude towards resource sharing networks. A majority of them thought that taking membership in consortia was very useful. The author suggested allotting adequate funds for the collection development of electronic resources in the colleges. Further a model for the state-wide consortia was proposed by the investigator with the details of its network architecture, technical, financial and professional requirement. The investigator stressed the need for employing professionally qualified librarians and technically skilled supporting staff for the successful functioning of the network.

## 2.3 Virtual Libraries/Digital Libraries

Digital libraries (DL)/Virtual libraries (VL) have become an integral part of an academic library system now a day. A lot of research is being carried out in different parts of the world for the development and enhancement of DL/VL. Library professionals and academics collaborate with computer professionals in the development of efficient systems. The advent of open source software (OSS) opened new vistas for the development of DLs/VLs as well. A good number of papers have been published in referred journals, conference proceedings, books, etc dealing with the different aspects of the development, use and design of DLs. In this section some national and international papers are reviewed to understand the growth of the subject.

The reviews in this section are presented under

- International Studies &
- National Studies

### 2.3.1 International Studies

**Korwitz (2002)** outlined the design and development of a Virtual Medical Library (VML) in Germany which was a co-operative of the Deutsche Zentralbibliothek fur Medizin (DZM), the German national medical library in Cologne with other libraries and information agents like online hosts and research institutions. The design was based on a comprehensive user study on the need for medical information and literature and the opinion of the users regarding a sample virtual library portal. The respondents demanded a single access point where they get complete (fee-based and free) medical information with simple search strategies. The users also asked for evaluated information to be

delivered individually. The study revealed that users urge for a centralised information portal in the Internet guaranteeing access to the complete world of medical information. The VML named MedPilot portal was designed and made online since January 2002, that provide access to a number of medical databases, OPAC of the German National Library of Medicine and a collection of more than 1500 evaluated medical links.

A potential model of a digital library was developed by **Magnussen (2003),** based on the findings of a study on the development of digital libraries in the Commonwealth Government libraries in Australia. The author conducted a detailed literature survey on DLs and analysed the concept of digital library and its activities in detail. The study identified 8 basic components of a DL and some interlinked factors that enabled or hinderd the development of digital libraries. Based on this the author developed a model of DL environment with 8 basic components and 9 inter-linked factors that influence the DL. This model was then tested with a previous study of the author on the digital library activities performed by Commonwealth libraries in Australia. It was found that some DL activities were performed by far more libraries than some other DL activities. Based on this the author re-categorised the components of DL as 'core' and 'optional'. The components/activities undertaken by more than 65% libraries were taken as 'core' and others as optional. The factors that influence the DL were found to be equally important in all cases. Finally the author revised and developed the model of the DL environment with the following components and factors:

**Core Components-** Internet and intranets, electronic publications, electronic document delivery, end-user services.

**Optional Components-** Integrated access to information, digitisation of materials, resource sharing, library co-operation.

The 9 **factors/issues** that influence these components were financial, management, client, legal, personal, subject/discipline, organisational, technological and collaboration.

An e-mail questionnaire survey was conducted by **Gomes (2004)** among Brazilian researchers to study the virtual library and the role it played for the scientific community as an informational and scientific-technical object. The questionnaires were distributed among 9224 researchers who were the subscribers of five different virtual libraries in Brazil and a response rate of 37% was obtained. Respondents were asked about their opinions regarding the reliance on internet resources, particularly the virtual library, in their research. Majority (69%) of the respondents agreed that virtual libraries are the most relevant tool in their activities. The results demonstrated the contribution of internet and these virtual libraries in fostering the scientific communications and productivity of Brazilian researchers.

**Wisher (2005)** expalined the process of building a virtual library for the Touro University-Nevada, a medical university in Henderson, USA. He described how the collection development of e-resources were made. By opting cooperative collection development 50% of the library budget was saved. Sixty free websites of value for its academics were identified from the internet and links were provided in the virtual library. Further he opined that the impact of the virtual library on students was very high

whereas the faculties were bewildered. A 45 minutes hands-on orientation designed by the library was then delivered to the faculties which in turn changed their attitude.

A significant need to plan and implement national digital library for higher education in developing countries was pointed out by **Ogunsola and Okusaga (2006)** who examined and found out the poor state of academic libraries in these countries. The authors explained the concept, advantages and problems associated with digital/ virtual libraries. They opined that for the successful execution of digital / virtual library in developing countries, project administrators and other key staff need to be trained effectively. It was pointed out that resource sharing get promoted with the introduction of virtual libraries. The study recommended the governments of developing countries to allocate sufficient funds for the sustainable development of such virtual libraries.

"The virtual library helps to improve the quality of teaching and research by providing access to tools such as databases, electronic journals, alerting services, online reference tools, and quality-selected web resources", opined **Gbaje (2007)**. He examined the national virtual library project initiatives in Nigeria and identified the challenges of its implementation. Misconceptions of what constitute a virtual library, unavailability of the basic information infrastructure; poor policy implementation and lack of technologically skilled librarians had been identified as some of the challenges. The study also highlighted the process of building a virtual library, collection development, acquisition and access of electronic resources in the virtual library, and the basic

skills required for the deployment and sustainability of the national virtual library.

Changing trends in library use and management of e-resources were discussed by **Wolverton and Burke (2009)** from ProQuest/Serials Solutions. The investigators opined that a paradigm shift in library collections has occurred in which e-resources are now the major component of new library materials, requiring new ways to manage and display them. The use of e-resource access and management services was pointed out as a helpful tool, along with federated searching. Authors suggested that by spending less time for processing print materials and ending bibliographic instruction, more time will be available for librarians to market and manage e-resources, which will be of greater benefit to today's library users.

**Virkus et al. (2009)** made a literature review on the integration of digital libraries and virtual learning environments (VLE). Eleven documents dealing with both the concepts, published between 2000 and 2008 were selected for reviewing. The authors identified certain reasons for integrating digital libraries and VLEs. The lecturers' need for creating links from the course management systems to the libraries online holdings, students' demand for a one stop access to all relevant resources and the IT directors wish to provide a single login interface to access all the resources were the major reasons for the integration. The authors also identified various issues and challenges for these integrations like technical issues, human and organizational issues, copy right issues, etc. Finally the paper discussed the probable benefits of this integration. The major benefits highlighted were quick access to

the resources mentioned in VLEs and more usage of the digital libraries. The authors concluded by suggesting that integration should be the catchword in the design, re-design, implementation, and maintenance of digital libraries and VLEs.

**Wei (2011)** briefly discussed the concept of Open Source Software (OSS) and its applications in libraries. The study revealed that over 67% of the web servers around the world use OSS. The author opined that libraries are the frequent users of OSS and many of the library services are delivered through the application of OSS. Further the paper gave a brief outline of different OSS used in the libraries for the development of institutional repositories, digital libraries and integrated library management systems. The features of Greenstone, DSpace & Eprint were then discussed briefly. Finally the paper pointed out some problems related to the implementation of OSS in libraries. The scarcity of high-quality expertise among librarians in handling the software was raised as the major problem. The author remarked that while implementing OSS in libraries librarians should be vigilant about the licenses, standards and legal risks.

### 2.3.2 National Studies

An exhaustive coverage of various digital library projects in India developed by higher education institutions, parliament and other governmental and quasi governmental bodies, private agencies, etc was given by **Jain and Babbar (2006)** . The paper pointed out the features of the recommendations of the National Task Force on IT and Software Development (2003) for development of DLs in the country. Further, the problems of digital libraries in India were discussed in the paper. The

lack of interest on the part of parent institutions and the absence of action plans or priorities were found to be the major hindrances towards the development of digital libraries. Another problem was the acute shortage of competent personnel to take up the task of digitizing local content and creating digital information repositories. The authors opined that the responsibility of envisioning, developing and sustaining functional hybrid and virtual library and information systems and services rested on the library and information professionals.

**Deb (2006)** conducted a case study to describe the development and functioning of the digital library of The Energy and Resources Institute (TERI), India. The author pointed out that the DL provided a single window access to all digital and digitized contents of the library. All the electronic resources were made accessible using linkages with a single click to its location in a database or in their virtual collection. The study identified that this integration helped the researchers to save their valuable time. Library management was also found to be easier and effective as a result of this. The future plan of the DL project mentioned in the paper was developing a highly interoperable platform that enables cross-database searching and retrieval through a single interface. The author remarked that future libraries have no escape from such an integrated digital library approach.

The digital library initiatives at higher education and research institutions in India were discussed by **Varatharajan and Chandrashekara (2007)**. A brief description about the various digital libraries developed by different higher education institutions and R&D organisations in the areas like traditional ayurvedic knowledge,

manuscripts, science and technology, ETDs, etc were discussed in the paper. The study envisioned an Indian information infrastructure linking education, research, government, and business with the participation of state and national governments. The paper stressed the need for clear-cut national plans and polices for infrastructure, standards, metadata, interoperability, multi-lingual databases, training, co-ordination, copyright, and archiving and preservation methods.

The perceptions and use of the digital library of Cochin University of Science and Technology (CUSAT) by its undergraduate engineering students were examined by **Sheeja (2010)**. A questionnaire survey was conducted among 225 undergraduate students in 7 branches of engineering and received a response rate of 89%. The paper gave a brief description of the digital library of CUSAT. It was found that 98% of the respondents were aware of and used the DL. The main purposes for the use were identified as downloading previous years question papers and syllabi. A vast majority of the respondents opined that the browse and search facilities were easy to use and were satisfied with the DL. Majority (76%) of the respondents were of the view that the DL helped them to improve their performance. The author suggested expanding the services of the DL by including more collections related to the course of study. Another recommendation was to provide proper training to the students on the effective utilization of the DL.

The need for the development of National policy for digitization, co-operative subscriptions and user centered policies and strategies were stressed by **Ramesh (2011)** for the sustainablility of the DLs in India**.**

The author explored the digital library initiatives undertaken by the government and other organizations in India. The paper gave an exhaustive coverage of various DL initiatives in different disciplines like art, manuscripts, engineering, public administration, women studies etc.; and DL initiatives on different types of resources like ETDs, manuscripts, etc., functioning successfully in the country. The author identified certain problems associated with these initiatives. A major problem pointed out was the lack of clear cut national level policies that support the sustainability of these DLs. Lack of OCR facilities for multiple Indian languages and non-availability of well-trained skilled personnel were some other problems identified.

## 2.4 Observations Based on the Review

The following observations are made from the literature review. The developments in the subject fields are listed down in a chronological order.

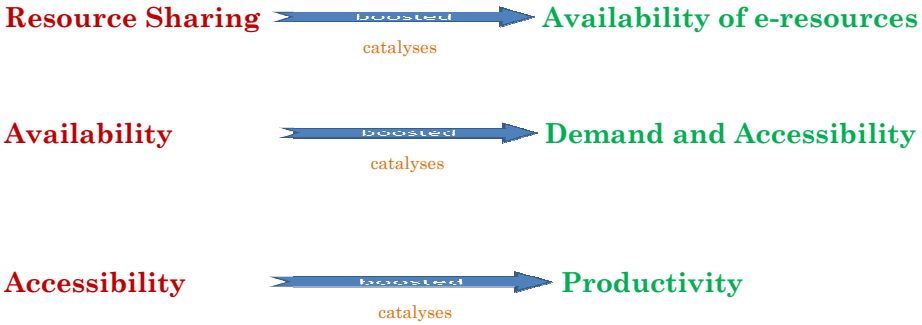
1. Use of e-resources and services & resource sharing and consortia are the widely discussed areas in the field of librarianship. Whereas design and development of digital libraries and virtual libraries is a developing field and hence relatively lesser number of publications have come out in this area.
2. In the beginning of 2000s the use of e-resources and services was comparatively less and studies recommended campaigns for the promotion of e-resources.
3. In India, consortial subscriptions of databases took impetus in 2003-2004. But the services were made available to the IITs, IIMs, and centrally funded universities.

4. In the second half of 2000s, the availability and utilization of e-resources in IITs, IIMs, and other centrally funded institutions were comparatively high.
5. By this time a shift in preference towards e-resources became evident in academic libraries around the world.
6. The activities of resource sharing consortia in different discipline were extended to more number of institutions which in turn improved the availability, acceptance and use of e-resources among academics
7. Studies related to the use of e-resources and the impact of consortia occupied the professional literature.
8. The demand for special type of consortia for different types of institutions started emerging and many studies proposed models and prototypes for the same.
9. Studies on the development and use of digital libraries, virtual libraries and institutional repositories started appearing in literature.
10. In the field of design of DLs/VLS Indian studies are comparatively less.
11. Regarding the studies on engineering college libraries, a lot of studies have come out from different states of the India. But from Kerala only one study has come out in 2007. The study revealed that the librarians and academics of engineering colleges in Kerala are in favour of a resource sharing consortium.
12. No comprehensive study has come out on the availability and use of e-resources in the engineering college libraries in Kerala.

## 2.5 Conclusion

A sincere effort has been made to identify, locate, collect and evaluate relevant literature in the above mentioned concepts. The review helped to make a clear understanding of these concepts and the

tools used for collecting and analyzing data. The gaps in the studies are also identified. The review leads the researcher to the following conclusion.

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# Chapter 3
# ENGINEERING EDUCATION IN KERALA

## 3.0 Introduction

Ever since independence, the higher education sector in India especially technical education, has largely been public funded. With the introduction of economic liberalization and privatization in the country, the central and state governments' policies on public financing of higher education also changed. As a result a large number of self financing institutions imparting higher and technical education budded up all over the country. While the central government funded institutions get huge financial support for building up their resources and facilities, the state government funded institutions and private self financing institutions lag much behind them in raising funds for maintaining such standards. Many studies have identified a wide gap among the institutions imparting technical education in the country in terms of the quality of resources and teaching faculties.

This chapter attempts to briefly describe the technical education scenario in the country, the growth of engineering colleges in Kerala and the status quo of the study units. Various electronic resources available to the engineering academics in the country as well as the activities of different consortia in the area of engineering and technology are also discussed.

## 3.1 Technical Education Scenario in India

The foundation of technical education in India was laid almost in the same time as in Europe around 1794, when the British traders established a Survey School at Madras to train Indian personnel in

modern land surveying. The need for the introduction of occupational education was highlighted in 1854 in the "Wood's Despatch". The recommendations of this report formed the basis for the establishment of formal engineering education in the country. The first EC in India was established at Roorke in 1847 which later became the First Engineering University of independent India in 1949 and an Indian Institute of Technology (IIT) in 2001. In 1854, the second EC was established in Pune (College of Engineering, Pune) and then in Bengal (Bengal Engineering College) and Madras (College of Engineering, Guindy) respectively in 1856 and 1859. All these colleges imparted courses in civil engineering. In the beginning of the 20th century, College of Engineering Jadavpur, Bengal started a diploma course in Mechanical Engineering followed by a course in Chemical Engineering (Sen, 1989).

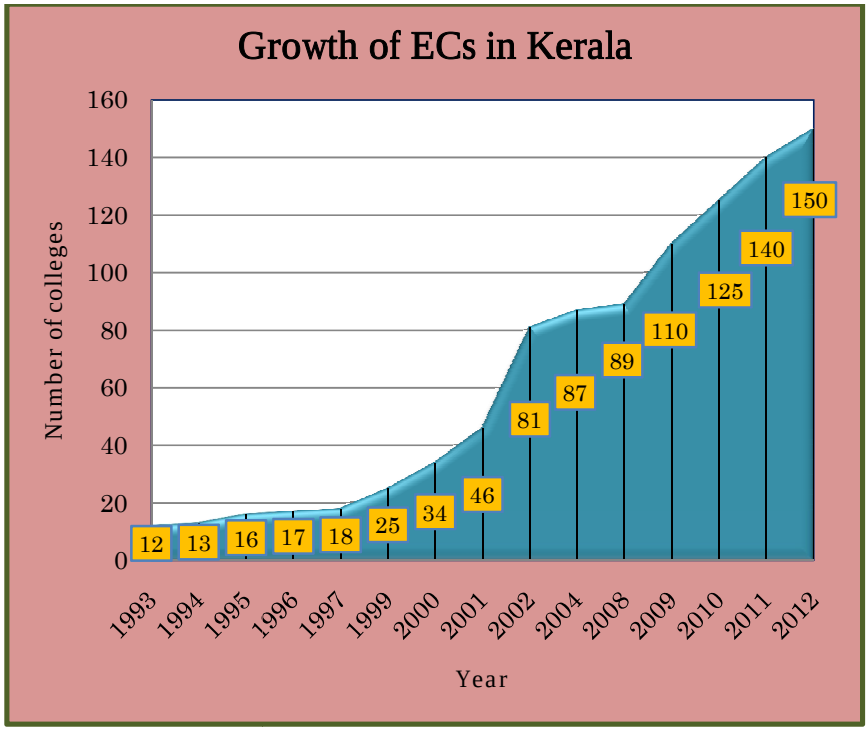
The technical education scenario geared up in the mid twentieth century by the appointment of AICTE in 1945. The AICTE recommended the establishment of four regional higher technical education institutes in the pattern of Massachusetts Institute of Technology (MIT), USA. Thus the first IIT was established in 1950 at Kharagpur, West Bengal. The other 3 IITs were then set up in Kanpur, Bombay and Madras. In 1947, there were hardly 38 institutions offering first degree course in engineering in the country (Sen, 1989). The number of institutions imparting engineering education has grown up to around 3500 in the year 2013. This includes 16 IITs, 8 Indian Institutes of Information Technology (IIITs) and 20 National Institutes of Technology (NITs). The growth of AICTE approved ECs for the last seven years (AICTE, 2013) is depicted in the following table (Table 3.1).

**Table 3.1 Growth of ECs in India**

| YEAR | NO. OF ENGINEERING INSTITUTES | ANNUAL INTAKE |
|---|---|---|
| 2006-07 | 1511 | 550986 |
| 2007-08 | 1668 | 653290 |
| 2008-09 | 2388 | 841018 |
| 2009-10 | 2972 | 1071896 |
| 2010-11 | 3222 | 1314594 |
| 2011-12 | 3393 | 1485894 |
| 2012-13 | 3495 | 1761976 |

## 3.2 Engineering Colleges in Kerala

Formal engineering education started in Kerala even before Indian independence. The first EC in Kerala was established in 1936 at Thiruvananthapuram by Sree Chithira Thirunal Balarama Varma, the then Maharaj of Travancore (College of Engineering Trivandrum, 2012). Until 2001, the engineering education in the state was mainly public funded. There were 34 ECs in Kerala in 2000 which were established and run directly by the state government or autonomous bodies under state government and aided managements. In 2001, the state government decided to permit private managements to establish self financing ECs across the state which in turn changed the technical education scenario of the state. For the last 10 to 12 years there has been an enormous increase in the growth of ECs in the state, which is depicted in the figure 3.1.




*Source: Commissioner for Entrance Examination Kerala, 2013

**Fig 3.1 Growth of ECs in Kerala**

At the time of conducting the present study (in 2012), there were 150 ECs in the state. Out of these 150 colleges, one is the NIT, Calicut, a national level institute. Two colleges affiliated to (run by) the Kerala Agricultural University and the Kerala Veterinary and Animal Sciences University offer BTech and MTech courses in different disciplines of Agriculture, Food Technology and Dairy Science & Technology. All the other 147 colleges offer BTech and MTech courses in different branches of engineering and are affiliated to the 5 different universities in Kerala (Commissioner for Entrance Examination Kerala, 2013), (University of Kerala, 2013), (M.G.University, 2013), (Cochin University of Science and Technology, 2013), (University of Calicut, 2013) & (Kannur

University, 2013). The number of colleges affiliated by different universities is depicted in the figure 3.2. It is clear from the diagram that M.G.University is the largest affiliating university of ECs.

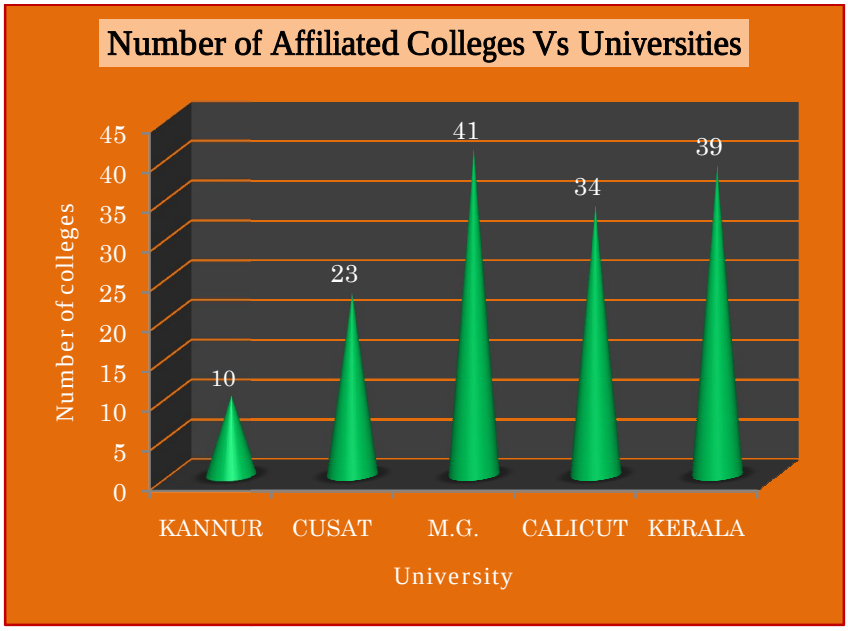



**Fig 3.2 Number of Affiliated Colleges Vs Universities**

### 3.2.1 Types of Institutions Offering Engineering Education

In Kerala, the types of institutions offering engineering education mainly fall under three groups- viz, **government, aided** and **self financing (S.F.)**. The government colleges are fully funded by the state government. The aided colleges are set up by private managements with respect to their infrastructure facilities and the state government aids the salary of the teachers and staff. These colleges are also assisted by certain special funds from the central and state governments. The self financing colleges are set up by private managements, semi governmental/autonomous bodies, universities, etc

and are run solely by the fee collected from the students. The numbers of colleges that fall under the different categories mentioned above are depicted in the figure 3.3.

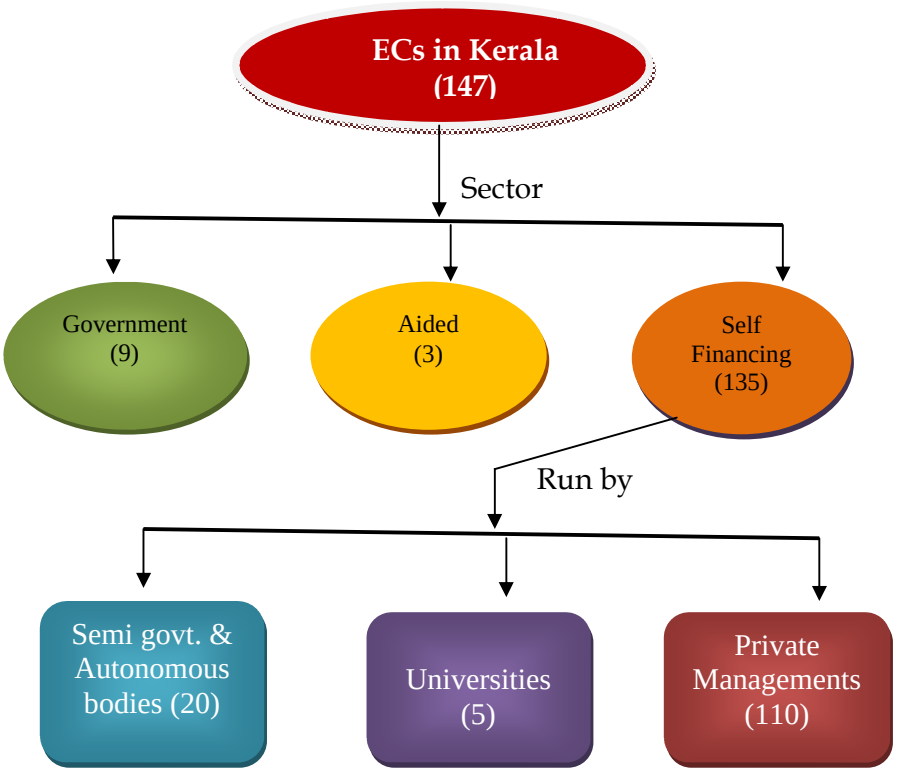



**Fig 3.3 Number and Types of ECs in Kerala**

Co-operative Academy of Professional Education (CAPE), Institute of Human Resource Development (IHRD), LBS Centre for Science & Technology, Kerala State Road Transport Corporation (KSRTC) and Center for Continuing Education, Kerala are the semi governmental/ autonomous bodies (established by the state government) that run ECs

in the self financing sector. The University of Kerala, Mahatma Gandhi University(M.G.University), Cochin University of Science and Technology (CUSAT) & Calicut University are the universities in the state that runs self financing ECs. Among these CUSAT manages 2 ECs.

## 3.3 Mahatma Gandhi University, Kottayam

The M.G. University, Kottayam was established on 2nd October 1983 and has jurisdiction over the revenue districts of Kottayam, Ernakulam, Idukki and parts of Pathanamthitta and Alappuzha. It conducts a range of programmes at the undergraduate, postgraduate, MPhil and doctoral levels through its 16 university departments, 7 self financing departments, 82 aided affiliated colleges, 158 unaided affiliated colleges and 73 recognized research institutes. It imparts education in the conventional disciplines of science, social science and the humanities as well as in the professional disciplines of medicine, nursing, pharmacy, dentistry, engineering, technology, pedagogy and legal studies. The University has also made its educational presence felt outside its territorial jurisdiction through the Off-Campus Centres of the School of Distance Education (M.G.University, 2013).

### 3.3.1 Engineering Education under M.G. University

The M.G. University gives affiliation to 41 ECs (until 2012) under the government, aided and self financing sector that are located at Kottayam, Ernakulam, Pathanamthitta and Idukki districts. The university offers BTech degree in 8 branches of engineering and MTech

degree in 6 branches (M.G.University, 2013). The different braches under which courses are offered is listed in the table 3.2. The number and types of the 41 affiliated ECs under the university is depicted in the table 3.3.

**Table 3.2 Branches Under which Courses are Offered in M.G.University**

| | | |
|---|---|---|
| **BTech** | 1 | Applied Electronics and Instrumentation |
| | 2 | Automobile Engineering |
| | 3 | Civil Engineering |
| | 4 | Computer Science |
| | 5 | Electrical and Electronics |
| | 6 | Electronics and Communication |
| | 7 | Information Technology |
| | 8 | Mechanical Engineering |
| **MTech** | 1 | Computer Science and Information System |
| | 2 | Computer and Structural Engineering |
| | 3 | Communication Engineering |
| | 4 | Machine Design |
| | 5 | Power Electronics and Power System |
| | 6 | Production and Industrial Engineering |

It is clear from the table that the university gives affiliation to 2 government colleges, 1 aided college and 38 self financing colleges. It is also evident that more than 50% of the colleges are located at Ernakulam district (M.G.University, 2013).

**Table 3.3 Number & Type of ECs Affiliated to M.G.University until 2012**

| District | Govt. | Aided | S.F. | Total |
|---|---|---|---|---|
| Kottayam | 1 | | 6 | 7 |
| Ernakulam | | 1 | 25 | 26 |
| Pathanamthitta | | | 4 | 4 |
| Idukki | 1 | | 3 | 4 |
| Total | 2 | 1 | 38 | 41 |

### 3.3.2 Profile of ECs under Study

Even though the M.G. University gives affiliation to 41 ECs, the present study covers only the colleges that were established before 2009. The number and types of the ECs under study is presented in the table 3.4.

**Table 3.4 Number and Type of ECs under Study**

| **District** | **Govt.** | **Aided** | **S.F.** | **Total** | **%** |
|---|---|---|---|---|---|
| Ernakulam | | 1 | 10 | 11 | 50% |
| Idukki | 1 | | 2 | 3 | 14% |
| Kottayam | 1 | | 4 | 5 | 23% |
| Pathanamthitta | | | 3 | 3 | 14% |
| Total | 2 | 1 | 19 | 22 | 100% |

Brief profiles of these 22 colleges are made here under each district.

**ERNAKULAM DISTRICT**

**3.3.2.1 Adi Shankara Institute of Engineering & Technology (ASIET)**

ASIET, established in 2001 and run by the Adi Sankara Trust claims to be the first self financing technical education centre to be awarded the ISO certification for quality management. The college is situated at Kalady, Ernakulam district, the birth place of Adi Shankara. The college offers undergraduate courses in 6 branches and post graduate courses in 3 branches of engineering and an MBA programme. The knowledge network integrates the knowledge centres of different institutions under the Adi Sankara group. The network provides internet connectivity in the hostels. With a good collection of books and electronic resources, the college library is open to all the staff and students of the college (http://www.adishankara.net/index.aspx).

**3.3.2.2 Federal Institute of Science And Technology (FISAT)**

FISAT is a private self financing EC, established in 2002 and run by the Federal Bank Officers' Association Educational Society (FBOAES). The college is set up at Mookannoor, near Angamaly in Ernakulam District. An ISO 9001:2008 certified institution, it offers BTech (6 branches), MTech (4 branches), MCA & MBA courses. The 'Central Computing Facility' of the college has five labs and 250 computers. In addition an 'Internet café' with thirty terminals is kept open upto 6 P.M to enable the students to utilize the possibilities of web-based learning. 7Mbps Broadband internet connectivity is available for this. The College has a Central library and separate reference libraries for MBA and MCA. The Central library is operating in a three

storeyed building where separate reference and stack rooms are provided. The library membership is open to FISAT community on request. The working hours are 8am to 8pm (http://www.fisat.ac.in/).

#### 3.3.2.3 Ilahia College of Engineering and Technology (ICET)

ILAHIA College of Engineering and Technology established in the year 2002, is a private self financing college situated at Muvattupuzha. It offers BTech (6 branches), MTech (6 branches), MBA & MCA courses. The college library has a good collection of books, journals, and electronic resources. A 6Mbps broad band internet connection enabled with Wi-Fi technology provides campus wide access to these resources. Working hours of the library is from 8 A.M. to 7 P.M (http://icet.ac.in/).

#### 3.3.2.4 KMEA Engineering College (KMEA)

KMEA Engineering College is a private self financing EC run by the Kerala Muslim Educational Association at Edathala, Aluva. A minority institution established in 2002, the college received the ISO 9001:2008 Certification on May 2013. The college offers BTech in 7 branches and MTech in 4 branches. The college library has a collection of around 15000 books and 100 journals. The digital library provides access to 6000 e-books. The campus is Wi-Fi enabled (http://kmeacollege.ac.in/index.php).

#### 3.3.2.5 Mar Athanasius College of Engineering (MACE)

MACE is an aided EC established in 1961 at Kothamangalam by the Mar Athanasius College Association. It is the first EC to be affiliated to the M.G. University. The college offers BTech in 5 branches

and MTech in 7 branches. With respect to the collection of books, the college library ranks first among the ECs affiliated to M.G.University. In addition to the central library the college has department libraries with a good collection of books and journals. The campus network is connected to internet through 1Mbps broad band connectivity and 512 Kbps DVB downstream satellite connectivity. The library working hours are 8.30 a.m.-5.30 p.m. (http://www.mace.ac.in/).

#### 3.3.2.6 Matha College of Technology (MCT)

Matha College of Technology, North Paravur is an ISO 9000:2001 certified private self financing college. Established in 2003, the college offers BTech courses in 6 branches. The college library has a collection of 15000 books under 5000 titles and around 100 journals. The working hours of the library are from 8.30 a.m. to 5 p.m. (http://www.mathacollegeoftechnology.edu.in/).

#### 3.3.2.7 Rajagiri School of Engineering and Technology (RSET)

RSET, established in 2001 is a private self financing EC situated at Kakkanad, Ernakulam. The institution is managed by the Sacred Heart Province of CMI fathers. The college offers 7 BTech courses and 6 MTech courses. The college has 12Mbps leased line internet connectivity with Wi-Fi facility. The central library has a collection of around 25000 books, a good number of electronic databases and e-books. The library is open from 8a.m. to 8.30 p.m. The institutional repository maintained by the college provides access to faculty publications, proceedings of conferences conducted by the colleges and student project reports. The access to the digital resources is limited to authorized users within the campus (http://www.rajagiritech.ac.in/Home/Index.asp).

### 3.3.2.8 SCMS School of Engineering and Technology (SCMS)

SCMS School of Engineering & Technology, established in 2001 is a private self financing EC setup at Karukutty, Ernakulam and managed by the SCMS Group of Educational Institutions. An ISO certified institution, the college offers BTech and MTech courses (6 branches each) and MCA programmes. The campus wide network comprises of 617 computers connected to 2 leased line with 10Mbps speed. The central library and department libraries offer a good collection of reading materials to the academics. The college library has a collection of around 26000 books and about 150 periodicals. The library functions from 8a.m. to 8 p.m. (http://www.scmsgroup.org/sset/).

### 3.3.2.9 Sree Narayana Gurukulam College of Engineering (SNGCE)

SNGCE is an ISO 9001:2008 certified private self financing college managed by the Sree Narayana Gurukulam Trust, Kunnathunadu. The college was set up in 2002 at Kadayiruppu, Ernakulam. It offers BTech (6 branches) and MTech (7 branches) courses as well as MBA & MCA courses. The college library has a collection of over 37000 books, over 200 journals and a digital repository. The central computing facility provides internet accees through Asianet's and BSNL's dedicated fibre optic cable with 2Mbps bandwidth. The library is open from 8a.m. to 8p.m. (http://www.sngce.ac.in/).

#### 3.3.2.10 Sree Narayana Mangalam Institute of Management & Technology (SNMIMT)

SNMIMT, Maliankara, Ernakulam is a private self financing college under the patronage of the HMDP Sabha. Established in 2002, the college offers BTech courses in 6 branches of engineering. The central computing facility offers 40 networked computers. The campus wide network is connected to internet with 4Mbps broadband line. The college library has a collection of about 16000 books and 60 periodicals and electronic databases. The library remains open from 8 a.m. to 5 p.m. ( http://www.snmimt.edu.in/).

#### 3.3.2.11 Viswajyothi College of Engineering & Technology (VJCET)

VJCET is a private self financing EC established in 2001 by the Catholic Diocese of Kothamangalam. The college is situated at Vazhakkulam near Muvattupuzha. The college has 6 academic departments each offering BTech courses and 4 MTech courses. The central computing facility of the campus functions at a speed of 40Mbps from 8a.m. to 8p.m. The central library holds a collection of around 30000 books and 139 periodicals. The normal working hours of the library is from 8 a.m. to 6 p.m. (http://www.vjcet.ac.in/).

### IDUKKI DISTRICT

#### 3.3.2.12 Government Engineering College, Idukki (GECI)

GECI is situated at Painavu, Idukki and was established in 2000 under the Directorate of Technical Education, Government of Kerala. The college offers BTech in 4 branches and MTech in 2 branches. The college receives funds under the Technical Education

Quality Improvement Programme (TEQIP) of the Ministry of Human Resource Development (MHRD), Government of India, for the period 2011 to 2015. GECI has a 2 Mbps broadband internet connection, along with 10 more 512 Mbps connections under National Mission on Education through Information and Communication Technologies (NMEICT) program. The students can access internet through Campus Area Network (CAN) and Wireless Area Network (WAN). The Satellite Interactive Terminal established in the college by the ISRO enables distant education via EDUSAT. The college library provides access to books, journals and electronic resources and is open from 9am to 5pm on all working days. The colleges is a remote center of the Ekalavya eOUTREACH Programme of Indian Institute of Technology (IIT) Bombay. (http://www.gecidukki.ac.in/).

#### 3.3.2.13 Mar Baselios Christian College for Engineering (MBC)

MBC, Peermedu is a self financing EC established in 2001 and is managed by the Malankara Syrian Orthodox Church. The college offers BTech courses in 5 branches. The college library has a collection of more than 25000 books and 80 periodicals. The Wi-Fi enabled campus provides round the clock access to internet through leased line and broadband connections (http://www.mbcpeermade.com/).

#### 3.3.2.14 University College of Engineering (UCE)

UCE is a self financing EC run directly by the M.G. University and is established in 1996 at Thodupuzha. The first self financing EC affiliated to the university, the college offers BTech (5 branches) and MTech (1 branch) course. The library collection ranges to 12000 books, 45 periodicals and online databases. The library provides broadband

internet connectivity through 12 terminals (http://ucet.ac.in/index.php?page=).

**KOTTAYAM DISTRICT**

**3.3.2.15 Amal Jyothi College of Engineering (AJCE)**

Amal Jyothi College of Engineering, Kanjirapally, a christian minority institution founded in 2001 by the Catholic Diocese of Kanjirappally offeres BTech, MTech and MCA courses. The college claims to be Kerala's highest student intaker of 690 seats for BTech across eight branches and 162 seats for 6 Master's Programmes. The college has secured NBA accreditation for prime departments. The campus has 30 Mbps internet connectivity with WiFi. The college has been approved as a center of Relevance and Excellence by the Technology Information, Forecasting and Assessment Council (TIFAC), under the Department of Science and Technology, Govt. of India. Amal Jyothi Knowledge Centre spread over 50000sq.ft dedicates 30000sq.ft for the central library. The Central Computing Facility is divided into 5 labs and seminar halls and provides 250 workstations for internet browsing. The Central library established in 2001 has a separate reference section, reading room, periodical section, stack area and PG library. The library is open on all days with a regular time table of 8am to 8pm. Amal Jyothi is selected as one of the remote centers of Ekalavya eOUTREACH Programme of Indian Institute of Technology (IIT) Bombay (http://www.ajce.in/ ).

**3.3.2.16 Mangalam College of Engineering (MLM)**

Mangalam CE, Kottayam is an ISO certified institution established in 2002 under the private self financing sector by the

Mangalam Group of Educational Institutions. The college offers BTech (6 branches) & MTech (5 branches) courses. The college has a central library and department libraries. The central library houses some 16000 volume of books and 100 periodicals and subscribes many electronic databases (http://www.mangalam.ac.in/).

### 3.3.2.17 Rajiv Gandhi Institute of Technology (RIT)

RIT is a government run EC established in 1991 at Pampady near Kottayam. The college offers BTech & MTech (5 branches each) courses as well as MCA & B.Arch courses. The college receives financial assistance under the TEQIP programme. The computer centre provides sufficient number of terminals connected on a LAN along with an interactive terminal of EDUSAT. The central library has a book collection of around 47000 volumes. The subject periodicals are purchased by the departments and maintained in the concerned department libraries (http://www.rit.ac.in/index.php).

### 3.3.2.18 Saintgits College of Engineering (SAINGITS)

SAINTGITS is a private self financing EC run by the Saint Gregorios Institute of Technology and Science Group of Professional Colleges. Set up at Pathamuttom near Kottayam in 2002, the college now offers 6 BTech courses and 4 MTech courses in addition to MBA & MCA courses. The college has been selected by IIT Mumbai as one of its 'Eakalavya eOUTREACH programme Remote Center.' The college library has a good collection of more than 40000 books and nearly 160 journals. Open from 7a.m. to 7p.m., the library maintains an institutional repository on DSpace platform, and E-Learning platform over Moodle software. The library provides around 100 computers with

10Mbps leased line connectivity for its users for accessing networked resources. The campus is wiFi enabled. The institution also maintains partnership with several industries and international institutions (http://saintgits.org/main/sie/default.asp).

#### 3.3.2.19 St. Joseph's College of Engineering and Technology (SJCET)

SJCET, Pala is a Christian minority institution under the private self financing sector. Established in 2002 by the Catholic Diocese of Palai, the college offers 6BTech and 5MTech courses along with MBA & MCA courses. An ISO 9001:2008 certified institution; the college has been selected as a remote center of IIT Mumbai's Ekalavya eOUTREACH programme. The college library houses around 32000 books, 200 print periodicals and a good number of electronic databases. The library offers a digital library built on DSpace platform. A leased line internet connectivity of 44Mbps and an additional connectivity of 10Mbps (for digital library) along with wiFi technology offer unlimited access to electronic resources in the campus. The college publishes a half yearly technical journal "**SJCET Journal of Engineering and Management" (**http://www.sjcetpalai.ac.in/Home).

**PATHANAMTHITTA DISTRICT**

#### 3.3.2.20 Caarmel Engineering College (BCC)

Caarmel Engineering College established in 2002 and currently run by the Believers Church is a self financing EC at Perunad of Pathanamthitta district. The college offers BTech courses in 6 branches. The college is an ISO 9001:2008 certified institution. The college is selected as a remote center of the Ekalavya eOUTREACH Programme

of Indian Institute of Technology (IIT) Bombay. The college library has a good collection of books, journals, and electronic resources with Wi-Fi connectivity. The digital library offers access to thousands of e-books. (http://www.bccaarmel.ac.in/default.asp).

#### 3.3.2.21 Musaliar College of Engineering and Technology (MCET)

MCET is an ISO 9001 certified institution managed by the Musaliar Education Trust under the private self financing sector. Established in 2001 at Pathanamthitta, the college offers BTech(5 branches) and MTech courses(3 branches). The college library houses a collection of more than 13000 volumes and 55 print periodicals. The library provides 15 networked computers with 2Mbps internet speed for accessing electronic resources.
(http://www.musaliarcollege.com/musaliar/).

#### 3.3.2.22 Mount Zion College of Engineering (MZC)

MZC is a private self financing EC established in 2001 by the Mount Zion Group. The college is located at Kadamanitta near Pathanamthitta. It offers BTech courses in 5 branches. The college library has a collection of nearly 20000 books and around 60 periodicals. The library is open from 8 a.m. to 6 p.m.
http://www.mountzioncollege.org/).

A general overview of the colleges under study with respect to their basic characteristics is given in table 3.5

**Table 3.5 List of Colleges under Study**

| Sl. No. | Name of College | Year of Est. | Locaton (District) | Sector | Offers P.G. Course |
|---|---|---|---|---|---|
| 1 | Amal Jyothi College of Engineering | 2001 | Kottayam | S.F. (Private) | yes |
| 2 | Adi Shankara Institute of Engineering & Technology | 2001 | Ernakulam | S.F. (Private) | yes |
| 3 | Caarmel Engineering College | 2002 | Pathanamthitta | S.F. (Private) | no |
| 4 | Federal Institute of Science And Technology | 2002 | Ernakulam | S.F. (Private) | yes |
| 5 | Government Engineering College, Idukki | 2000 | Idukki | Govt. | yes |
| 6 | Ilahia College of Engineering and Technology | 2002 | Ernakulam | S.F. (Private) | yes |
| 7 | KMEA Engineering College | 2002 | Ernakulam | S.F. (Private) | yes |
| 8 | Mar Athanasius College of Engineering | 1961 | Ernakulam | Aided | yes |
| 9 | Mangalam College of Engineering | 2002 | Kottayam | S.F. (Private) | yes |
| 10 | Matha College of Technology | 2003 | Ernakulam | S.F. (Private) | no |
| 11 | Mar Baselios Christian College for Engineering | 2001 | Idukki | S.F. (Private) | no |
| 12 | MUSALIAR College of Engineering and Technology | 2001 | Pathanamthitta | S.F. (Private) | yes |
| 13 | Mount Zion College of Engineering | 2001 | Pathanamthitta | S.F. (Private) | no |
| 14 | Rajiv Gandhi Institute of Technology | 1991 | Kottayam | Govt. | yes |
| 15 | Rajagiri School of Engineering and Technology | 2001 | Ernakulam | S.F. (Private) | yes |

| | | | | | |
|---|---|---|---|---|---|
| 16 | SAINGITS College of Engineering | 2002 | Kottayam | S.F. (Private) | yes |
| 17 | SCMS School of Engineering and Technology | 2001 | Ernakulam | S.F. (Private) | yes |
| 18 | St. Joseph's College of Engineering and Technology | 2002 | Kottayam | S.F. (Private) | yes |
| 19 | Sree Narayana Gurukulam College Of Engineering | 2002 | Ernakulam | S.F. (Private) | yes |
| 20 | Sree Narayana Mangalam Institute of Management & Technology | 2002 | Ernakulam | S.F. (Private) | no |
| 21 | University College of Engineering | 1996 | Idukki | S.F. (University) | yes |
| 22 | Viswajyothi College of Engineering & Technology | 2001 | Ernakulam | S.F. (Private) | yes |

## 3.4 Online Resources Available for Engineering Academics

Online resources refer to the electronic resources that are accessible online to the user community. In this section an overview of different online resources available and accessible to the engineering academics in India is being made. The online resources discussed here include online databases, e-learning courseware, etc.

### 3.4.1 Online Databases in Engineering

A lot of online databases are available free of cost as well as on subscription mode to the engineering libraries in the country. The AICTE has made it mandatory that all the approved ECs conducting UG/PG course shall purchase a minimum number of electronic databases depending on the branches in which courses are offered. For this purpose the AICTE published a list of such databases in its handbook (AICTE, 2012). Other electronic databases for engineering academics includes INSPEC, SCOPUS, PROQUEST, etc.

**Table 3.6 List of E-Journal Packages to be Subscribed by All ECs Conducting UG/ PG Courses Mandated by AICTE.**

| Sl. No. | Publisher | Subject Areas | e-content |
|---|---|---|---|
| 1. | IEEE | CE+CS+EEE+ Telecommunications and related disciplines | IEEE- ASPP (145 e-Journals) |
| 2. | Springer | EEE and CS | (134 e-Journals) |
| | **OR** | | |
| | Wiley- Blackwell | CS+ Data System+ Telecommunication & related discipline | 30 Journals |
| 3. | ASME | Mechanical Engineering | ASME e-Journals Package (25 e-Journals) |
| | **OR** | | |
| | Springer | Mechanical Engineering | (46 e-Journals) |
| | **OR** | | |
| | Wiley- Blackwell | Mechanical, Electrical and Electronics Engineering | 14 Journals |
| 4. | ASCE | Civil Engineering | ASCE e-journals Package (33 e-Journals) |
| | **OR** | | |
| | Wiley- Blackwell | Civil Engineering | 18 journals |
| 5. | McGraw Hill | General Engineering and Reference | Access Engineering Library |
| 6. | j-GATE | Engineering and Technology (JET) | 4700 Indexed, free full text 1700 |
| 7. | ELSEVIER | Engineering + Computer Science | SCIENCEDIRECT 275 Journals |
| 8. | ASTM DIGITAL LIBRARY (DL) ONLINE VERSION | Online dictionary of Engineering Science and Technology<br><br>EEE, ME, CE, Metallurgical, Petroleum, Instrumentation | ASTM DIGITAL LIBRARY over 1700 e- book and over 13,000 journal articles |

### 3.4.2 E-learning Courseware

The Indian Institutes of Technology (IITs), the premier engineering institutions in India are contributing much for the enhancement of technology education in the country. Innovations made by these institutions have proved much beneficial to the engineering academics in the country. By the projects named Ekalavya and National Programme on Technology Enhanced Learning, these institutions have contributed a lot of open contents as courseware for the engineering academics in varied digital formats. A brief discussion of these ventures is made here in.

#### 3.4.2a National Programme on Technology Enhanced Learning (NPTEL)

National Programme on Technology Enhanced Learning is a government of India sponsored collaborative education programme. It is an initiative by seven Indian Institutes of Technology (IIT Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and Indian Institute of Science (IISc) for creating course contents in engineering and science with IIT Madras as the coordinating institution. NPTEL is directed towards providing learning materials in Science and Engineering by adhering to the syllabi of All India Council for Technical Education and the slightly modified curricula of major affiliating Universities. They are meant to fill the large gap that exists between the current expertise level of faculty in institutions of higher learning such as the IITs/IISc and those in private and other government aided engineering institutions in India. The phase I of NPTEL, started in June 2003 to June 2007 produced 110 video lecture courses. The second phase of the project aimed at developing 400 video lecture courses. The

programme is now in its third phase and is aiming to become the world's largest video **repository of technical lecture-courses in the** streaming video format. The contents are freely downloadable to institutions and individuals (http://nptel.iitm.ac.in/faq.php).

### 3.4.2b Ekalavya eOUTREACH

Project **Ekalavya** is an endeavour to provide an interactive platform for the creation, absorption, dissemination and usage of knowledge for the well being of the individual and the society. Initiated in 2004, it is an **Open Source Knowledge Initiative** launched by the Affordable Solutions Laboratory (ASL), Department of Computer Science & Engineering, IIT Bombay. The eOUTREACH is a programme under this project aimed at disseminating digital contents of specialised workshops, courses, lectures, nutshell series of lectures and seminars of educational value to the beneficiaries outside the institution. These events are either arranged specially for the eOUTREACH programme or take place as a part of the regular events that are held at the IIT Bombay campus. They are held in modern state-of-the-art classrooms with a capacity to seat around 100 participants and are recorded using highly sophisticated equipments for achieving best quality. The recorded contents are then edited, reproduced in different formats like html, text, power point slides, streaming videos, audios, CDs and DVDs and disseminated at a small cost for maximum outreach. The eOUTREACH programme of project ekalavya has been funded and supported by the Technology Information Forecasting & Assessment Council (TIFAC). Under the programme, IIT Bombay conducts ISTE workshops during the vacation period in summer and winter through its various Remote Centers (RC). Lectures are delivered by faculty from IIT

Bombay, while tutorials and lab sessions are conducted in the same RC. A Remote Center is a place from where the participants/people can interact with the instructor (faculty at IIT) who is conducting the course or delivering a lecture from IIT Bombay. The live lectures are transmitted at RCs using A-VIEW software. The RC is usually a reputed engineering college with good facility and infrastructure (http://ekalavya.it.iitb.ac.in/ekalavyaHome.do).

### 3.4.3 K-BASE: a State Level E-learning Initiative

Kbase is an e-learning initiative by the Directorate of Technical Education, Government of Kerala. The repository was established in 2010 to facilitate the deposit of digital content of a scholarly nature created by the faculty, staff and students of various institutions under the Directorate of Technical Education, Government of Kerala. Kbase is an e-learning management system as well as an Institutional Repository which is an online locus for collecting, preserving, and disseminating, in digital form, the intellectual output of its various institutions. Kbase includes materials such as research journal articles, before (pre-prints) and after (post-prints) undergoing peer review, and digital versions of thesis and dissertations, administrative documents, course notes, or learning objects. There are 9 Engineering Colleges and 49 Polytechnic Colleges in addition to the Colleges of Fine Arts, Technical High Schools, Govt. Commercial Institutes, Tailoring and Garment Making Training Centres and Vocational Training Centers under the Department of Technical Education and they are expected to benefit from Kbase. The respository of Kbase is built on Dspace and the E-learning modules are built on Moodle (http://kbase.cet.ac.in).

## 3.5 Consortial Efforts Among Engineering Colleges

Resource sharing efforts among academic institutions in India gained a new face from the beginning of the last decade with the emergence of consortial subscription of electronic journals and databases. Different national level consortia are now functioning in the country serving the needs of academics and scientists in different disciplines. These are funded by the different ministries of the central government. In this section, a brief description of the different consortia serving the engineering academics in the country is made.

### 3.5.1 INDEST-AICTE Consortium

The Indian National Digital Library in Engineering Sciences and Technology (INDEST) consortium was set up in 2003 by the Ministry of Human Resource Development (MHRD), Government of India, with an objective to provide electronic resources for centrally funded and other academic institutions in Engineering, Science and Technology at highly discounted rates. IIT Delhi is made as the head Quarters for coordinating its activities. The consortium was renamed as INDEST-AICTE Consortium in December 2005 with AICTE playing a lead role in enrolling its approved institutions for subscribing selected electronic databases at subsidized rates (http://paniit.iitd.ac.in/indest/).

The consortium has three types of members based on funding agencies:

**I - Core Members supported by the MHRD**

**II - AICTE Supported Members**

**III- Self Supported Members**

However the first two types of members were allowed to take membership in the third group on the condition that they could subscribe to additional resources from their own fund at the subsidized

rates. Over the time a lot of engineering institutions took membership in the consortium and started subscribing to different databases. Until 2011 the number of self supported membership has grown upto 1007. In the year 2012, the AICTE recommended the mandatory subscription of electronic databases and the AICTE negotiated the price of these databases with various publishers and vendors. Then the colleges were asked to subscribe the items directly from the publisher thereby stopping the service of the consortium to a large majority of the Self Supported Members. Since 2012, the number of Self Supported Membership has fallen to 116 (Sahoo & Agarwal, 2012). Now this group includes only public funded higher education institutions that belong to the first 2 groups of membership. In other words, majority of the engineering colleges in self financing, government and aided sectors are now denied the membership in the consortium.

As far as the present study is concerned no library covered in this study is now a beneficiary of the INDEST-AICTE consortium.

### 3.5.2 DELNET

Developing Library Network (DELNET) was established in 1992 with the prime objective of promoting resource sharing among the libraries through the development of a network of libraries. It aims to collect, store, and disseminate information besides offering computerised services to users, to coordinate efforts for suitable collection development and also to reduce unnecessary duplication wherever possible. DELNET has been actively engaged with the compilation of various Union Catalogues of the resources available in member-libraries. In addition the DELNET provides Inter Library Loan and Document Delivery Service, retro-conversion, reference service,

professional training and technical support to its member institutions. Recently DELNET started providing access to electronic databases in different disciplines. The Infotrac Engineering, Science & Technology Collection (**IESTC**) provides access to more than 2000 journals covering various streams of Engineering, Technology & Allied Sciences (http://www.delnet.nic.in/index.htm).

Many of the colleges under this study have a membership in DELNET and avail its services. Some of the colleges subscribes to the IESTC collection.

## 3.6 Conclusion

The chapter presented a clear understanding of the growth of ECs in India and Kerala. The descriptions of the ECs affiliated to M.G.University provide an overview of the status quo of the colleges and their libraries covered in this study. The data regarding the study units provided in this chapter is solely taken from their respective websites. A close examination of this data reveals that the available facilities among different colleges vary to a large extent.

Regarding the online resources available to the engineering academics, a lot of open resources are also available in addition to those discussed in this chapter. The engineering academics of national level institutions are gifted with the facilities to harness all these resources, while the academics in state level and self financing institutions are having access to only some or none of these resources. This gap could be minimized to some extent if the library professionals of these institutions take some effort to identify, locate, collect and organize such open content to support their academics. The discussions made in this

chapter provide a basis for further analysis of collected data in the following chapters.

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# Chapter 4

# THE METHODOLOGY

## 4.0 Introduction

Methodology in research refers to the scientific approach followed by an investigator in studying a research problem. It is a body of methods and techniques employed by the researcher in carrying out his investigation in a logical manner. It explains the procedures involved in identifying the sources, population and samples, methods of data collection, as well as the statistical and other techniques needed to analyse the collected data for interpretation.

This chapter deals with the discussions of the various methodologies employed by the investigator in carrying out the present study.

## 4.1 The Population

The investigator collected data from 2 different populations to study their characteristics. The populations are:

- Engineering College Libraries &
- Library Users

### 4.1.1 Engineering College (EC) Libraries

As discussed in chapter 3, the study covered 22 ECs affiliated to the M.G.University, Kottayam which were established before 2009. All the entities included in the population were studied without any sampling.

### 4.1.2 Library Users

The final year BTech students, the MTech students and faculty members were taken as the population under this group. The total population identified under each category is depicted in table 4.1

**Table 4.1 Population of Library Users under the Study**

| CATEGORY | NUMBER |
|---|---|
| Final Year BTech Students | 9406 |
| MTech Students | 1764 |
| Faculty Members | 2910 |
| **Total** | **14080** |

## 4.2 The Sample

Among the two populations, the second one was comparatively large. Hence it was required to take a sample from that population. For determining the sample size several sources were consulted as discussed below:

For small populations, less than 200, the general rule-of-thumb is that one needs to have at least 50% of the population respond. If the population exceeds 10,000 the sample size hardly increases. Although this is contrary to common sense, this has been statistically proven and is a common research procedure (IEEE, 2013). According to Rea and Parker (1997), for a population size of 20000, the required sample size for 95% confidence level with (±) 5% margin of error, is **377**.

Jeff Watson's table for finding the base sample size shows that for a confidence level of 95% with (±) 5% margin of error, the base sample for a population of size 15000 is **390**. Here the base sample size is the number of responses the researcher must get back. However,

since not everyone will respond, it is necessary to increase the sample size. This could be reached by dividing the base sample with the estimated response percentage (Watson, 2001).

According to Toro Yemane the sample size 'n' is given by:

$$? = \frac{?}{? + ? ??}$$

where N is the size of the population and e=5%, is the error (confidence level).

Substituting the values for the current population in this formula, n is calculated to be **388.**

Based on these discussions, the base sample for the current population was set to be **400**. This represents the number of good responses eligible for analysis.

After calculating the sample size, the sample design was made. Since the population included three categories of users as mentioned in table 4.1, a stratified (proportionate) random sampling technique was employed for identifying the samples. The calculated sample size accordingly is given in the table 4.2.

**Table 4.2 Sample Size of Library Users under the Study**

| CATEGORY | POPULATION CODE | POPULATION | SAMPLE CODE | PROPORTIONATE SAMPLES (=$N_X$/14080*400) |
|---|---|---|---|---|
| BTech | $N_B$ | 9406 | $n_b$ | 267 |
| MTech | $N_M$ | 1764 | $n_m$ | 50 |
| Faculty | $N_F$ | 2910 | $n_f$ | 83 |
| **TOTAL** | **N** | **14080** | **n** | **400** |

In order to overcome the chances of non-responses and bad responses the sample size was increased, expecting a response rate of 70%.

Therefore; the required sample was calculated as:

$$N = \frac{???}{??\%} = 570$$

where 400 is the calculated base sample

## 4.3 The Survey and Instruments

The study employed survey method to collect the requisite data for the analysis. The instruments used for data collection were structured questionnaires, interviews and observations. Two separate sets of questionnaires were used to collect data from the students and faculty members. To collect data regarding the library resources and facilities, the chief librarians of the colleges were given questionnaires. Personal interviews of the librarians were also taken as and when needed to get supplementary information. Investigator's personal observations and experiences with the library systems of the study units helped to interpret the data properly.

The questionnaire given to librarians consisted of 7 sections viz; general information, library collection, library budget, ICT infrastructure, library services, library personnel and resource sharing. All the questions were closed ended (AppendixI).

Two sets of questionnaires were designed to collect data from users - one for students (Appendix II) and one for the faculty members (Appendix III). The main purpose for this data collection was to ascertain the use of different resources of the libraries and to measure the satisfaction with their current library facilities. Even though the type of data to be collected from both the groups were similar, some of the questions given to students were exempted from the questionnaire

for faculties whereas some other questions were included in it. The questions in both the instruments generally fall under 4 sections – general information, library use, use of electronic resources and resource sharing.

The questionnaires were pretested with a small population of respondents and librarians in 2 colleges and the modified instruments were used for the actual survey. For the purpose of collecting data the investigator personally visited all the 22 colleges spread over the four districts in Kerala during the period from January 2012 to August 2012. The potential users of the libraries were identified with the help of the library staff and the questionnaires were distributed.

## 4.4 The Responses

As discussed under section 4.2, around 600 questionnaires were distributed among the respondents expecting a response rate of 70%. The faculty members were given 100 questionnaires; BTech students were given 400 and MTech students, 100 questionnaires respectively.

Out of the 400 questionnaires given to BTech students, 365 were received and out of the received responses 330 were completed ones and the rest were rejected since they were incomplete and not good for analysis. From the MTech students, 81 responses were received and 70 were found to be good for analysis. Out of the 100 questionnaire distributed to faculty members, 92 were received and 85 good responses were taken for analysis and 7 were rejected since they were incomplete. Hence a total of **485** good responses were received thereby achieving the base sample size. The response rate was found to be 80%.

Table 4.3 represents the details of the number of questionnaires distributed to different categories and the percentage of responses received.

**Table 4.3 Details of Questionnaires Distributed and Responses Received**

| CATEGORY | NUMBERS OF QUESTIONNAIRES DISTRIBUTED | REQUIRED NUMBER OF RESPONSES | ACTUAL NUMBER OF GOOD RESPONSES RECEIVED | PERCENTAGE OF RESPONSES |
|---|---|---|---|---|
| BTech | 400 | 267 | 330 | 82% |
| MTech | 100 | 50 | 70 | 70% |
| Faculty | 100 | 83 | 85 | 85% |
| **TOTAL** | **600** | **400** | **485** | **80%** |

## 4.5 Tools and Techniques used for Data analysis

The collected data was coded and analysed using Microsoft Excel 2007 package and Statistical Package for Social Sciences (SPSS). For generating graphs, figures and charts, Excel was used and SPSS was used for descriptive and inferential statistical analyses. The techniques used for data analysis included percentage analysis and Chi-square analysis.

For comparing the facilities and resources of the libraries, simple percentage analysis was done. Graphs and other figures were generated mostly on the basis of percentage analysis.

Chi-square ($\chi^2$) test was mainly used in the study for the analysis of user questionnaires. Chi-square ($\chi^2$) as a non parametric test, otherwise called chi-square test for independence is used to test the dependency between two attributes (Kothari, 2004). It is based on the

deviation of the observed frequencies from their expected frequencies. It is given by:

$$\chi^2 = \sum (O_{ij} - E_{ij})^2 \div E_{ij}$$

Where; $O_{ij}$ is the observed frequency of the cell in the *i*th row and *j*th column and $E_{ij}$ is the expected frequency of the cell in the *i*th row and *j*th column.

The expected frequency of a cell is calculated by:

$$E_{ij} = \left( \frac{\text{(Row total for the row of the cell)} \times \text{(Column total for the column of the cell)}}{\text{Grand Total}} \right)$$

Degrees of freedom play an important role in using the chi-square test. The degree of freedom for $\chi^2$ test is calculated as follows:

$$\textbf{d.f.} = (c\text{-}1)\,(r\text{-}1);$$

where *c* means the number of columns and *r* the number of rows.

If the calculated value of $\chi^2$ is greater than the table value for a given degree of freedom at a certain level of significance, then the dependency of the attributes is considered as significant (Vaughan, 2009).

## 4.6 Conclusion

A brief description of the various methods and methodologies employed at various stages of the present study has been discussed. In the next chapter the detailed statistical analysis of the collected data is made.

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# Chapter 5

# ANALYSIS AND INTERPRETATION

## 5.0. Introduction

In this chapter a detailed statistical analysis of the data collected from different college librarians and users is made. Two statistical software packages- the Microsoft Excel 2007 and Statistical Package for Social Sciences (SPSS) are used for the analysis, hypothesis testing and generating graphs, charts and other figures. The primary objective of the study is to ascertain the status quo of the facilities and services of the engineering college libraries (study units) under study and to analyse the use and user satisfaction. The analysis is done from two points of view. The data regarding the library facilities and resources are analysed according to the type (sectors) of the institutions such as government colleges, aided colleges and private self financing colleges. After this the total study units are again categorized and ranked according to their facilities irrespective of their types (sectors). Further the user responses are analysed according to this categorization. This is because the user satisfactions are always dependent on what their libraries provide and not based on the sector to which their institutions belong to. Hence the analysis is presented in two parts:

**Part A** - Analysis of the data collected from the college librarians and categorization of the colleges with respect to their facilities.

**Part B** - Analysis of the user responses based on the above categorization and with respect to some other variables.

# Part A- Analysis of Library Details

The data for this section has been collected by means of a structured questionnaire supplemented with interviews of the librarians in charge of the college libraries. The investigator personally visited each library and librarian covered in this study to collect the necessary data. In certain rare cases, the librarians/managements were not willing to share some information that they thought to be confidential. Apart from that the investigation is successful in collecting the complete information required for this analysis.

## 5.1 General Information

As discussed in the previous chapters the engineering colleges (ECs) under study fall under different types and levels. In this section, some general information regarding the colleges and their libraries are discussed.

### 5.1.1 Type of Institutions

At the time of conducting this study there were 41 ECs affiliated to M.G. University. Among these, 19 colleges were established on and after 2009. These colleges were exempted from the study since their development is at an initial stage and also the study intended to survey the final year BTech students.

The institutions covered in this study fall under 3 different types (sectors) – Government ECs, Government Aided ECs and Self Financing ECs. The distribution of the number of colleges under these categories is depicted in the following diagram (fig 5.1). Among the 22 colleges under study 86% (19 colleges) come under the self financing

(S.F.) sector, 9% (2 colleges) are run directly by the government (Govt.) of Kerala and 5% (1 college) falls under the government aided sector.

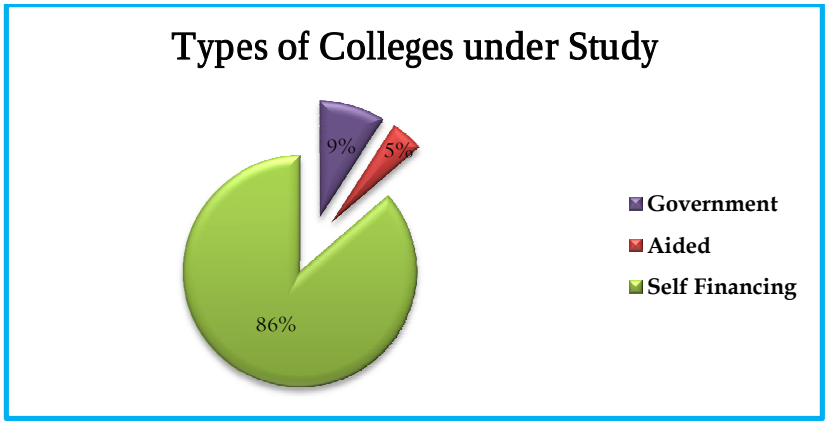



**Fig. 5.1 Type of Institutions**

### 5.1.2 Level of Institutions

With respect to the level of courses (undergraduate and post graduate) offered by the institutions, they are categorized into undergraduate (UG) level and postgraduate (PG) level colleges. The number of UG and PG level colleges under different types (sectors) is depicted in table 5.1.

**Table 5.1 Level of Institutions**

| Level | Type of Colleges | | | Total (n=22) |
|---|---|---|---|---|
| | Govt. (n=2) | Aided (n=1) | S. F. (n=19) | |
| UG | - | - | 5 (26%) | 5 (23%) |
| PG | 2 (100%) | 1 (100%) | 14 (74%) | 17 (77%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

It is seen that all the colleges under the government and aided sector, and 74% (14) colleges in the S.F. sector are PG level colleges. On

a whole 77% (18) of the colleges under study are PG level institutions and 23% (5) of the colleges offer only UG courses.

### 5.1.3 Year of Establishment

The study units include colleges established from 1961 to 2003. The year of establishment of different types of colleges is depicted in the table 5.2. The oldest college among the group is the aided college established in 1961. One of the government colleges was established in 1991 and the other in 2000. Among the S.F. colleges, the first one was established by the M.G.University in 1996. All the other colleges were established on or after the year 2001. Most of the colleges under study were established on 2001 and 2002. All these colleges have completed a decade of educational service.

**Table 5.2 Year of Establishment of Colleges**

| Year of Estb. | Type of Colleges | | | Total (n=22) |
|---|---|---|---|---|
| | Govt. (n=2) | Aided (n=1) | Self Financing (n=19) | |
| 1961 | _ | 1 (100%) | _ | 1 (5%) |
| 1991 | 1 (50%) | _ | _ | 1 (5%) |
| 1996 | _ | _ | 1 (5%) | 1 (5%) |
| 2000 | 1 (50%) | _ | _ | 1 (5%) |
| 2001 | _ | _ | 8 (42%) | 8 (36%) |
| 2002 | _ | _ | 9 (48%) | 9 (41%) |
| 2003 | _ | _ | 1 (5%) | 1 (5%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.1.4 Number of Library Memberships

It is observed that in many of the libraries, all the students, teachers and non-teaching staff are considered as library members

where as in other libraries, membership is given only on requisition. An analysis of the details provided by the librarians regarding the total number of users (members) that they cater to is given in table 5.3. It is seen that 50% (11) of the total number of libraries cater to 1501-2000 members, 18% (4) of the libraries have a membership of 1000-1500 and 32% (7) libraries have members ranging from 2001 to 2500.

**Table 5.3 Details of Library Memberships**

| No. of Memberships | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| 1000-1500 | 1 (50%) | | 3 (16%) | 4 (18%) |
| 1501-2000 | 1 (50%) | | 10 (53%) | 11 (50%) |
| 2001-2500 | - | 1 (100%) | 6 (31%) | 7 (32%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

## 5.2 Library Collection

The collection of a college library includes both print and electronic collection. The details regarding the number of printed books, printed periodicals, electronic resources (e-resources), etc were collected from the study units and the status of different library collection is discussed in this section.

### 5.2.1 Collection of Printed Books

The number of printed books in the libraries ranges from 10000 to 50000. This includes both purchased books and gift books. The table 5.4 gives an overview of the number of printed books in the libraries and

figure 5.3 gives a sector wise analysis of collection of books in different colleges.

**Table 5.4 Number of Printed Books in Libraries**

| Total no. of books | No. of colleges (n=22) | |
|---|---|---|
| 10000-20000 | 8 | (36%) |
| 20001-30000 | 10 | (45%) |
| 30001-40000 | 1 | (5%) |
| 40001-50000 | 3 | (14%) |
| Total | 22 | (100%) |

It is seen that majority (81%) of the libraries have a collection of less than 30000 books and 14% (3) of the libraries have a collection of more than 40000 to 50000 books. A sector wise analysis of the collection of printed books is depicted in the figure 5.2. The figure reveals that the aided college library has a strong collection of more than 40000. One government college and one S.F. college also possess a collection of more than 40000 books. Majority of the S.F. colleges have a book collection of more than 20000 to 30000 volumes. The number of printed books in one government college and 37% (7) of the S.F. college libraries is less than 20000. From the table, a wide gap is visible among the colleges with respect to the collection of printed books in their libraries.

It is also observed that in all the libraries the collection of books is fully classified. Different editions of Dewey Decimal Classification (DDC) are used in all these libraries for organizing their collection. The catalogs of all the libraries follow Anglo American Cataloging Rules II (AACR 2) format.

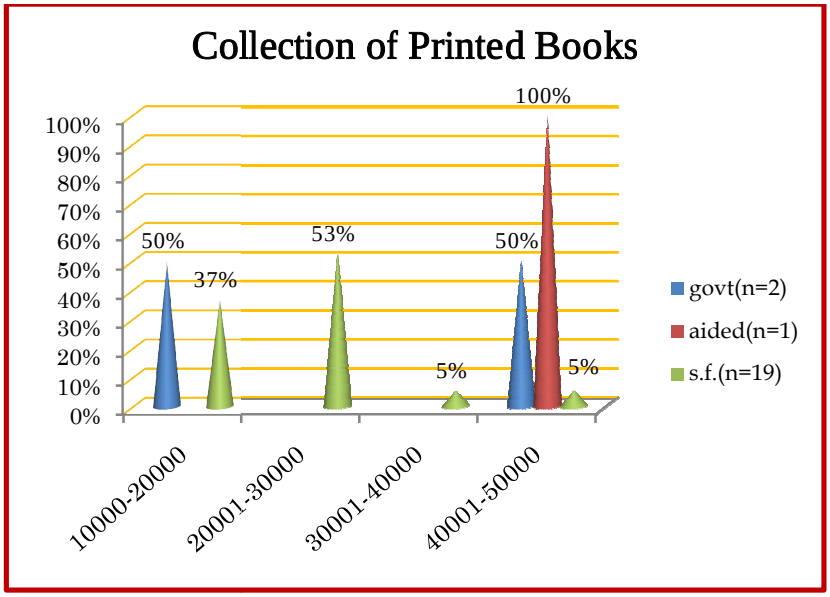



**Fig. 5.2 Sector Wise Analysis of Collection of Print Books**

### 5.2.2 Collection of Print Periodicals

Print periodicals refer to the foreign journals, Indian journals, popular magazines and newspapers subscribed by the libraries. The collected data revealed that the periodical collection in different libraries ranges from 45 to 250. The total print periodical subscriptions in different libraries (n=22) is shown in the figure5.3.

It is clear that 50% (11) of the libraries have a print periodical collection that ranges from 76 to 150. The college under the aided sector and one government college fall in this group. Five (22%) libraries, of which one is a government college library, have a collection of 1 to 75 print periodicals. The total periodical collection in 18% (4) of libraries range from 151-225 and 9%(2) of the total libraries have a periodical collection of more than 225. It is clear that one of the government

college libraries has a poor collection of print periodicals; whereas 79% (n=19) of the S.F. colleges have medium or strong periodical collection.

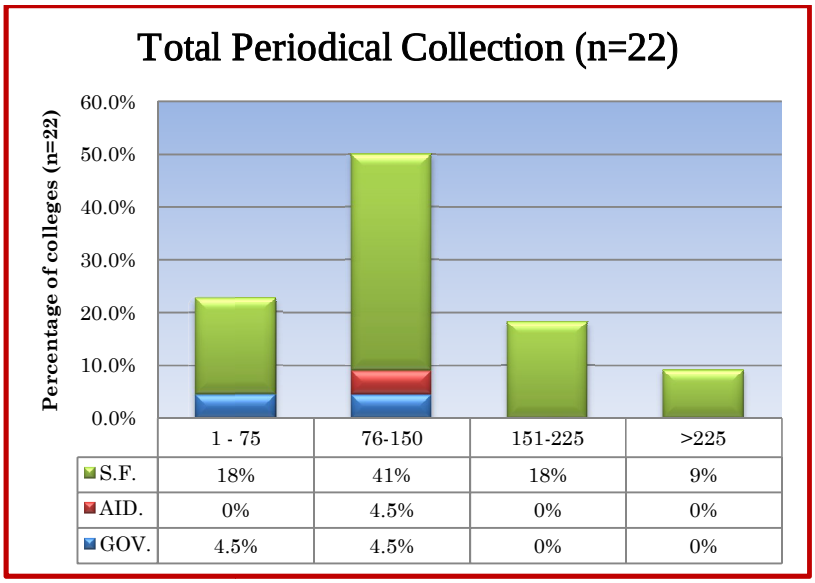



**Fig. 5.3 Total Collection of Print Periodicals**

The detailed analysis of subscription of different periodical collections is discussed below.

### 5.2.2a Subscription of Indian Journals

The number of Indian journals subscribed by the college libraries ranges from 0 to 125. Table 5.5 shows the details of subscription of Indian journals by the libraries. It is evident that 41% (9) of the total number of libraries (n=22) subscribes to 26-50 Indian journals. The colleges in the government and aided sectors come under this group. Majority (63%) of the S.F. college libraries (n=19) subscribes more than 50 to 100 Indian journals and 16% (3) of the S.F. college libraries subscribes 100-125 Indian journals.

**Table 5.5 Subscription of Indian Journals**

| No. of Indian Journals subscribed | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| NIL * | 1 (50%) | - | - | 1 (5%) |
| 1-25 | - | - | - | - |
| 26-50 | 1 (50%) | 1 (100%) | 7 (37%) | 9 (41%) |
| 51-75 | - | - | 5 (26%) | 5 (23%) |
| 76-100 | - | - | 4 (21%) | 4 (18%) |
| 100-125 | - | - | 3 (16%) | 3 (13%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

* In one of the government ECs, the college library doesnot subscribe to any periodicals other than newspapers. The subject periodicals are subscribed by the concerned departments and the library doesnot maintain any statistics regarding it.

### 5.2.2b Subscription of Foreign Journals

The detailed presentation of the subscriptions of foreign journals by different types of libraries is made in the table 5.6.

**Table 5.6 Subscription of Foreign Journals**

| No. of foreign Journals subscribed | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| NIL | 1 (50%) | - | 4 (21%) | 5 (23%) |
| 1-25 | - | - | 6 (32%) | 6 (27%) |
| 26-50 | 1 (50%) | 1 (100%) | 4 (21%) | 6 (27%) |
| 51-75 | - | - | 4 (21%) | 4 (18%) |
| 76-100 | - | - | 1 (5%) | 1 (5%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

It is observed that 23% (5) of the libraries including a government college do not subscribe to any foreign journal. The aided college and one government college subscribe 26-50 foreign journals. Four S.F. college libraries also fall under this group counting to a total

of 27% (6) of the total number of libraries. The collection of foreign journals ranges from 50 to 100 in 23% (5) of the total number of libraries. All these libraries come under the S.F. sector.

### 5.2.2c Subscription of Popular Magazines

Five (23%) of the college libraries under study do not subscribe to any popular magazine. Eight (36%) libraries subscribe 1-15 magazines. The government and aided college libraries subscribe less than 15 magazines. The details of subscription of popular magazines are shown in table 5.7. Two colleges in the S.F. sector subscribe more than 50 popular magazines. In the subscription of popular magazines also the S.F. colleges are far ahead of the other two types of colleges.

**Table 5.7 Subscription of Popular Magazines**

| No. of Popular Magazines subscribed | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Nil | 1 (50%) | - | 4 (21%) | 5 (23%) |
| 1-15 | 1 (50%) | 1 (100%) | 6 (32%) | 8 (36%) |
| 16-30 | - | - | 6 (32%) | 6 (27%) |
| 31-45 | - | - | 1 (5%) | 1 (5%) |
| 46-60 | - | - | 1 (5%) | 1 (5%) |
| >60 | - | - | 1 (5%) | 1 (5%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.2.2d Subscription of News Papers

It is observed that majority (55%) of the libraries subscribe 6 to 10 newspapers. The government college libraries subscribe 1 to 5 newspapers and the aided college library subscribes more than 10 newspapers. The details are shown in table 5.8

**Table 5.8 Subscription of newspapers**

| No. of News Papers subscribed | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| 1-5 | 2 (100%) | - | 5 (26%) | 7 (32%) |
| 6-10 | - | - | 12 (63%) | 12 (55%) |
| >10 | - | 1 (100%) | 2 (11%) | 3 (14%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.2.2e Status of Print Periodicals Collection Vs Types of Colleges

Discussions made in the above sections point towards the fact that S.F. colleges are far ahead with respect to the collection of periodicals when compared with the other two types of institutions. To substantiate this, the data is further analysed to identify the strengths and weaknesses of periodicals in different types of colleges. The analysis is based on the scatter of values (number of periodicals) around the average value and the periodicals collection of the libraries are categorized into three- below average, average and above average. The collection of Indian and foreign journals, popular magazines and newspapers are taken for this analysis. It is observed that the collection of Indian journals ranged from 27 to 119, foreign journals from 8 to 85, popular magazines from 5 to 65 and newspaper collection ranged from 4 to 16. A detailed analysis of the level of different types of print periodicals is depicted in the figure 5.4.

The figure makes it clear that the collections of all categories of print periodicals are at below average level in the government college libraries. In the aided college library, foreign journals and newspapers are above the average level. In majority of the S.F. colleges, the collection of Indian journal is above the average level. Nearly one third

of the colleges in this sector possess an above average collection of the other three types of periodicals.

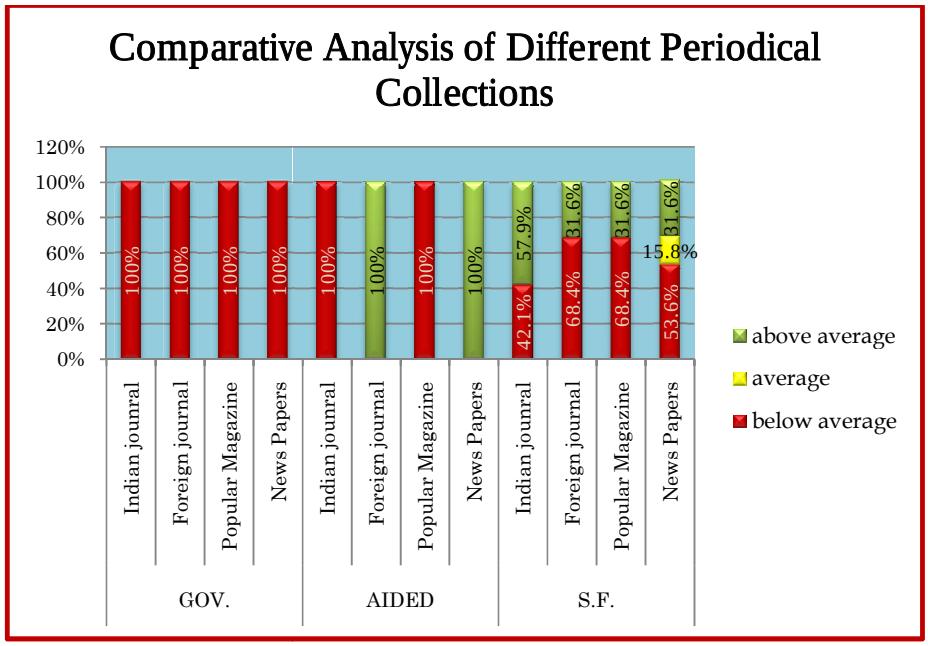



**Fig.5.4 Comparison of Print Periodicals Collection Vs Types of Colleges**

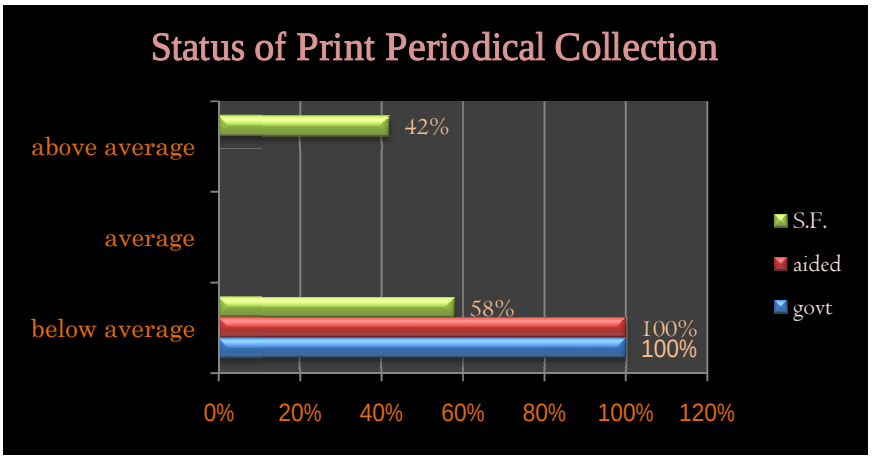



**Fig 5.5 Status of Print Periodical Collection Vs Types of Colleges**

A general overview of the status of print periodical collection in different types of libraries is depicted in the figure 5.5. This is based on the total collection of different types of print periodicals in the libraries that ranges from 5 to 231. It is evident from the figure that around half of the S.F. college libraries have above average collection of print periodicals where as the collection is below the average level in all the college libraries under government and aided sectors.

### 5.2.2f Bound Volumes

The study tried to ascertain the number of bound volumes in the study units. But in most of the libraries there is no separate register for bound volumes. They are either unnumbered or accessioned in the register for books. Hence a statistical analysis of this item could not be made.

### 5.2.3 Collection of Project Reports

Project reports are important primary documents/records of innovations made by the students and are to be preserved properly especially in EC libraries. But in most cases the college libraries do not give much importance in preserving this collection. The quantum of items that is difficult to manage and store is pointed out to be the reason behind this. It is observed that majority of the college libraries have no regular policy for collecting and maintaining the student project reports. Only 9% (2) of the colleges have a good collection of student project reports of around 2000 volumes. Six (27%) libraries maintain project report collection that is below 500 in number. Some of the college libraries maintain electronic versions of student project reports in their institutional repositories.

### 5.2.4 Subscription of Electronic Databases

Electronic databases have now become an indispensable component of an academic library. As far as technical education is concerned, a lot of national and international databases of scholarly publications are now available for subscription. The AICTE's recent mandate for the subscription of electronic databases radically changed the availability of e-databases in the ECs. In this section, the status of availability of different electronic databases in the study units is discussed.

#### 5.2.4a Number of Electronic Database Subscriptions

In the year 2012, the AICTE recommended the ECs to subscribe some electronic databases mandatorily and some other databases optionally depending on the nature and number of courses the colleges offer. The AICTE handbook 2012-13 made this subscription compulsory for running UG/PG courses in colleges. However, the institutions subscribing to DELNET/INDEST were exempted from the subscription of these packages. The collected data from different libraries regarding the number of electronic databases revealed that 13.6% (3) of the libraries subscribe to nine databases and 9.1% (2) of the colleges do not subscribe to any electronic database. It is also observed that these 2 colleges do not have a membership in DELNET/INDEST consortia. Three (13.6%) libraries subscribe to a single database. The databases these colleges subscribe are Proquest (Engineering), DELNET-IESTC & Elsevier Science Direct, of which the first one is not a recommended product by the AICTE. The figure 5.6 provides a detailed presentation of the number of e-databases subscribed Vs number of colleges.

It is clear that majority of the colleges (73%) subscribe to 5 or more electronic databases and 50% of the total number of libraries subscribe to 7 to 9 databases.

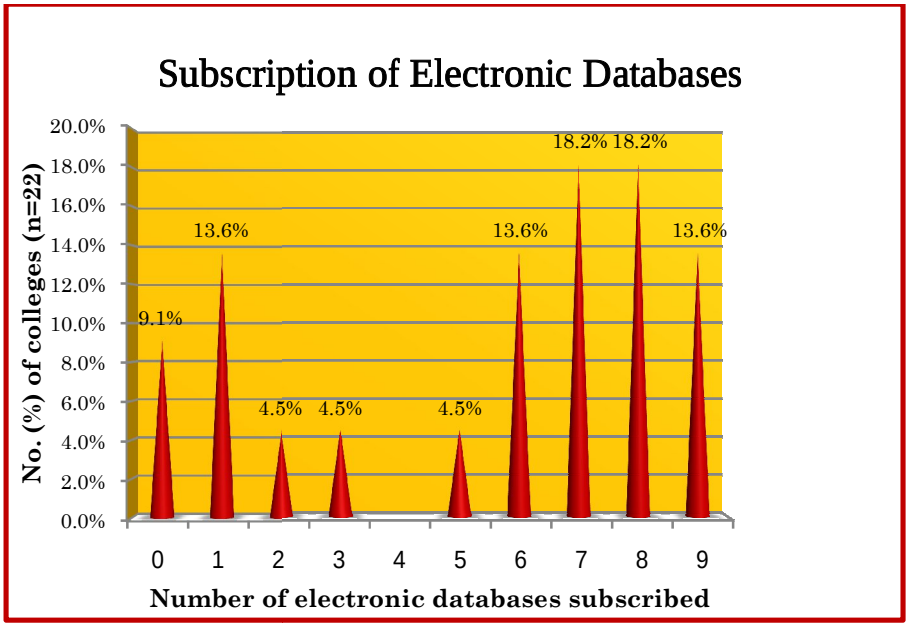



**Fig. 5.6 Number of E-databases Subscribed** Vs **Number of Colleges**

A sector wise analysis of colleges with respect to the availability of electronic databases is given in table 5.9. The table reveals that the 50% of the colleges that subscribe to more than 7 databases are all under the S.F. sector. An important observation regarding this subscription is that the librarians of all the colleges under the government and aided sectors are kept away from the procedures for the subscription of electronic databases and the teachers of some departments are given charge for this. The librarians of all these institutions are given only a notice regarding the availability of different databases. In one college, the desired information for this investigation was collected from the faculty members of the IT department, who were in charge of this subscription. One of the librarians among these colleges commented that the college authorities consider them as unfit for managing this subscription and the librarians personally felt insult in this regard.

**Table 5.9 Sector Wise Analysis of Colleges Vs Number of E-Databases Subscribed**

| No. of E- databases Subscribed | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Nil | - | - | 2 (11%) | 2 (9.1%) |
| 1 | - | - | 3 (16%) | 3 (13.6%) |
| 2 | - | - | 1 (5%) | 1 (4.5%) |
| 3 | 1 (50%) | - | - | 1 (4.5%) |
| 5 | - | 1 (100%) | - | 1 (4.5%) |
| 6 | 1 (50%) | - | 2 (11%) | 3 (13.6%) |
| 7 | - | - | 4 (21%) | 4 (18.2%) |
| 8 | - | - | 4 (21%) | 4 (18.2%) |
| 9 | - | - | 3 (16%) | 3 (13.6%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.2.4b Availability of different Electronic Databases

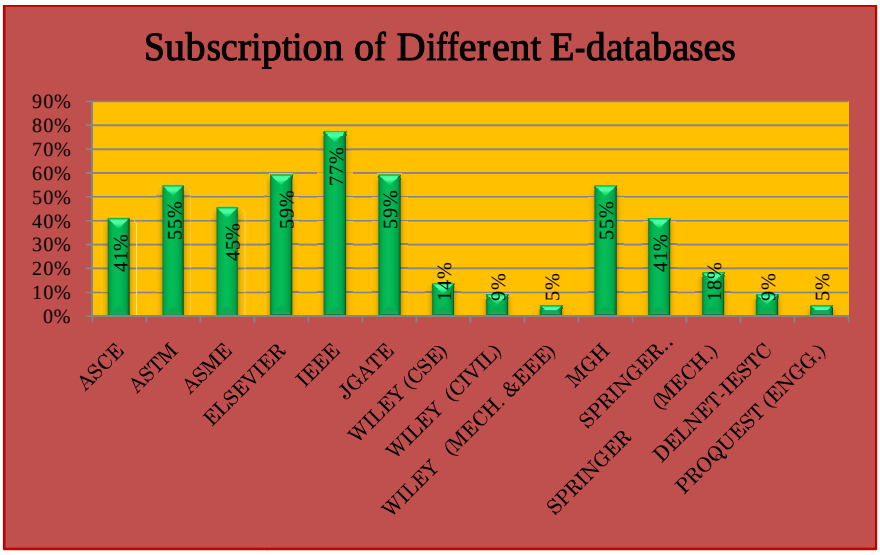



**Fig. 5.7 Availability of Different Engineering Databases in Libraries**

Around 14 different databases are available on a whole in all the colleges. Figure 5.7 depicts the name of the databases and the percentage of colleges subscribing them.

IEEE (ASPP) is the widely (77%) subscribed database followed by JGate and Elsevier Science Direct (both 59%). The least subscribed databases are Wiley (Mech, & EEE) and Proquest (Engg.). The details of the databases recommended by AICTE are discussed in chapter 3. Among the databases discussed in this section, DELNET-IESTC and PROQUEST (ENGG.) are not included in the AICTE recommendations. The optional databases recommended by AICTE are ASCE, ASME, Springer and Wiley. Among these databases ASCE and Springer (EEE, ECE & CSE) are more popular in the study units.

### 5.2.5 Availability of E-books

E-books/online books are a common item in present day academic libraries. E-book collections are maintained by 59% of the libraries under study. An important matter to be noted here is that the libraries subscribing to ASTM Digital Library get access to 1700 e-books. The table 5.10 gives a picture of the availability of e-books in the libraries.

**Table 5.10 Availability of E-books in Libraries**

| No. of E-books | % of colleges |
|---|---|
| nil | 9 (41%) |
| 1700* | 9 (41%) |
| 1704* | 1 (4.5%) |
| 2275* | 1 (4.5%) |
| 6000 | 1 (4.5%) |
| 8700* | 1 (4.5%) |

*subscribes ASTM digital library

The remaining 41% of the libraries neither subscribes ASTM Digital Library nor any e-book/online book.

### 5.2.6 Collection of CD/DVD

It is observed that none of the study units are having a regular policy for the collection development of CDs/DVDs. Only a few libraries are having a smaller number of purchased CDs/DVDs. Majority of the libraries have a collection of CDs/DVDs that are accompanied with other reading materials like books and periodicals. There are around 300 to 3000 items in different libraries.

## 5.3 Annual Budget

The study intended to collect data pertaining to the budget allocations of the study units for 3 financial years. But many of the libraries provided only the data for the latest financial year (2011-12). Even though the study sought the budgetary allocations under different heads like books, periodicals, e-databases, etc, majority of the colleges provided the data pertaining to the total budget allocation and the amount spend for e-databases only. For those who provided the split data, it is observed that there are no regular budget allocation for maintenance and infrastructure. Table 5.11 shows the analysis of the same.

A wide gap is visible between the colleges with respect to the annual budget allocation for libraries. It is observed that 14% (3) of the colleges do not have a regular annual budget and there is no budgetary allocation for them in the financial year 2011-12. Whereas on the other end 9% (2) of the colleges have an annual budget of greater than 50 lakhs. All the colleges in both the groups come under the S.F. sector. Majority of the libraries (55%) have an annual budget of below 20lakhs.

The government and aided college libraries fall in this category. In the case of budget allocation also the S.F. colleges score high.

**Table 5.11 Annual Budgets of Different Libraries**

| Annual budget | Govt. (n=2) | Aided (n=1) | S. F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Nil/no regular budget | - | - | 3 (16%) | 3 (14%) |
| Up to 1000000 | 1 (50%) | - | 1 (5%) | 2 (9%) |
| 1000001 - 2000000 | 1 (50%) | 1 (100%) | 5 (26%) | 7 (32%) |
| 2000001 - 3000000 | - | - | 4 (21%) | 4 (18%) |
| 3000001 - 4000000 | - | - | 2 (11%) | 2 (9%) |
| 4000001 - 5000000 | - | - | 2 (11%) | 2 (9%) |
| > 5000000 | - | - | 2 (11%) | 2 (9%) |
| TOTAL | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.3.1 Budget Allocation for E-databases

As discussed in section 5.2.4a, the collection of e-databases in the colleges ranges from 0 to 9. An amount of upto 12.5lakhs has been spent by the different study units for subscribing this content.

**Table 5.12 Budget Allocation for E-databases Vs Types of Colleges**

| Amount Spent | Govt. (n=2) | Aided (n=1) | S.F. (n=19) |
|---|---|---|---|
| nil | - | - | 2 (11%) |
| 2 to 3 lakh | - | - | 4 (21%) |
| 4 to 5 lakh | 1 (50%) | - | - |
| 9 to 10 lakh | - | 1 (100%) | 2 (11%) |
| 10 to 11 lakh | 1 (50%) | - | 4 (21%) |
| 11 to 12 lakh | - | - | 3 (16%) |
| 12 lakh and above | - | - | 4 (21%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) |

Analysis of the amount spent by the study units revealed that majority of the S.F. colleges and the aided college has spent more than 9lakhs of rupees for the annual subscription of e-databases. Two colleges in the S.F. sector have not spent any money in this regard. A detailed analysis of the amount being spent by different types of colleges is given in table 5.12.

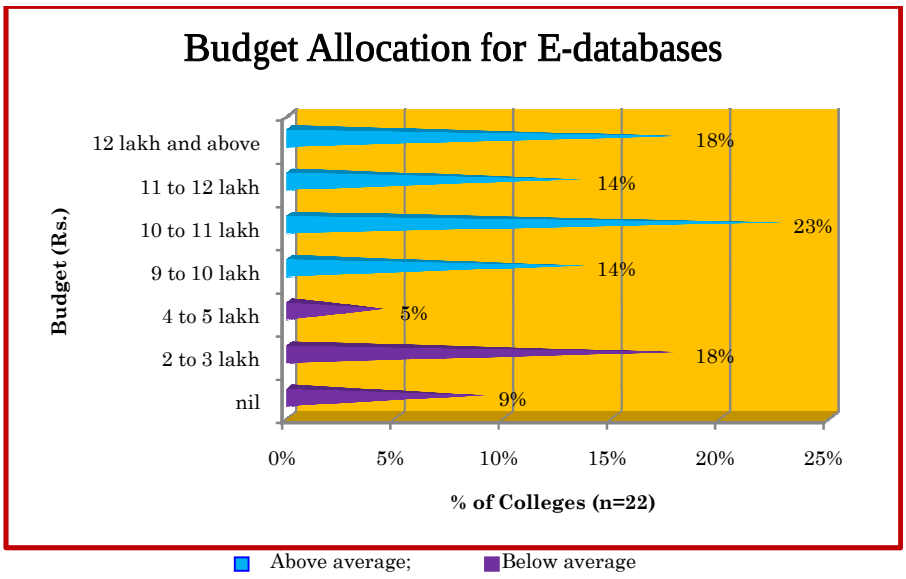



**Fig. 5.8 General Overview of Budget Allocation for E-databases**

It is also observed that majority of the study units have spent more than 9 lakhs (8lakhs is found to be the average allocation for e-databases among the libraries) of rupees for the subscription of e-databases. Fig 5.8 gives a graphical representation of this allocation. The figure makes it clear that budget allocation is below the average level in only 32% of the total number of libraries. It is inferred that the libraries are giving much importance to the subscription of e-databases.

## 5.4 ICT Infrastructure

Information Communication Technologies (ICTs) have now become an unavoidable component of a library system. The hardware infrastructure, the telecommunication and networking facilities and standard automation software are the backbone of an efficient ICT infrastructure. The details of the ICT infrastructure in the study units are discussed here.

### 5.4.1 Hardware Infrastructure

The number of server machines, networked computers, scanners, printers, security systems, etc corresponds to the hardware infrastructure. The availability of various hardware equipments in the libraries is given in table 5.13

Almost all (95%) the libraries are having server machines. Out of these 41% (9) colleges (all S.F.) have 2 servers, one dedicated for their Digital Library/ Institutional Repository. Networked computers refer to the networked systems used in the libraries for their housekeeping operations and those kept for user services including OPAC, internet browsing and accessing e-resources. All the colleges are having networked computers in their library. But a wide gap is noticed regarding the number of computers that ranges from 2 to 98. Only 50% of the colleges under study possess a scanner and all these come under S.F. sector. Out of these 3 colleges are having 2 scanners each. The number of Bar Code Readers (BCR) in the libraries ranges from 1 to 4. One govt. college and 3 S.F. colleges do not have any BCR. All the colleges except one in the S.F. sector have UPS facility. Out of these 17 colleges have a centralized UPS facility. The number of UPS in the other colleges ranges from 2 to 15. Five ( 23%) colleges (all in S.F.)

sector do not have photocopier. At the same time 4 colleges in the S.F. sector have more than one photocopier.

**Table 5.13 Hardware Infrastructure of libraries**

| Hardware Infrastructure | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Server machines | 2 (100%) | 1 (100%) | 18 (95%) | 21 (95%) |
| Networked computers | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |
| Scanners | - | - | 11 (58%) | 11 (50%) |
| Barcode readers | 1 (50%) | 1 (100%) | 16 (84%) | 18 (82%) |
| Barcode printers | - | 1 (100%) | 10 (53%) | 11 (50%) |
| Printers | 2 (100%) | 1 (100%) | 18 (95%) | 21 (95%) |
| UPS | 2 (100%) | 1 (100%) | 18 (95%) | 21 (95%) |
| RFID | - | - | 1 (5%) | 1 (5%) |
| Web camera / Security Systems | - | - | 4 (21%) | 4 (18%) |
| Photocopier | 2 (100%) | 1 (100%) | 14 (74%) | 17 (77%) |
| CD-servers | - | - | 2 (11%) | 2 (9%) |

## 5.4.2 Telecommunication and Networking

The telecommunication and networking facilities available in the libraries is presented in table 5.4. It is observed that all the libraries are having internet connectivity and 59% of the total number of libraries including the aided college library is having WiFi enablance in their campus/library.

**Table 5.14 Telecommunication and Networking facilities**

| Item | Govt. (n=2) | Aided (n=1) | S. F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Telephone | 1 (50%) | - | 14 (74%) | 15 (68%) |
| LAN | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |
| WIFI | - | 1 (100%) | 12 (63%) | 13 (59%) |
| Internet | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

### 5.4.2a Internet Connectivity

Table 5.14 makes it clear that all the study units are having internet connectivity. Generally two types of internet connectivity are available in these libraries- broadband and leased line. Broadband refers to the internet connectivity provided typically via a digital subscriber line or a cable network. Leased lines are private dedicated lines used to connect local area networks and campus networks to the internet. An enquiry into the type of internet connectivity available in the libraries revealed that 42% of the libraries (all S.F. colleges) have leased lines for internet connectivity as depicted in the figure 5.9.

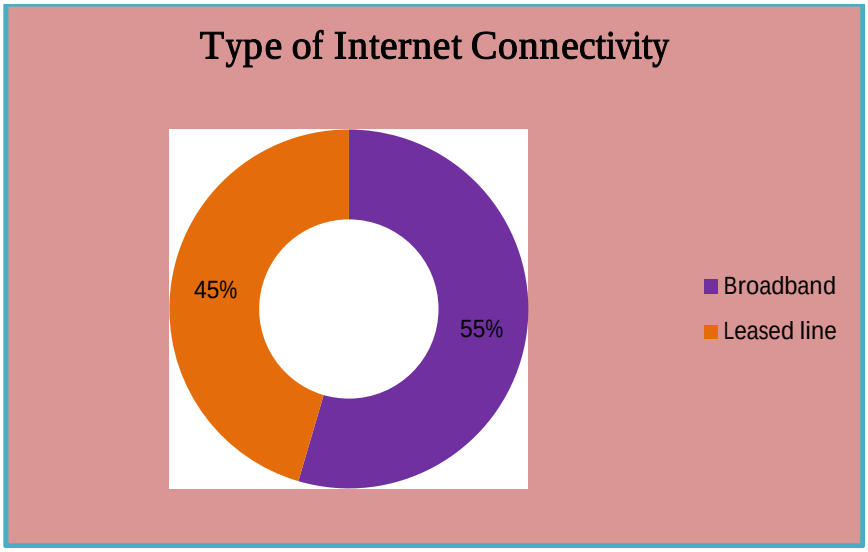
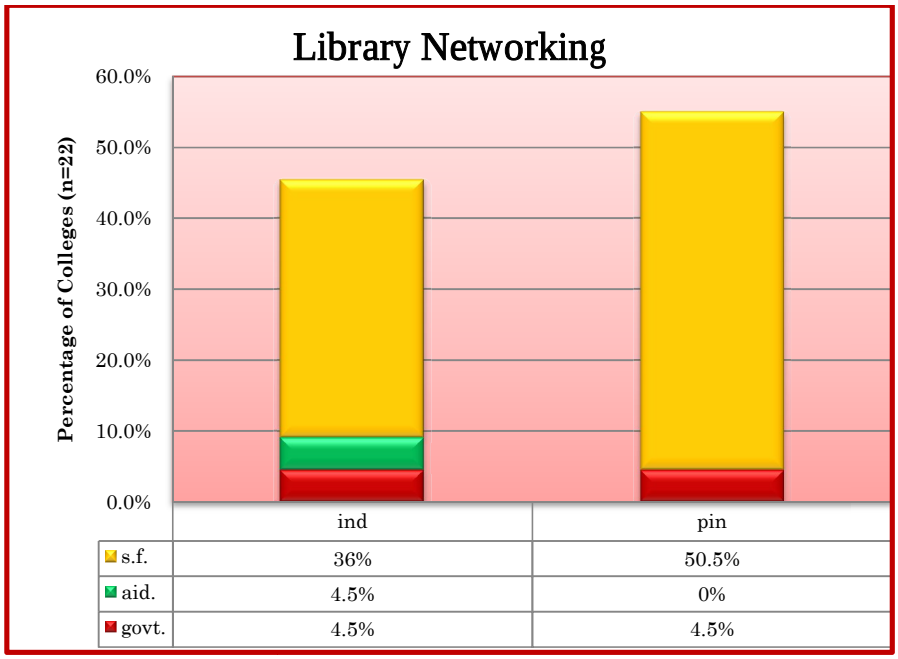



**Fig. 5.9 Type of Internet Connection**

### 5.4.2b Networking

The nature of networking in libraries is given in figure 5.10. It is seen that two types of networks exist in the libraries- an independent network in which only the computers in the library are networked and

the services/operations cannot be made from outside the library. The other one is in which the library network forms a part of the institution's network so that services like OPAC can be accessed from outside the library or from anywhere in the campus.




***ind**= independent network, **pin**= part of institution's network

**Fig. 5.10 Type of Library Networks**

In more than half of the study units (55%), the library network forms a part of the institutional network thereby facilitating library services over the campus. One government college and 11 S.F. college libraries fall in this group. In 45%, of the libraries, the library LAN is not connected to the campus network. It is also inferred that more than half of the S.F. college libraries are connected to their campus wide networks.

### 5.4.2c Library Websites

It is observed that only 18% (4) of the libraries are having a library website. All these libraries are in the S.F. sector. Majority of the libraries (77%) are having a link and a page for the library in their college website. One of the libraries does not have a web presence. But for this institution a direct link named 'library' is given at the homepage of the college website which leads to a blank page.

**Table 5.15 Accessibility of Library Websites**

| Accessibility | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Direct Link on parent institution's home page | – | – | 4 (21%) | 4 (18%) |
| Link under "facilities/resources/on campus/infrastructure, departments, etc" with the title "Library" | 1 (50% | 1 (100%) | 8 (42%) | 10 (45%) |
| With the link "facilities/ resources/ on campus /infrastructure", etc without the title "Library" | 1 (50%) | – | 7 (37%) | 8 (36%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

The websites of the colleges are further analysed using certain criteria for measuring the accessibility of webpages, extent of provision of information and online services. The accessibility refers to the easiness of locating the link for library page/site from the parent institution's homepage. It is measured on the basis of whether a direct link for 'library' is available at the home page of the college website or a link for 'library' is available under certain related links. The analysis of

the accessibility of different library websites/webpages is depicted in the table 5.15.

Library websites are expected to impart at least some basic information about the libraries such as collection, opening hours, contacts, etc. The websites of the study units are analysed with respect to the provision of such information, on the basis of five criteria as presented in the figure 5.11.

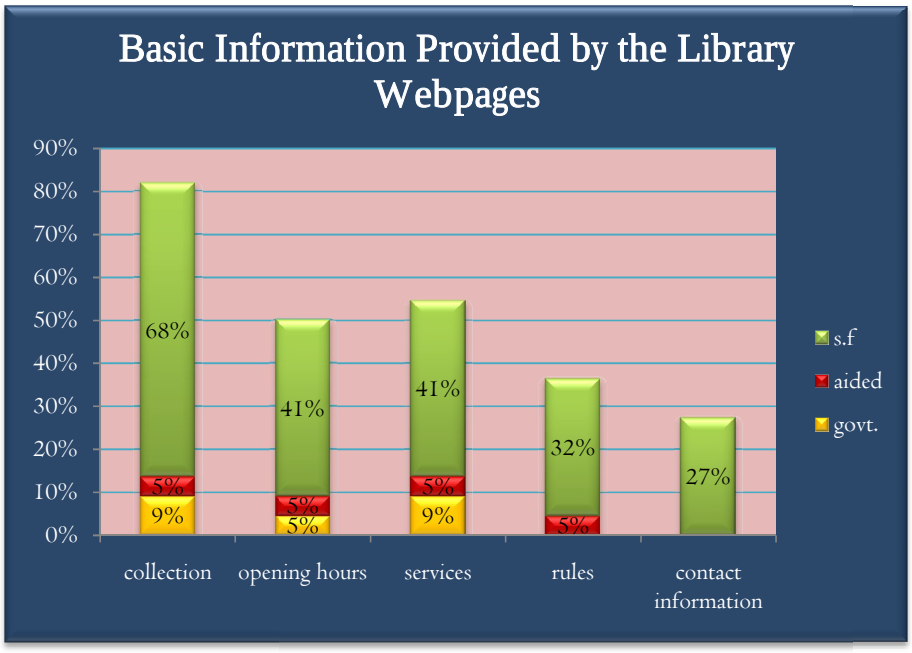



**Fig. 5.11 Basic Information Provided by the Library Webpages**

It is found that 82% of the libraries provide information about their collection in the webpages. The websites of government colleges and aided college also impart this information. Only 50% of the library webpages provide information about their *opening hours*. With respect to the *services* offered, 55% of the webpages provide some information. Only 36% of the libraries have published the library rules in their

webpages. *Contact* information such as the e-mail address or phone numbers of the library/librarian is provided by 27% of the library webpages. In other words, *collection* information is the most popular content in the library webpages followed by information about services. Contact information is the less frequent item in the webpages. Another important thing noticed in this analysis is that the webpages of two of the libraries do not provide any useful information about themselves.

Links to online resources and services is another major content of any library website. The websites are further analysed with respect to the provision of links to the online resources and services and is found that only a small number of libraries (all S.F.) provide such links. The results are presented in the table 5.16.

**Table 5.16 Provision of Links to Online Resources**

| Types of E-resource | Frequency | Percentage (n=22) |
|---|---|---|
| E-databases | 2 | 9% |
| E-books | 2 | 9% |
| Digital Libraries | 3 | 14% |
| OPAC | 2 | 9% |

It is inferred that the librarians as well as the college authorities are not seriously concerned about the importance of online services. It is also observed that certain libraries have created wepages that are accessible in the campus LAN through which they provide the online services. Such library pages are not covered in this analysis.

### 5.4.3 Software used for Library Automation

All the libraries have automated their library housekeeping operations. But no single library has completely shifted to a fully

automated library system. Generally the circulation and cataloging/technical processing operations are found to be automated in all the libraries. Regarding library management software, a variety of automation software is used in the libraries. These include integrated library management systems (ILMS) and locally developed software for automating certain operations. Figure 5.12 gives a picture of the different software used in these libraries for their house keeping operations.

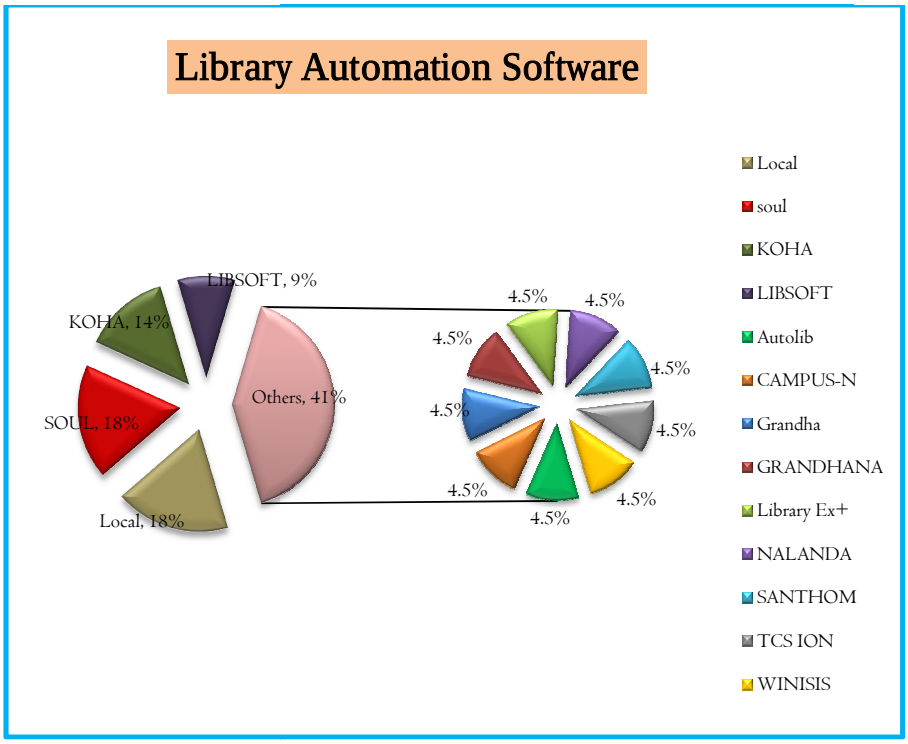



**Fig. 5.12 Different Software used for Library Automation**

Locally developed software are used in 18% of the libraries and the majority (82%) of the libraries use professional software. The professional software include both open source software and proprietary software. Of these the most popular is SOUL followed by KOHA and

LIBSOFT. The rest of the colleges (41%) use different professional software as depicted in the figure. Among these libraries, one has started shifting towards KOHA. TCS ION is a cloud computing environment that networks the whole campus and its activities.

### 5.4.4 OPAC Facility

An enquiry to ascertain the provision of Online public Access Catalog (OPAC) by the libraries revealed that almost all the libraries (91%) provide OPAC facility either within the library, campus or over the internet. Only 2 colleges (9%) under study are not providing this facility. The details are given in table 5.17.

It is seen that 14% (3) of the colleges provide webopac facility. Among these libraries one provide the facility only to the authorized users via a password. The government and aided college libraries provide the service only within the library. In 32% (7) of the libraries, the facility is available within the college intranet. Among them, one library permits only the staff members to access the OPAC via college intranet.

**Table 5.17 OPAC Facility in the Libraries**

| Availability of OPAC | Govt. (n=2) | Aided (n=1) | S. F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| WEBOPAC | - | - | 3 (16%) | 3 (14%) |
| Available in college intranet | - | - | 7 (37%) | 7 (32%) |
| Available in library intranet | 2 (100%) | 1 (100%) | 7 (37%) | 10 (45%) |
| Not available | - | - | 2 (11%) | 2 (9%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) | 22 (100%) |

The librarians of the study units were enquired about the compatibility of their catalogs with certain international standards. It is

found that 41% (9) of the librarians do not know whether their catalogs are compatible with any standard. Six (27%) librarians opined that their catalogs are not compatible with any standards. The catalogs of 23% (5) of the libraries are found to be compatible with MARC 21 format. The remaining 2 library catalogs are compatible with 2 other standards- the CCF and ISO. On an overall it is observed that 32% (7) of the library catalogs are compatible with certain international standards.

### 5.4.5 Digital Library /Institutional Repository

A **digital library (DL)** is a collection of digital objects, organized and stored according to some standards. DL makes use of digital technologies to acquire, store, conserve and provide access to information and materials in whatever form it was originally published. **Institutional Repository (IR)** is a digital archive of the intellectual products created by the faculty, research staff and students of an institution accessible to the users both within and outside the institution. The term digital library (DL) and institutional repository (IR) are used interchangeably in the study units except in one library where a digital library and an institutional repository are maintained separately. In this section the availability of DL/IR in the institutions and the features of established DL/IR are discussed.

#### 5.4.5a Presence of DL/IR

The general picture of the presence of DL/IR is given in figure 5.13. About half of the colleges (46%) are having a DL/IR. All these 10 colleges are in the S.F. sector. Six (27%) colleges are planning to start a

DL/IR. The aided college and one government college are included in this group.

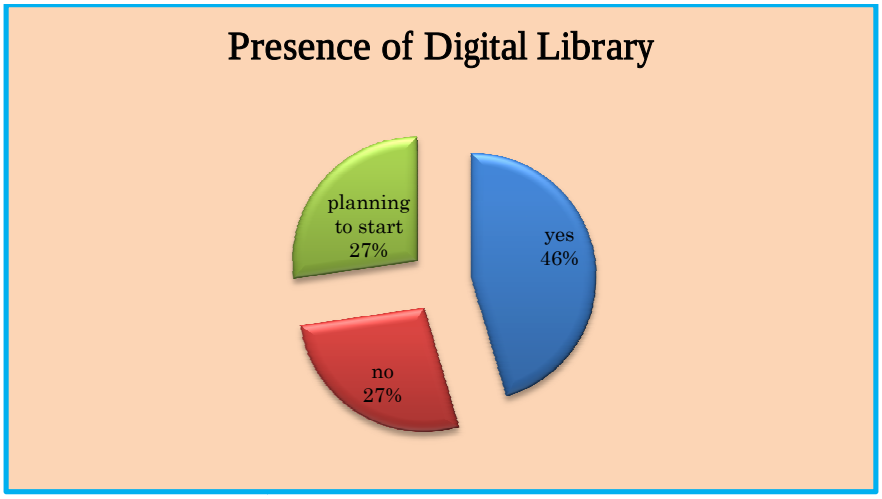



**Fig. 5.13 Presence of Digital library/Institutional Repository**

### 5.4.5b Contents of DL/IR

A variety of contents are available in these DLs ranging from question papers to faculty publications. Different types of contents available in the DLs are presented in the figure 5.14. It is found that E-question papers are the most popular item in the DLs. 90% (n=10) of the DLs have scanned question papers as an important content. Only one college is not providing this content. E-books are in the second position (80%). This includes purchased as well as free e-books. The efforts taken by the librarians in this area deserve special mention. One college has digitized a good number of back volumes of journals. Four (40%) libraries have posted e-learning videos in their DLs. This include NPTEL videos (both purchased and freely downloaded) as well as other freely available e-learning videos.

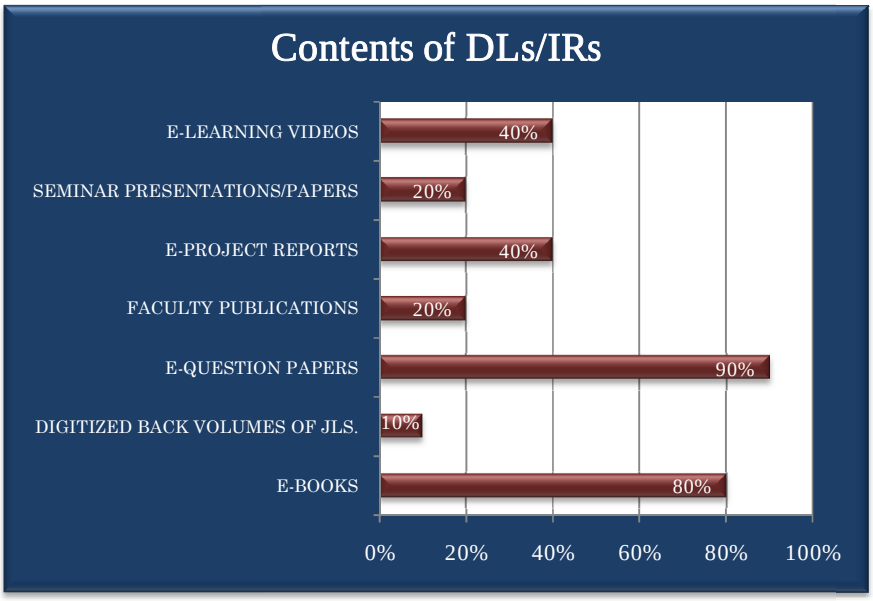



**Fig. 5.14 Contents of the DLs/IRs**

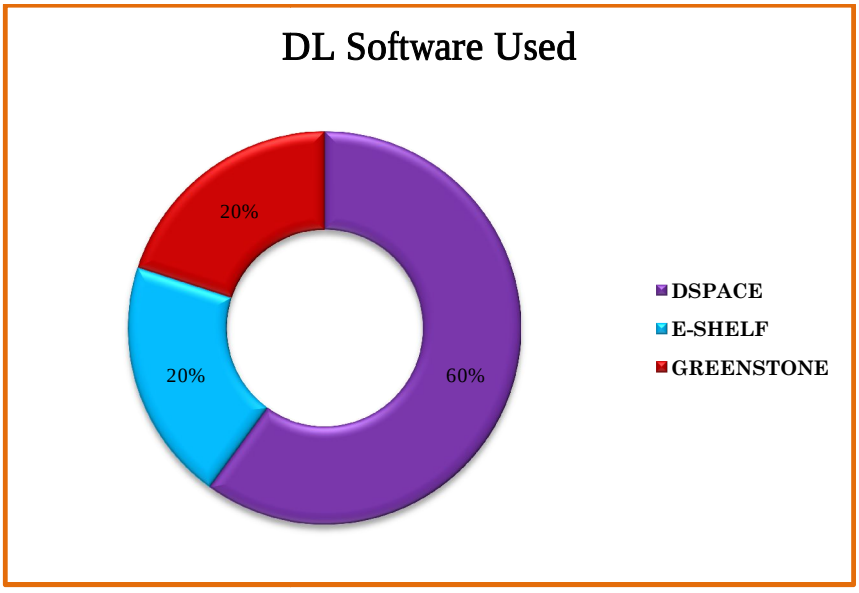



**Fig. 5.15 Different DL Software Used in the Libraries**

As mentioned earlier, one of these 10 colleges maintains both a DL and an IR. In that college the faculty publications and proceedings of different conferences conducted by the college are uploaded in its IR and other contents like educational videos, question papers, e-books, etc are made available in its DL. Another college maintains an e-learning platform built on Moodle software. The student assignments and seminar reports are made available in this platform.

In all these DLs/IRs the content is added centrally from the college library and in one college the faculty members are also allowed to add content. None of the DL/IR is open to public. It is available only within the campus or for authorized users over the web. One of the DLs provides enhanced service in the form of RSS feeds.

### 5.4.5c Software used for developing DL/IR

Figure 5.15 represents the different software used by the libraries for developing DL/IR. All the DLs/IRs are developed on three different software- DSpace, Greentone and E-shelf. The first two are open source software and the third is a proprietary one. It is seen that 60% (6) of the DLs are built on DSpace. Among these installations 4 are done by the library staff themselves with technical guidance from experts and 2 installations are made by external agencies and one college pays an annual maintenance Charge (AMC) of Rs.20000/-. Two (20%) of the DLs are built on Greenstone. In addition to this the college that maintains both DL and IR has built its DL on Greenstone. In other words there are 3 installations of Greenstone among these colleges. The other software E-shelf is used by 2 colleges. One college purchased this software for Rs.90,000 and the other for Rs.1,20,000. In both cases, the software were supplemented with 6000 free e-books.

The analysis of the availability and functioning of the DLs/IRs among the study units reveals that there is an increasing trend towards the realization of the importance of DLs/IRs among the librarians. There are well advanced DLs among the study units and the efforts taken by the librarians and managements of these institutions need to be appreciated.

### 5.4.5d Problems with Established DL/IR

It is observed that in most of the colleges, the DLs/IRs were established at the sole responsibility and effort of the library staff. For the same reasons these professionals are facing a lot of challenges in maintaining the system. The study tried to identify the problems faced by the librarians with the DLs/IRs. Table 5.18 gives an overview of the problems arranged in the order of their decreasing frequencies.

In many libraries technical support from within the institutions are not available due to various reasons. Hence for rectifying problems with their DLs/IRs it become necessary to take external assistance. Librarians face a lot of difficulties in convincing their authorities and getting permissions to take such external help. Also the institutions may not be interested in paying the remuneration for such expertise. Eventhough 90% of the libraries have a scanner, some of the librarians felt the requirement for high-end scanners for making digitization. Lack of an agency to seek for technical support is pointed out by 60% of the respondents. All these libraries are having OSS implementations for their DLs/IRs.

**Table 5.18 Problems with the DLs/IRs**

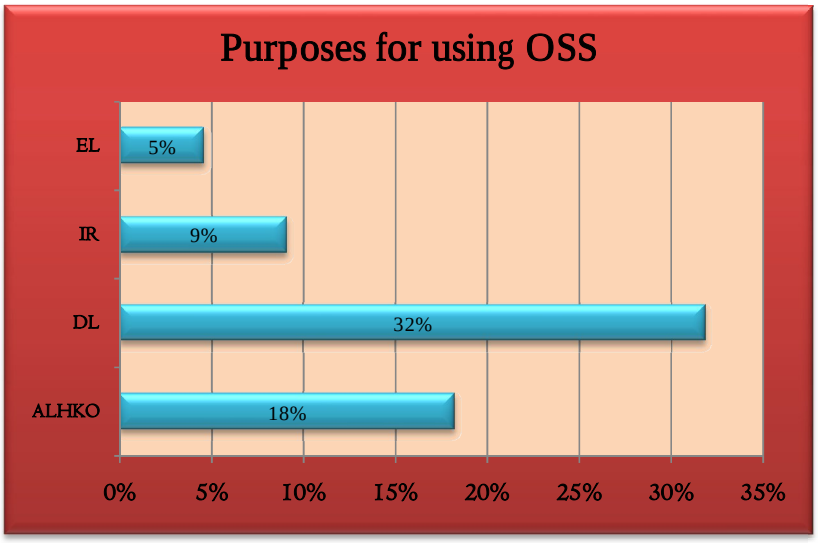
| Problems | Frequencies (n=10) |
|---|---|
| Lack of familiarity and technical skills | 9 (90%) |
| Lack of proper training | 9 (90%) |
| Incapable to rectify the problems with the system | 9 (90%) |
| Lack of technical support from the institution | 7 (70%) |
| Lack of an agency to provide technical support | 6 (60%) |
| Problems with updating to newer versions | 5 (50%) |
| Lack of support from management for taking external assistance | 5 (50%) |
| Lack of sufficient hardware for digitizing | 4 (40%) |
| Lack of confidence to move further | 3 (30%) |

### 5.4.6 Use of Open Source Software in Libraries

Open archives and open source software (OSS) are the products of cooperative efforts and their ultimate essence is resource sharing (RS). The discussions made under the different sections of 5.4 reveals a significant presence of OSS in the study units. Hence it is pertinent to study the extent of availability and usage of OSS in the libraries.

#### 5.4.6a Purposes for Using OSS

Different types of software packages are required in a library for various purposes like automation of library housekeeping operations, digital libraries, institutional repositories, e-learning platforms, etc. In the study units, the usage of different OSS for these purposes are identified on varying intensities as depicted in the figure 5.16.




*EL=E-learning, IR=Institutional Repository, DL=Digital Library, ALHKO=Automation of Library House Keeping Operations

**Fig 5.16 Purposes for Using OSS**

The figure makes it clear that the main purpose for using OSS in libraries is for developing digital libraries. Seven (32%) libraries use OSS for building their DLs. This is followed by automation of library housekeeping operations (18%). Only one library (5%) maintains an e-learning platform and that college uses OSS for setting up the same. An important finding in this regard is that only the S.F. colleges are using these software.

### 5.4.6b Popularity of Different OSS

It is observed that 45% (10) of the total study units uses OSS in their libraries for different purposes. Different software used for the above mentioned purposes and their popularity (number of installations) are presented in the table 5.19.

**Table 5.19 Popularity of Different OSS in the Libraries**

| Name of OSS | Purpose | No. of Installations (n=22) | |
|---|---|---|---|
| KOHA | Automation of library housekeeping operations | 4 | (18%) |
| GREENSTONE | Digital Library | 2 | (9%) |
| DSPACE | Digital Library | 5 | (23%) |
| DSPACE | Institutional Repository | 2 | (9%) |
| MOODLE | e-Learning | 1 | (5%) |

It is seen that, there are 14 installations of different OSS in the study units. Among the software DSPACE is the most popular one. This software is used for building DLs and IRs. Two colleges use greenstone for building their DLs. The second popular OSS is KOHA, an integrated library management software used for automating library housekeeping operations.

It is also observed that certain libraries have more than one installation of OSS (for different purposes). An analysis of the same shows that four (18%) colleges use 2 OSS in their libraries and six (27%) colleges use one OSS.

## 5.5 Services

**L**ibrary services can generally be classified as *conventional library services* and *electronic information services*. The study ascertained the various services provided by the libraries. The findings are discussed in the following section.

### 5.5.1 Conventional Library Services

The conventional library services range from lending of books to current awareness and selective dissemination of information services. An enquiry into the provision of different conventional services in the study units revealed that lending of books is the only service that all the libraries provide. This is followed by reprographic service (86%). User orientation programs and lending of non-book materials come next (73% each). It is observed that one of the libraries under study provides only lending of books. The provision of different conventional library services by the study units is depicted in the figure 5.17.

It is observed that 14% of the libraries (all S.F.) that provide Inter Library Loan (ILL) service makes use of the Document Delivery Service (DDS) offered by DELNET consortium.

A sector wise analysis of the provision of various conventional services is given in table 5.20. It is evident that among the ten different services listed here, the aided college library provides only four and the government colleges provide six services. New additions alert, conference alert, inter library loan and current awareness services are not been provided by any of the government or aided colleges libraries. The provision of these services is comparatively less in S.F. colleges also.

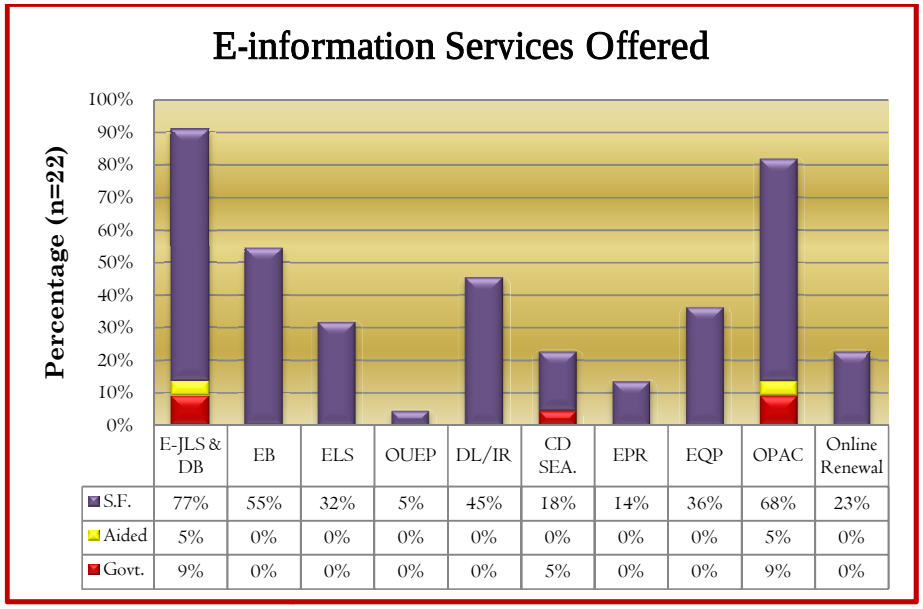

**Fig. 5.17 Conventional Library Services Offered by the Study Units**

**Table 5.20 Sector Wise Analysis of Provision of Conventional Library Services**

| SERVICES | Govt. (n=2) | Aided (n=1) | S.F. (n=19) |
|---|---|---|---|
| Lending of Books | 2 (100%) | 1 (100%) | 19 (100%) |
| Lending of Periodicals | 1 (50%) | - | 5 (26%) |
| Lending of Non-Book Materials | 2 (100%) | - | 14 (74%) |
| Reference | 2 (100%) | 1 (100%) | 15 (79%) |
| Reprography | 2 (100%) | 1 (100%) | 16 (84%) |
| New Additions Alert | - | - | 7 (37%) |
| Conference Alert | - | - | 3 (16%) |
| Inter Library Loan | - | - | 3 (16%) |
| Orientation | 1 (50%) | 1 (100%) | 14 (74%) |
| Current Awareness Service | - | - | 6 (32%) |

### 5.5.2 Electronic Information Services

Electronic Information Service has now become an essential service in an academic library. The governments and higher education agencies are giving an increased thrust in the development of electronic information sources and services in higher education institutions. An attempt made by this study to identify the various E-information services provided by the libraries brought the following results as depicted in figure 5.18.




E-JLS &DB= E-journals and Databases, EB=E-Books, ELS=E-Learning Service, OUEP=Online User Education Programs, DL/IR=Digital Library/Institutional Repository, CD SEA.=CD-Rom Search Service, EPR=E-Project Reports, EQP=E-Question Papers, OPAC=Online Public Access Catalog.

**Fig.5.18 E-Information Services Offered by the Libraries**

Access to e-journals and databases are the most common e-information service. Majority (91%) of the libraries under study provide this service. This is followed by OPAC service (82%). National

Programme on Technology Enhanced Learning (NPTEL) is the most common E-learning service provided by these libraries. Online User Education Programme is the least common service. Only one library and that in the S.F. sector is providing this service. Some important services like online reservation, chat reference/virtual reference service, etc are not been provided by any of these libraries. It is also evident that the aided college library provides only 2 of the e-information services- access to E-JLS &DB and OPAC. This is also the same with the case of government college libraries except that one of the government college libraries provides one more service- the CD-rom search. E-books are provided by 55% of the study units.

The analysis of the library services provided by the study units being discussed under section 5.5 reveals that S.F. colleges scored high than the other two types of colleges with respect to the provision of services. As far as electronic information services are considered, the government and aided college libraries lag much behind their S.F. counterparts.

## 5.6 Library Personnel

Sufficient number of qualified and efficient library staff is the essential component of an academic library. In the changed scenario of technology enabled library services, professional and technological competencies of library staff have become indispensable. Moreover library staff is considered as an important resource of a library and hence a study not covering the library staff would be incomplete. An enquiry made by the investigator in identifying the staff positions, qualifications, salary and computer proficiencies of library professionals in the study units brings to light the following results.

### 5.6.1 Strength of Professional Staff

It is observed that there is no regular pattern of professional staff positions in these libraries. The number of professional staff varies from 1 to 6 in the study units. Figure 5.19 explains the professional staff strength in the college libraries.

Majority of the colleges (all S.F.) have 4 or more professional staff in their libraries. In one college, there is only one professional staff, a retired person. It is observed that this library is managed by 3 library attendents. A total of 85 professionals are working in these libraries and the average staff strength is calculated to be 4. Based on this average, the staff strength in different types of libraries are presented in the table 5.21.

### 5.6.2 Professional Qualification of Library Staff

An enquiry into the professional qualifications of the library staff revealed that majority of them are holding a post graduate degree in Library and Information Science. An overview of the professional qualifications of the library staff is provided in figure 5.20

Out of these, 21% (18) library professionals are having an additional post graduation. The professionals having a Phd degree are retired persons who are serving their libraries on contract basis.

### 5.6.3 Knowledge and Skills in Handling Computers

To handle the facilities and services of present day academic libraries, basic knowledge regarding computers is indispensable. The study ascertained the skills and proficiencies of the library staff of the study units in handling computers from the point of view of two aspects as discussed below


**5.19 Strength of Professional Staff in the Libraries**

**Table 5.21 Professional Staff Strength Vs Types of Colleges**

| Professional Staff Strength | Govt. (n=2) | Aided (n=1) | S.F. (n=19) |
|---|---|---|---|
| Below Average | 2 (100%) | 1 (100%) | 6 (31.6%) |
| Average | - | - | 6 (31.6%) |
| Above Average | - | - | 7 (36.8%) |
| Total | 2 (100%) | 1 (100%) | 19 (100%) |

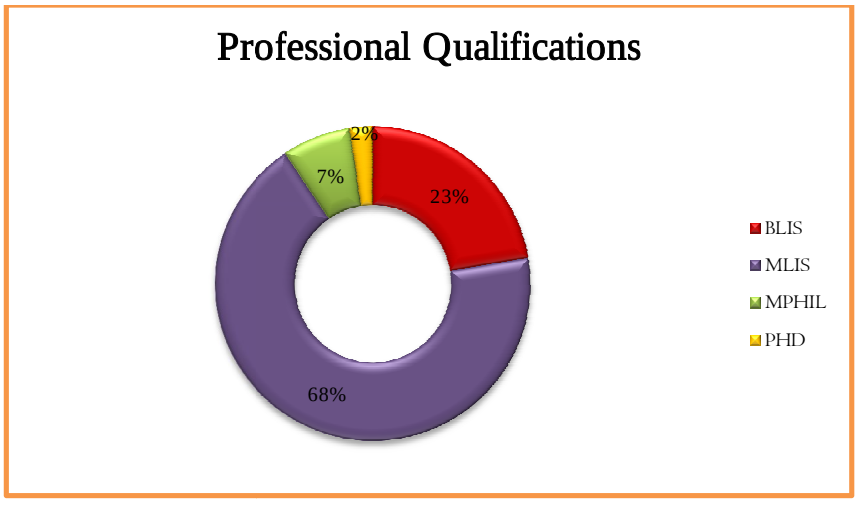
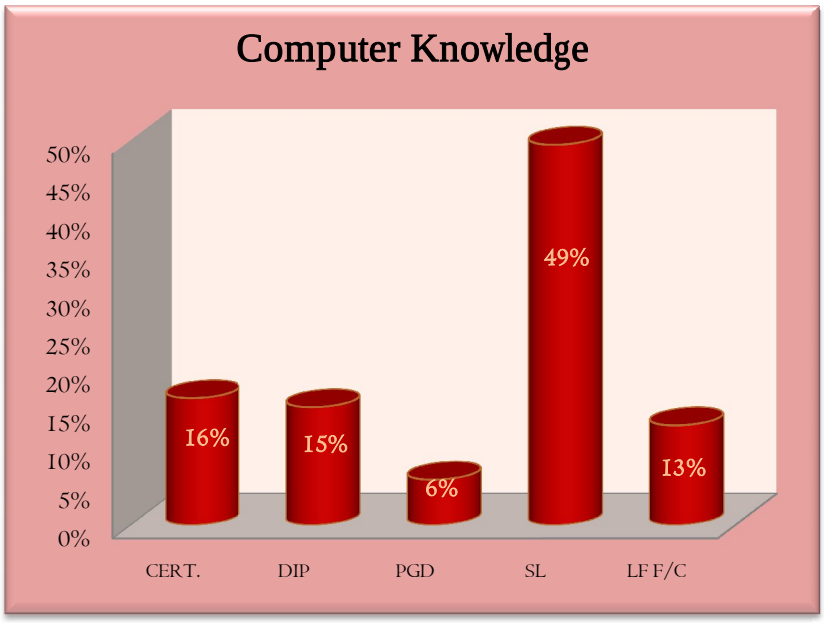



**Fig. 5.20 Professional Qualification of Library Personnel**

### 5.6.3a Computer Knowledge

It is observed that the all the professionals are having some knowledge in handling computers at least for their day to day housekeeping operations. An enquiry into the possession of an additional academic qualification in computer knowledge revealed that nearly 40% of the professionals have an additional qualification in computer knowledge. Figure 5.21 depicts the different qualifications and ways by which the professionals urged computer knowledge.




CERT.= Certificate, DIP= Diploma, PGD=P.G. Diploma, SL=Self Learnt, LFF/C=Learnt from Friends/Colleagues

**Fig 5.21 Details of Computer Knowledge of Library Professionals**

### 5.6.3b Computer Skills and Proficiencies

In order to measure the skills and proficiencies of the professionals in handling the computer, the library personnel were given a list of 10 activities (table 5.22) related to computer usage and asked to mark their skills against each item as 0 for not skilled, 1= somewhat skilled, 2=skilled and 3=highly skilled. A total of 85 (all the

professional staff members currently working in the study units except one where the post is vacant) library professionals responded to this question.

**Table 5.22 Activities to Measure Computer Proficiencies of Library Staff**

| Sl. No | ACTIVITIES |
|---|---|
| **1** | Programming |
| **2** | Networking |
| **3** | Proficiency in Linux |
| **4** | Proficiency in windows |
| **5** | Web Page Designing |
| **6** | Online Searching |
| **7** | Downloading |
| **8** | Uploading |
| **9** | Installing Computer Programmes |
| **10** | Automation Software used in their libraries |

The scores obtained by each one are added and the total scores ranged from 0 to 30. The total scores are then grouped into 4 categories as Not Skilled (0-7), Somewhat Skilled (8-15), Skilled (16-22) & Highly Skilled (23-30). The extreme values show that there are professionals with least and very high competencies. Among the respondents only one library professional opined that he is highly proficient in all the 10 activities and hence achieved a score of 30. On the other end, one professional opined that he do not has any skill in the listed activities. Both of them work in S.F. sector. The computer skills and competencies of library professionals in the study units are depicted in figure 5.22. It is seen that about half (49%) of the library professionals have "Somewhat Skills" in handling computers, & 5% are "Highly Skilled". About 5% of the professionals are found to be "Not Skilled" and 41% are found to be "Skilled" in handling computers. A sector wise analysis of the computer proficiencies is given in the table 5.23.

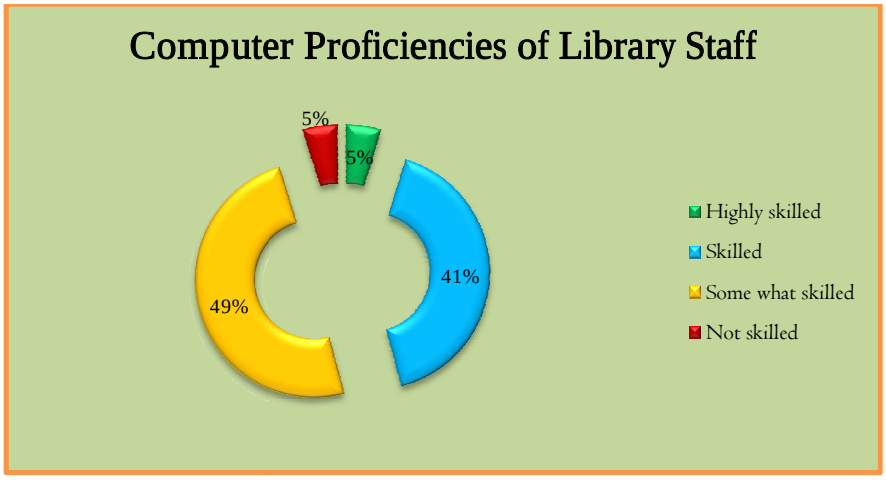



**Fig. 5.22 Computer Proficiency of Library Staff**

**Table 5.23 Computer Proficiency of Library Staff Vs Types of Colleges**

| Proficiency | Govt. (n=5) | Aided (n=2) | S.F. (n=78) |
|---|---|---|---|
| Highly skilled | - | - | 4 (5%) |
| Skilled | - | - | 35 (45%) |
| Somewhat skilled | 5 (100%) | - | 37 (47%) |
| Not skilled | - | 2 (100%) | 2 (3%) |
| Total | 5 (100%) | 2 (100%) | 78 (100%) |

It is clear that the professionals in the government and aided colleges are comparatively lesser skilled that those in S.F. colleges. It is also evident that 50% of the professionals in the S.F. colleges are skilled or highly skilled in using computers. This could be one of the reasons behind the provision of better levels of e-information facilities and services in the S.F. colleges.

### 5.6.4 Salary of Professional Staff

There is no uniform pattern or standard in the salary (pay and allowances) of library staffs in the colleges. The monthly salary of the

professional staff ranges from Rs.7000/- to Rs.40000/-. Librarians of 5 colleges claimed that they receive AICTE pay scale with local Dearness Allowance. Some of the librarians are getting salary in state pay scale for their corresponding positions. But in most cases they are not given the allowances and annual increments according to their respective scales. Nearly 50% of the library professionals receive a salary between Rs.10000 and Rs.20000.

With respect to the designation of staff positions also there is no uniformity. A wide range of designations are in usage in the study units that includes Chief Librarian, Librarian (grade I,II,III & IV), Assistant Librarian (grade I & II), Library Assistants, etc. Many librarians stressed the need to ensure uniformity in pay and allowances to employ and maintain library staff on permanent basis, which in turn improves the quality of library service.

## 5.7 Resource Sharing

The proliferation of information in varied types and formats present day pressurizes the academic libraries to find more funds for harnessing them. But this has become a major problem for all types of libraries especially in the S.F. sector. The only means to overcome this problem is cooperation with other libraries. One of the main objectives of the present study is to identify the existing system of cooperation among the libraries and to examine the problems towards effective resource sharing. In this section the existing system of library cooperation among the study units, the areas of cooperations and the hindrances to effective resource sharing are discussed.

### 5.7.1. Involvement in Resource Sharing

The response to the question, "Is your library involved in any resource sharing activity" is given in the figure 5.23. It is seen that majority of the libraries are not involved in any resource sharing (RS) activities. Only one third of the total libraries (32%) are involved in some RS activities. All these libraries are members in the DELNET consortium. Along with this some of these libraries undertake RS with the member institutions run by their respective managements. It is to be noted that none of the government ECs and aided ECs is involved in any RS activity. Figure 5.24 shows the extent of participation of these libraries in various RS activities.

It is observed that the libraries are involved in inter library loan (ILL), document delivery service (DDS), union cataloging (UC), sharing of expertise (SE) and exchange of publications (EP). The libraries that are involved in ILL (3 libraries) & EP (1 library) are cooperating with the sister institutions of their respective managements in this aspect. DDS and UC are the services provided by DELNET. The 4 libraries involved in expertise sharing, shares external expertise for solving their problems particularly with library software and digital library. 57% (4) of the libraries are participating in the union catalog of DELNET by uploading their catalog records.

#### 5.7.1a Informal Means of Cooperation

The librarians of the study units when inquired about their involvement in informal means of cooperation revealed that many of them are involved in such activities. This is mainly done for lending books (out-of-print) and journal articles from other libraries. Most of the librarians make use of their friend/professional circle for this. Some of the librarians opined that they receive the co-operation of nearby

university libraries in getting permission for taking photocopies of chapters of out-of print books. Some of the librarians use mailing groups for getting digital copies of articles. Informal means of cooperation is also carried out for sharing external expertise related to library automation and digital libraries.

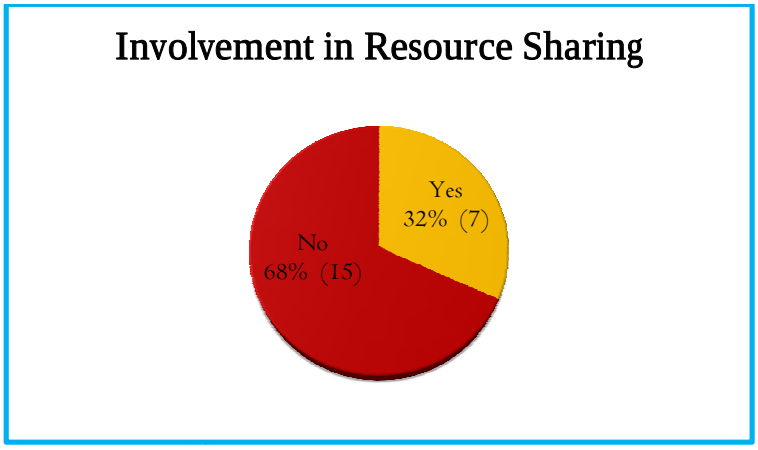



**Fig. 5.23 Involvement of Libraries in Resource Sharing Activity**

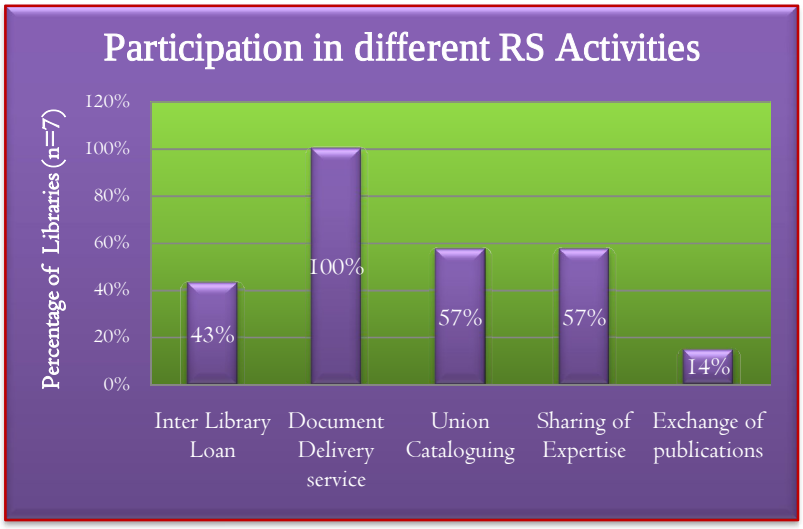



**Fig.5.24 Participation of the Libraries in Different RS Activities**

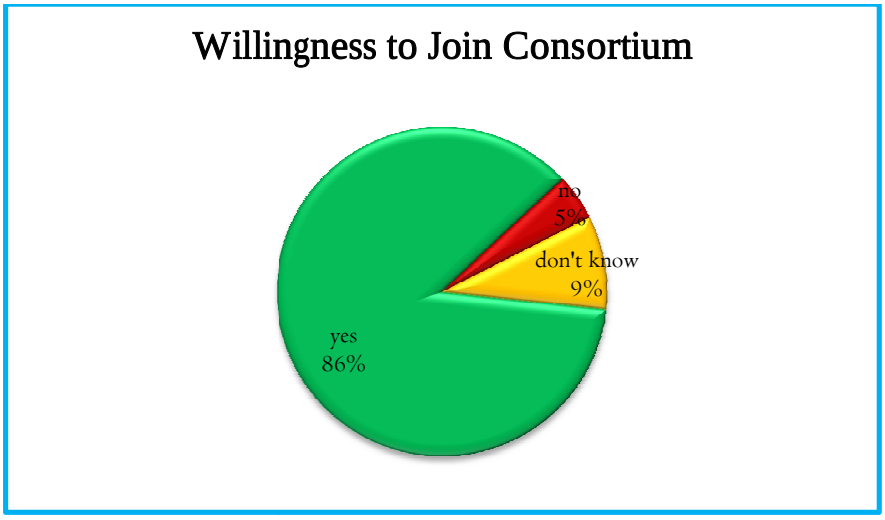



**Fig. 5.25 Willingness of the Librarians to Join a Regional Consortium**

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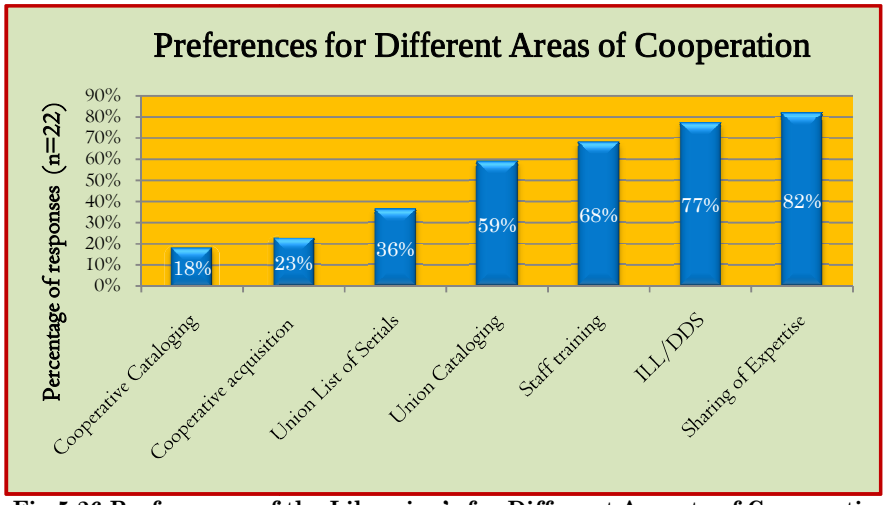



**Fig 5.26 Preferences of the Librarian's for Different Aspects of Cooperation**

### 5.7.2. Need for RS

The librarians in charge of the libraries of the study units were enquired about their opinion regarding whether effective RS is required

to cater to the needs of their students. A wide majority (77%) of the librarians opined that RS is needed to effectively satisfy the needs of their users. The remaining 23% (all in S.F. sector) opined that they have sufficient resources to satisfy their user requirements.

The responses of the librarians to whether they are willing to join a regional consortium of ECs are depicted in the figure 5.25. It can be seen that a wide majority of the librarians (86%) expressed their willingness to join a regional consortium. Among the 23% (5) of the librarians who considered that RS is not necessary to satisfy their user needs, 18% (4) expressed that they are willing to join the consortium and are ready to share their resources. Only one librarian expressed unwillingness towards joining the consortium and stated that "**A lot of competitions are there between the colleges and we are not willing to share our resources with any institution**." Two (9%) librarians opined that they do not know whether their managements would accept such a proposal. But these 2 librarians considered that RS is necessary for satisfying their user needs.

### 5.7.3. Preferences for Different Aspects of Cooperation

The chief librarians were given a list of different aspects of RS and asked to record their preferences for them. The results are given in figure 5.26.

It can be seen that the least preference is for cooperative cataloging. The online availability of catalog records in standard formats and the facilities available with the library software in uploading such records are pointed out by the librarians for this least preference. Out of the 23% (5) of the librarians who supported cooperative acquisition, 2 librarians recommended the cooperative

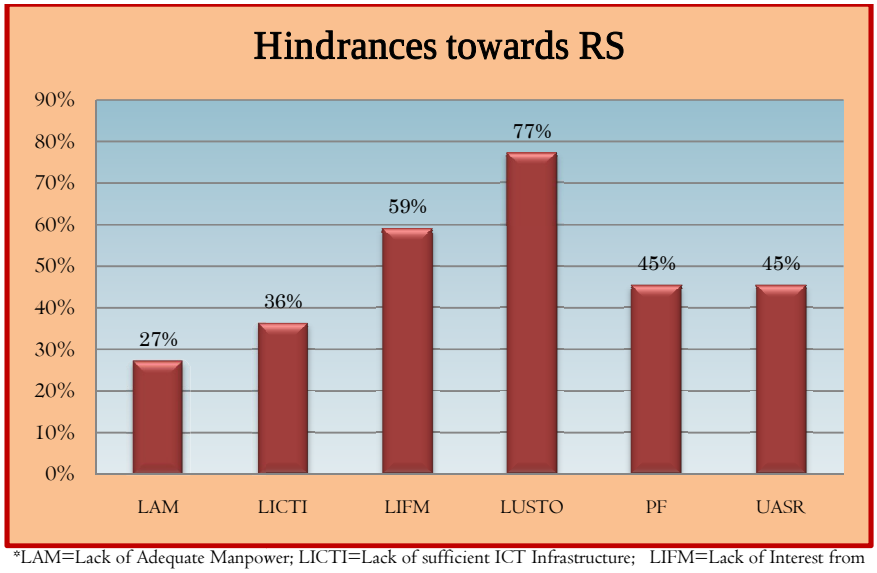
acquisition of only online journals. Majority of the preferences are for union cataloging, staff training, ILL/DDS and sharing of expertise.

It is evident that the librarians of the study units have a clear understanding of the types and areas of cooperation required in the present situation.

### 5.7.4. Hindrances Towards Effective Cooperation

The study aimed to identify the hindrances faced by the librarians in implementing an effective RS mechanism. A set of probable hindrances were listed and presented before the respondents and their opinions were collected. The hindrances for effective resource sharing as pointed out by the librarians are presented in the figure 5.27.

Majority (77%) of the librarians pointed out the lack of uniform standards in technical organization of collection as a major hindrance towards effective cooperation. More than half (59%) of the librarians opined that lack of interest from the part of management is a major hindrance towards RS. Nearly half (45%) of the librarians pointed out that their respective authorities may not be willing to share their resources. Only a small number (35%) of librarians pointed out that the lack of sufficient ICT infrastructure hinders RS. The least number of hits were received for lack of adequate manpower (27%).




*LAM=Lack of Adequate Manpower; LICTI=Lack of sufficient ICT Infrastructure; LIFM=Lack of Interest from Management; LUSTO=Lack of Uniform Standards in Technical Organization; PF=Paucity of Fund; UASR=Unwillingness of Authorities to Share their Resources

**Fig. 5.27 Hindrances towards Effective Cooperation**

A sector wise analysis of the hindrances towards effective cooperation as felt by the college librarians is presented in the table 5.24. The list of hindrances is presented in the decreasing order of their frequencies. The government and aided college librarians pointed out "Paucity of fund" as a major hindrance towards RS. The librarians of both the government colleges also pointed out that their insufficient ICT infrastructure also hindered effective RS. All the librarians (except two) from S.F. colleges pointed out one or more hindrances. The investigator's observations of the facilities of these colleges also substantiates the fact that these two colleges are having the maximum resources in terms of money, material and support from their respective managements.

**Table 5.24 Hindrances towards RS Vs Types of Colleges**

| Hindrances | Govt. (n=2) | Aided (n=1) | S.F. (n=19) | Total (n=22) |
|---|---|---|---|---|
| Lack of Uniform Standards in Technical Organization | 2 (100%) | - | 15 (79%) | 17 (77%) |
| Lack of Interest from Management | - | 1 (100%) | 12 (63%) | 13 (59%) |
| Paucity of Fund | 2 (100%) | 1 (100%) | 7 (37%) | 10 (45%) |
| Unwillingness of Authorities to Share their Resources | 1 (50%) | - | 9 (47%) | 10 (45%) |
| Lack of sufficient ICT Infrastructure | 2 (100%) | - | 6 (32%) | 8 (36%) |
| Lack of Adequate Manpower | 1 (50%) | - | 5 (26%) | 6 (27%) |

## 5.8. Ranking of College Libraries

The analysis of the different characteristics of the study units revealed that the resources and service of the colleges vary to a great extent. To substantiate this and to group and rank the colleges according to their facilities, the resources and services are further analysed. This is done on the basis of certain criteria and ranking methodology developed for this study and is explained in table 5.25.

Six items (variables) are selected for this analysis. The scores obtained by each college for a particular item is calculated according to the criteria mentioned in the table against that item. Then the total scores obtained by each college for all the six items are calculated. This is presented in table 5.26.

**Table 5.25 Methodology Used for Ranking the College Libraries**

| ITEM | CRITERIA | OBSERVATIONS | SCORES |
|---|---|---|---|
| **Budget** | Total budget allotment for the financial year 2011-12 is taken | Ranges from no regular budget to 55lakhs. One extreme value of 75lakhs was claimed by one college | 1 score is given for 10 lakh rupees |
| **No. of journals subscribed** | Total number of foreign and Indian journals excepting popular magazines are considered | Ranges from around 30 to around 180. | 1 score is given for 20 journals |
| **No. of books** | Total number of books excluding the project reports, gifts, etc | Ranges from 11500 to around 48000 | 1 score is given for 5000 books |
| **No. of E-db (e-databases)** | Total no. of E-dbs subscribed is considered | Ranges from 0 to 9 | 1 score is given for 1 E-db |
| **ICT infrastructure** | The numbers of networked computers, facilities like internet connectivity, opac, wifi and digital library are taken. (Here 1 point is given for 10 networked computers and 1 point each for the different facilities) | The sum of these values ranges from 2 to 14 | Scores given to this item is equal to the value observed according to the specified criteria |
| **Services** | Conventional and electronic services provided by the libraries are taken | The sum of these values ranges from 3 to 16 | Scores given to this item is equal to the value observed according to the specified criteria |

**Table 5.26 Scores and Ranks of College Libraries**

| COLLEGE | SCORES | | | | | | | STATUS |
|---|---|---|---|---|---|---|---|---|
| | Budget | Journals | Books | E-db | ICT Infra. | Services | Total Score | |
| C1 | 3.04 | 7.30 | 5.22 | 9.00 | 6.10 | 13.00 | 43.66 ≈ 44 | Rich |
| C2 | 1.65 | 4.00 | 5.34 | 6.00 | 5.50 | 8.00 | 30.49 ≈ 30 | Medium |
| C3 | 2.80 | 3.30 | 4.00 | 7.00 | 6.60 | 13.00 | 36.70 ≈ 37 | Medium |
| C4 | 7.50 | 9.55 | 8.59 | 7.00 | 8.20 | 13.00 | 53.84 ≈ 54 | Rich |
| C5 | 0.88 | 3.65 | 2.60 | 3.00 | 2.20 | 7.00 | 19.33 ≈ 20 | Poor |
| C6 | 2.50 | 8.50 | 4.40 | 9.00 | 3.30 | 7.00 | 34.70 ≈ 35 | Medium |
| C7 | 1.30 | 3.00 | 3.00 | 2.00 | 5.00 | 6.00 | 20.30 ≈ 20 | Poor |
| C8 | 1.80 | 3.95 | 9.76 | 5.00 | 3.30 | 5.00 | 28.81 ≈ 29 | Medium |
| C9 | 1.80 | 3.45 | 3.30 | 8.00 | 2.40 | 2300 | 21.95 ≈ 22 | Medium |
| C10 | 0.00 | 3.75 | 3.13 | 0.00 | 2.30 | 3.00 | 12.18 ≈ 12 | Poor |
| C11 | 0.00 | 2.90 | 3.10 | 1.00 | 4.30 | 8.00 | 19.30 ≈ 19 | Poor |
| C12 | 1.55 | 2.75 | 2.65 | 6.00 | 3.50 | 4.00 | 20.45 ≈ 20 | Poor |
| C13 | 0.00 | 2.30 | 4.17 | 0.00 | 1.30 | 5.00 | 12.77 ≈ 13 | Poor |
| C14 | 1.55 | 1.30 | 9.22 | 6.00 | 2.40 | 5.00 | 25.47 ≈ 25 | Medium |
| C15 | 4.00 | 6.75 | 4.61 | 7.00 | 5.30 | 16.00 | 43.66 ≈ 44 | Rich |
| C16 | 5.50 | 6.30 | 7.62 | 9.00 | 13.80 | 10.00 | 52.22 ≈ 52 | Rich |
| C17 | 1.50 | 6.90 | 5.04 | 1.00 | 4.40 | 7.00 | 25.84 ≈ 26 | Medium |
| C18 | 4.33 | 5.20 | 5.56 | 7.00 | 8.50 | 10.00 | 40.59 ≈ 41 | Rich |
| C19 | 5.00 | 7.80 | 5.00 | 8.00 | 6.20 | 9.00 | 41.00 ≈ 41 | Rich |
| C20 | 3.00 | 2.45 | 3.14 | 8.00 | 3.20 | 6.00 | 25.79 ≈ 26 | Medium |
| C21 | 1.00 | 1.65 | 2.31 | 1.00 | 3.20 | 7.00 | 16.16 ≈ 16 | Poor |
| C22 | 2.60 | 5.50 | 5.61 | 9.00 | 3.00 | 8.00 | 33.71 ≈ 34 | Medium |

Since many of the colleges do not wanted to mention their names in the analysis part and the investigator assured some of the college managements that their names may not be mentioned against any data presentation, the college libraries are conveniently named as C1, C2, C3…,C22. It can be seen that the final scores ranges from 12 to 60. The scores are then divided into three ranges: 1-20; 21-40; and 41-60 to make 3 groups with ranks mentioned as poor, medium and rich respectively. Figure 5.28 represents an overview of the number of libraries that fall in these 3 groups according to the ranks assigned to them.

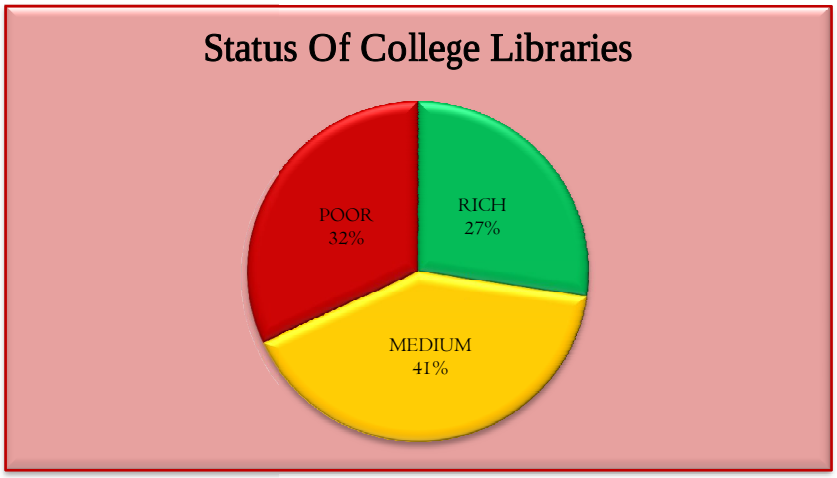



**Fig. 5.28 Status of College Libraries Based on Ranking**

It is clear that 7 colleges (32%) are found to be 'poor' with respect to their library facilities, 41% (9) of the libraries come under the group 'medium' and the remaining 6 libraries (27%) fall under the group 'rich'. In other words, nearly one third of the colleges under the study are found to be poor with respect to the library facilities.

# Part B- Analysis of User Responses

In this section the user responses are analysed. The sampled users were given structured questionnaires to collect the required data. For this the potential users of the libraries were identified first with the help of the library staff and then the questionnaires were administered. As discussed in the Methodology part of this thesis, the users were categorized into three- Under Graduate (UG) students, Post Graduate (PG) students and Faculty (FAC) members. The Questionnaire used to collect data from faculty members was a little bit different from that used for students. The common questions in both the instruments are analysed together and the rest separately. The conclusions are reached on the basis of percentage of responses, Chi-Square ($\chi^2$) test for independency and test for significance.

For the purpose of analysis, the user responses are sorted according to two attributes:

- **Category of Users**- UG, PG and FAC.
- **Status of Institution (EC Libraries)**- Rich, Medium and Poor.

The status of the institutions is identified and recorded on the basis of tables 5.25 and 5.26 respectively.

## 5.9 General Characteristics of the Respondents

The number and percentage of responses based on the respondents attributes viz; *category* and *status of institution* is presented in figures 5.29 and table 5.27.

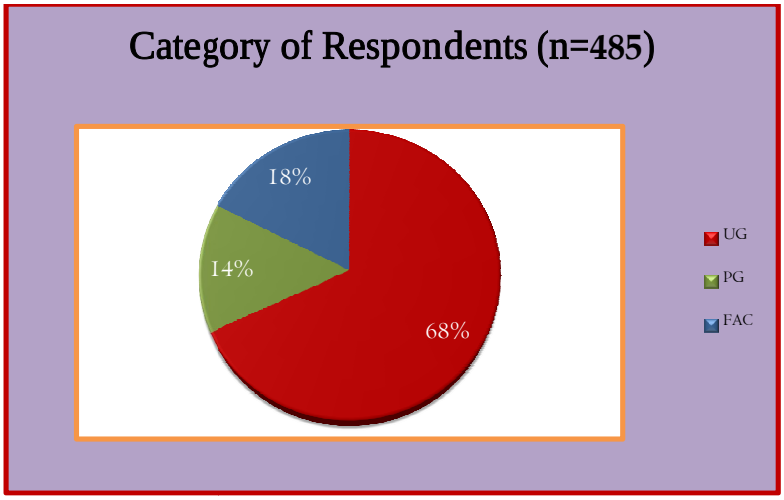



**Fig. 5.29 Category of Respondents**

**Table 5.27 Number of Respondents Vs Status of Institution**

| Status of the Institution | No. of Respondents | % of Respondents |
|---|---|---|
| Poor | 136 | 28% |
| Medium | 209 | 43% |
| Rich | 140 | 29% |
| Total | 485 | 100% |

The figure makes it clear that out of the 485 respondents, 330 (68%) are UG students. 18% (85) are the Faculty members and the remaining 14% (70) are PG students. The number of respondents belonging to different status of institution is clearly depicted in the table.

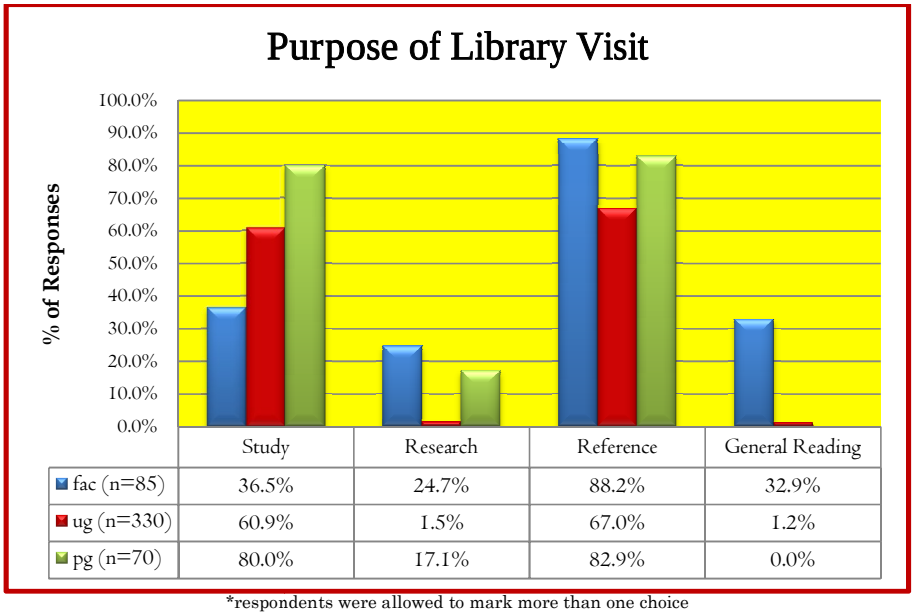
## 5.10 Use of Library Resources

In this section the respondents' use of different library resources are analysed. Before moving on to the analysis of specific types of

resources some general information regarding library use is analysed first.

### 5.10.1 Purpose of Library Visit

The purpose of library visits by different categories of users is detailed in the figure 5.30. The primary purpose for visiting the libraries is found to be reference. The student users' secondary purpose behind library visit is studying. A considerable number of faculty members and PG students visited the library for the purpose of research. An important observation is that student users rarely use their libraries for general reading.




| | Study | Research | Reference | General Reading |
|---|---|---|---|---|
| fac (n=85) | 36.5% | 24.7% | 88.2% | 32.9% |
| ug (n=330) | 60.9% | 1.5% | 67.0% | 1.2% |
| pg (n=70) | 80.0% | 17.1% | 82.9% | 0.0% |

*respondents were allowed to mark more than one choice

**Fig. 5.30 Purpose of Library Visit by Different Categories of Users**

### 5.10.2 Frequency of Library Visits

The frequency of library visits by different user categories is represented in figure 5.31.

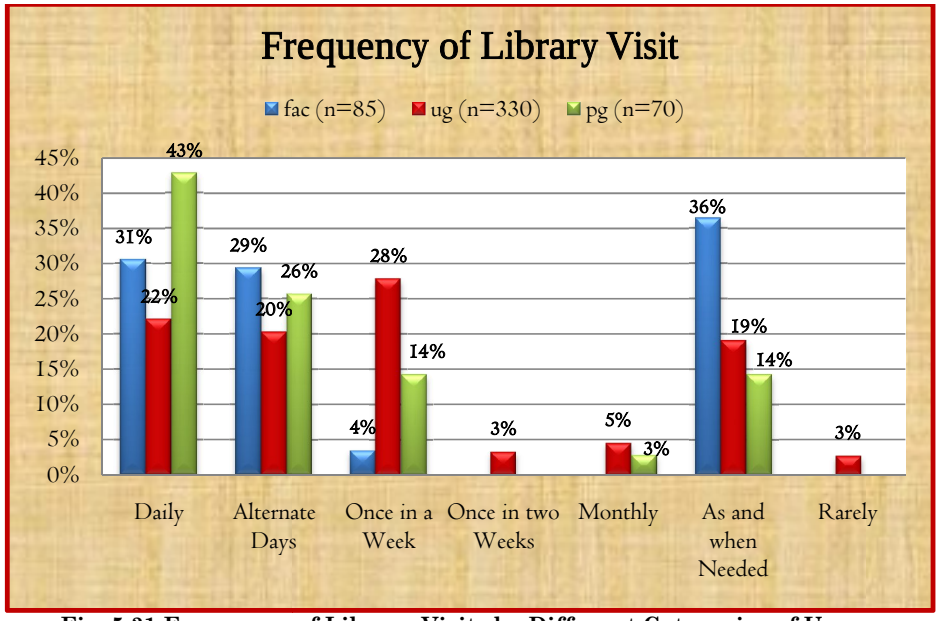



**Fig. 5.31 Frequency of Library Visits by Different Categories of Users**

It is seen that nearly half of the PG students (43%) visit their libraries daily and a good number of faculty members (36%) visit their libraries when need arises. On an overall majority of the respondents are regular visitors to their libraries- either daily, on alternate days or weekly. A small number (3%) of the UG students covered under this study are rare visitors of their libraries. Among the respondents, PG students are found to be the frequent visitors of their libraries.

### 5.10.3 Average Time Spend in the Library

An enquiry into the average time spend by the respondents in their libraries revealed that majority of the student users (72% of UG & 60% of PG) spend less than 1 hour in their libraries, where as majority of the faculty members (67%) spend an average of 1 to 3hours in their libraries and the rest spend less than one hour in the libraries. A small

number of student respondents claimed that they spend an average of 3to 5 hours in the library as depicted in figure 5.32.

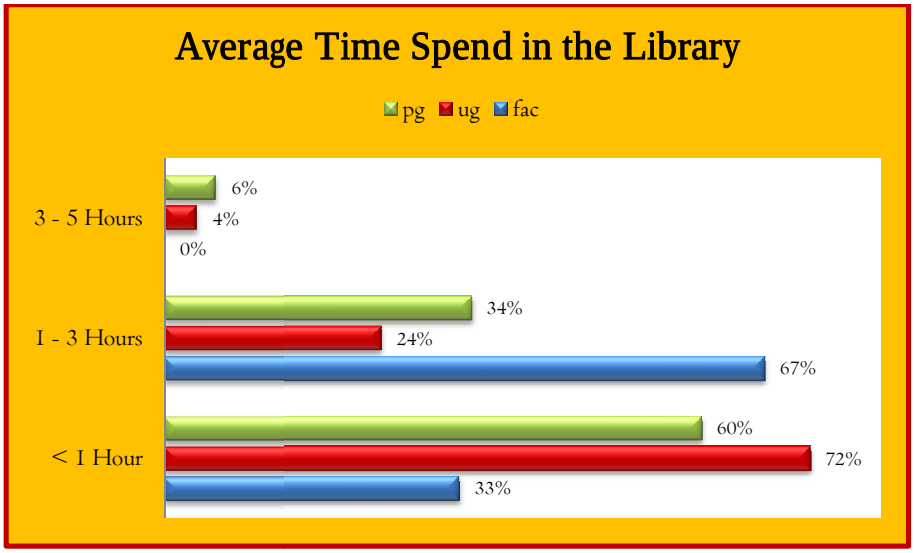



**Fig 5.32 Average Time Spend by the Respondents in their Libraries**

### 5.10.4 Use of Print Resources

The main print resources in a college library are books and periodicals. The use of different print resources by the student users is given in the table 5.28.

**Table 5.28 Use of Different Print Resources by Student Users**

| ITEM | UG (n=330) | PG (n=70) | TOTAL (n=400) |
|---|---|---|---|
| Text Books | 330 (100%) | 70 (100%) | 400 (100%) |
| Reference Books | 289 (88%) | 70 (100%) | 359 (90%) |
| Print Periodicals | 264 (80%) | 58 (83%) | 322 (81%) |

Text books are used by all the users and 100%of the PG students use

reference books. 81% of the total student users make use of the print periodical collection in their library.

### 5.10.5 Use of E-resources

One of the major objectives of the study is to ascertain the users' awareness of electronic resources and to analyse the use of e-resources by different groups of users. It is observed that majority of the users are aware of e-resources provided by their libraries. The details are depicted in the table 5.29. E-project report is the item about which the users are less aware (56%). An important observation in this matter is that the user group that is least aware of this resource is the faculty members (only 33%). As far as UG students are taken, more than 60% of the users are aware of all the e-resources. PG students are less aware about the digital libraries/institutional repositories in their libraries.

**Table 5.29 Users' Awareness of Different E-Resources Provided by Libraries**

| ITEM | UG (n=330) | PG (n=70) | FAC (n=85) | Total (n=485) |
|---|---|---|---|---|
| E-books | 220 (67%) | 55 (79%) | 61 (72%) | 336 (69%) |
| E-journals & databases | 231 (70%) | 60 (86%) | 77 (91%) | 368 (76%) |
| Online Catalogs | 214 (65%) | 56 (80%) | 67 (79%) | 337 (69%) |
| E-question papers | 222 (67%) | 50 (71%) | 50 (59%) | 322 (66%) |
| Digital Library/ Institutional Repository [DL/IR] | 204 (62%) | 40 (57%) | 60 (71%) | 304 (64%) |
| E-project reports | 200 (61%) | 44 (63%) | 28 (33%) | 272 (56%) |
| Internet | 301 (91%) | 60 (86%) | 76 (89%) | 437 (90%) |

An overview of the use of different e-resources is depicted in figure 5.33.It is observed that internet/www is the widely used e-resource followed by e-journals and databases and then by e-books. The least used item is the e-project reports. The observed reason behind this is that only 14% (3) of the colleges provide this resource and too a small number of items. An important point noticed here is that the use of e-books among academics is increasing. Some previous studies by Kaur (2009), Sharma & Sharma (2010) reported lesser usage of e-books whereas some recent studies by Dhanavandan, Esmail and Nagarajan (2012) reported an increased use of e-books by the academics.

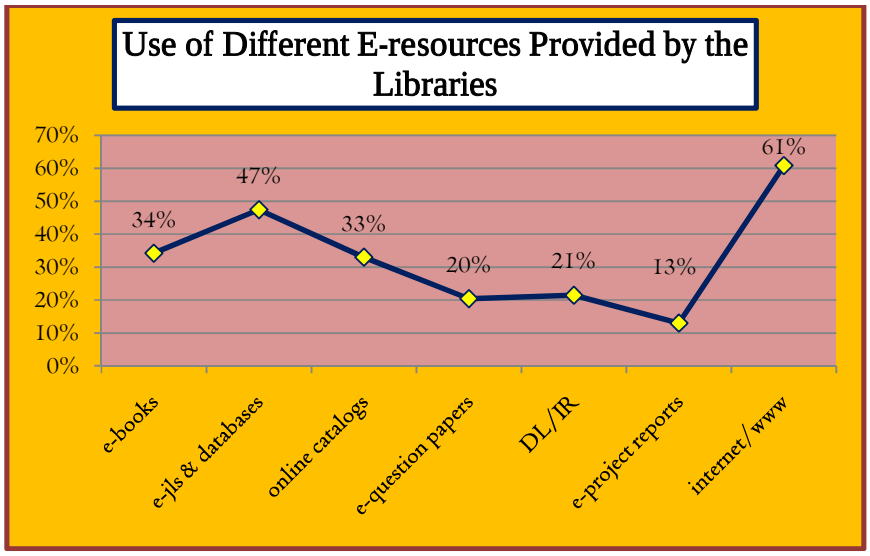



**Fig. 5.33 Use of Different E-Resources Provided by the Libraries**

The use of different e-resources by different groups of users is analysed in detail in the following sections.

### 5.10.5a Use of E-resources Vs Category of users

One of the major objectives of the study is to identify whether

there is any relation between the use of e-resources and category of users. The hypothesis framed in relation to this objective is that "*The use of e-resource is dependent on the category of users*". The study used Chi-square **($\chi^2$)** analysis to test this hypothesis. The table 5.30 represents the relation between the use of e-resources with category.

**Table 5.30 Use of E-resources Vs Category of Users**

| Items | Use | Category | | | Chi-square (df=2) | p - value |
|---|---|---|---|---|---|---|
| | | UG | PG | Faculty | | |
| E-Books | Yes | 91 (27.6%) | 28 (40.0%) | 47 (55.3%) | 24.279 | 0.000 |
| | No | 239 (72.4%) | 42 (60.0%) | 38 (44.7%) | | |
| E-Journals | Yes | 119 (36.1%) | 46 (65.7%) | 65 (76.5%) | 55.244 | 0.000 |
| | No | 211 (63.9%) | 24 (34.3%) | 20 (23.5%) | | |
| Online Catalogue | Yes | 78 (23.6%) | 30 (42.9%) | 52 (61.2%) | 46.691 | 0.000 |
| | No | 252 (76.4%) | 40 (57.1%) | 33 (38.8%) | | |
| E-Question Papers | Yes | 70 (21.2%) | 6 (8.6%) | 27 (31.8%) | 12.345 | 0.002 |
| | No | 260 (78.8%) | 64 (91.4%) | 58 (68.2%) | | |
| Digital Library/ Institutional Repository | Yes | 59 (17.9%) | 9 (13%) | 41 (48%) | 40.091 | 0.000 |
| | No | 271 (82.1%) | 61 (87%) | 44 (52%) | | |
| E-Project Reports/E-Dissertations | Yes | 71 (21.5%) | 6 (8.6%) | 7 (8.2%) | 12.696 | 0.002 |
| | No | 259 (78.5%) | 64 (91.4%) | 78 (91.8%) | | |
| Internet | Yes | 183 (55.5%) | 42 (60.0%) | 70 (82.4%) | 20.547 | 0.000 |
| | No | 147 (44.5%) | 28 (40.0%) | 15 (17.6%) | | |

The percentage of responses against each item shows a variation among categories with respect to their use of a particular item. The chi-square values calculated against each item are found to be greater than the table values for the degree of freedom (df=2). This shows that the

variables are dependent. The p-value ($\leq .01$) shows that the dependence is significant at 1 percent level of significance. Thus the hypothesis is valid at 1 percent level of significance.

### 5.10.5b Use of E-resources Vs Status of Institution

The study analysed whether the use of e-resources is dependent on the status of the institutions of the respondents. The hypothesis formulated for this purpose is "*The use of e-resources is dependent on the status of institution*." The table 5.31 with Chi-square **($\chi^2$)** analysis substantiates this.

The table makes it clear that the use is dependent on the status of institution. The percentage of responses reveals that the usage of e-resources is very less in poor colleges. The $\chi^2$ values for all the items are found to be above the table values for a degree of freedom, df=2. The p-values are found to be $\leq .01$ which shows that the usage is dependent on the status of institution at 1 percent level of significance.

#### 5.10.5.1 Reasons for Non-Use of E-Resources

The identified reasons behind the non-use of e-resources are lack of availability of the resource, unawareness and lack of interest. Figure 5.34 shows the reasons behind non-use of various e-resources. Each bar in the diagram represents the total number of non-users for a particular e-resource.

Around 26 to 44 percent users responded that their libraries did not provide the listed e-resources. About 10% to 44% users replied that they were unaware of the different e-resources. A few number of users responded that they were not interested in the listed e-resources. Hence

it is inferred that the main reasons for non-use of e-resources in the study units are unavailability and unawareness.

**Table 5.31 Use of E-resources Vs Status of Institutions**

| Items | Use | Status of Institution | | | Chi-square (df=2) | p - value |
|---|---|---|---|---|---|---|
| | | Poor | Medium | Rich | | |
| E-Books | Yes | 7 (5%) | 75 (36%) | 84 (60%) | 92.515 | 0.000 |
| | No | 129 (95%) | 134 (64%) | 56 (40%) | | |
| E-Journals | Yes | 37 (27%) | 93 (44%) | 100 (71%) | 55.369 | 0.000 |
| | No | 99 (73%) | 116 (56%) | 40 (29%) | | |
| Online Catalogue | Yes | 23 (17%) | 67 (32%) | 70 (50%) | 34.310 | 0.000 |
| | No | 113 (83%) | 142 (68%) | 70 (50%) | | |
| E-Question Papers | Yes | 8 (6%) | 29 (14%) | 66 (47%) | 82.110 | 0.000 |
| | No | 128 (94%) | 180 (86%) | 74 (53%) | | |
| Digital Library/ Institutional Repository | Yes | 7 (5%) | 35 (17%) | 67 (48%) | 79.141 | 0.000 |
| | No | 129 (95%) | 174 (83%) | 73 (52%) | | |
| E-Project Reports/E-Dissertations | Yes | 11 (8%) | 22 (11%) | 48 (34%) | 50.528 | 0.000 |
| | No | 125 (92%) | 187 (89%) | 92 (66%) | | |
| Internet | Yes | 50 (37%) | 113 (54%) | 132 (94%) | 102.828 | 0.000 |
| | No | 86 (63%) | 96 (46%) | 8 (6%) | | |

The reasons for non-use of e-resources is further analysed with respect to the status of the institutions. The observations are presented in the table 5.32. The number of hits against the variable "*library doesn't provide it*" under the heading "Poor" is found to be comparatively high. This makes it clear that majority of the poor colleges do not provide the listed e-resources for their users. The minimal number of hits under the heading "Rich" reveals that the user community in this group of colleges admits that their libraries provide such resources. A good number of users responded that they were *unaware* of the

availability of different e-resources. But the corresponding hits under the "Rich" colleges are found to be comparatively less with respect to the other two groups of colleges. This points towards the fact that "Rich" colleges provide the resources as well as market them properly. Whereas in the other two groups, the resources are not been marketed effectively. Even though most of these libraries display the resources and services provided by it in the library notice board (as observed by the investigator), the matter is not been properly communicated to the targeted users. The study recommends that the librarians should necessitate proper measures to market the resources as well as train the users for the proper utilization of their resources.

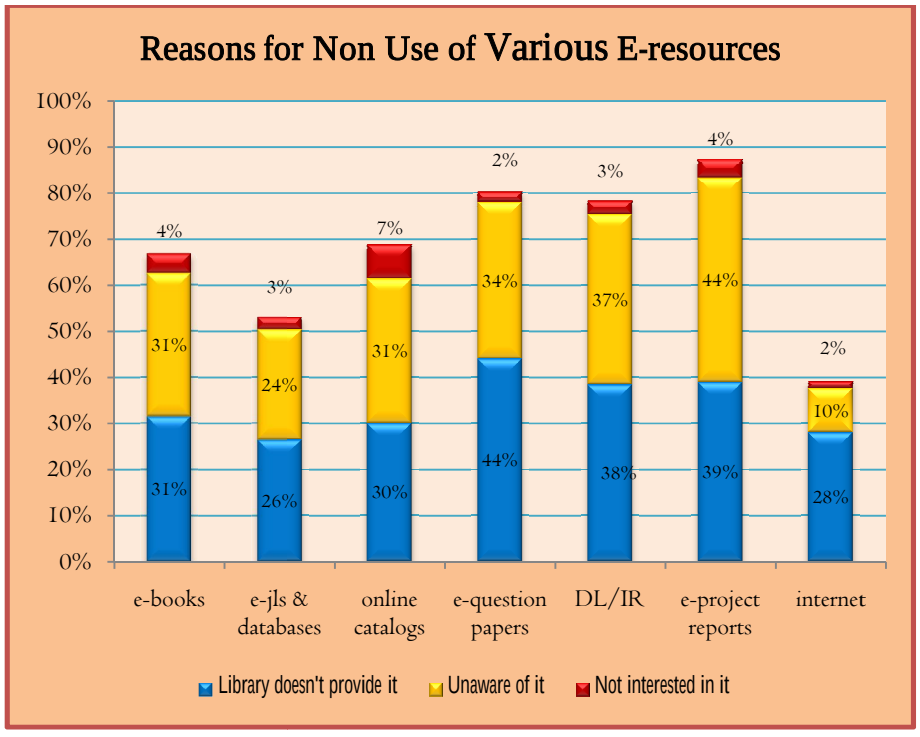



**Fig. 5.34 Reasons for Non-Use of Various E-Resources**

**Table 5.32 Reasons for Non-Use of E-Resources Vs Status of Institution**

| Item | Reasons | Status of Institution | | |
|---|---|---|---|---|
| | | Poor (n=136) | Medium (209) | Rich (n=140) |
| E-books | Library doesn't provide it | 91 (67%) | 51 (24%) | 5 (4%) |
| | Unaware of it | 32 (24%) | 78 (37%) | 41 (29%) |
| | not interested in it | 6 (4%) | 5 (2%) | 10 (7%) |
| E-journals | Library doesn't provide it | 74 (54%) | 50 (24%) | 4 (3%) |
| | Unaware of it | 20 (15%) | 63 (30%) | 30 (21%) |
| | not interested in it | 5 (4%) | 3 (1%) | 6 (4%) |
| Online catalogue | Library doesn't provide it | 83 (61%) | 60 (29%) | 1 (1%) |
| | Unaware of it | 22 (16%) | 71 (34%) | 47 (34%) |
| | not interested in it | 8 (6%) | 11 (5%) | 22 (16%) |
| E-question papers | Library doesn't provide it | 103 (76%) | 91 (44%) | 11 (8%) |
| | Unaware of it | 21 (15%) | 86 (41%) | 53 (38%) |
| | not interested in it | 4 (3%) | 3 (1%) | 8 (6%) |
| Digital Library/ Institutional Repository | Library doesn't provide it | 104 (76%) | 71 (34%) | 3 (2%) |
| | Unaware of it | 21 (15%) | 102 (49%) | 52 (37%) |
| | not interested in it | 4 (3%) | 1 (0%) | 19 (14%) |
| E-project reports/ E-dissertations | Library doesn't provide it | 103 (76%) | 77 (37%) | 7 (5%) |
| | Unaware of it | 20 (15%) | 110 (53%) | 78 (56%) |
| | not interested in it | 4 (3%) | 8 (4%) | 7 (5%) |
| Internet | Library doesn't provide it | 67 (49%) | 67 (32%) | 0 (0%) |
| | Unaware of it | 13 (10%) | 27 (13%) | 4 (3%) |
| | not interested in it | 6 (4%) | 2 (1%) | 4 (3%) |

*The sum of the frequencies under each item gives the total number of non-users and the percentage corresponds to the n-values

The reasons for non-use, when analysed with the categories of respondents revealed that the faculty members are mostly unaware of the services. Whereas, the reasons for non use among students are found to be similar. In almost all cases more number of responses are

received for the option *'Library doesn't provide it'*. A comparative analysis of the non-use factors of e-resources against category of users is given in the table 5.33

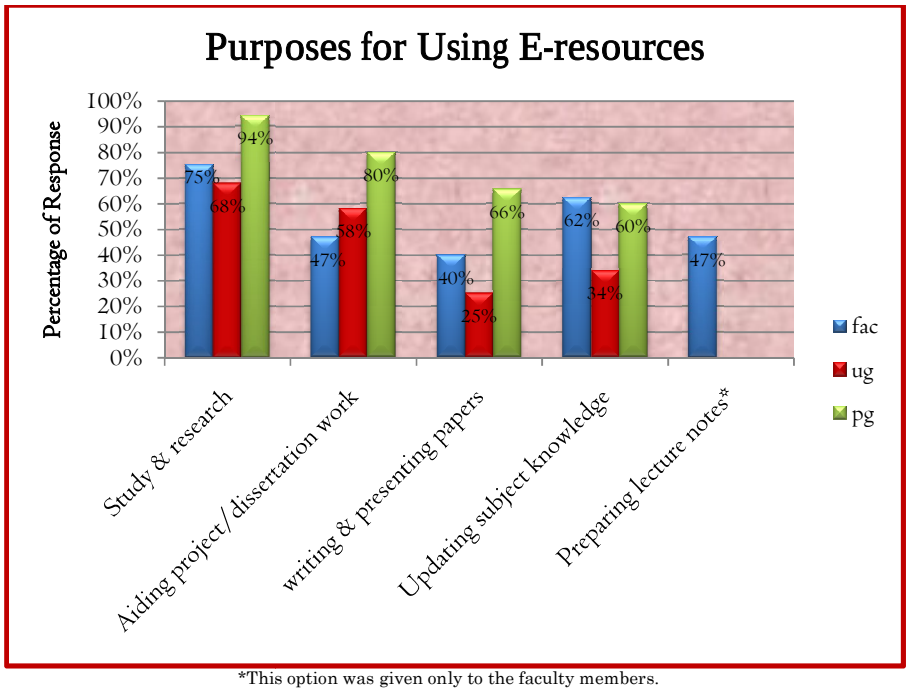
**Table 5.33 Reasons for Non-Use of E-Resources Vs Category of Users**

| ITEMS | REASON FOR NON-USE | UG (n=330) | PG (n=70) | FAC. (n=85) |
|---|---|---|---|---|
| E-books | Library doesn't provide it | 114 (35%) | 22 (1%) | 12 (14%) |
| | Unaware of it | 110 (33%) | 16 (23%) | 24 (28%) |
| | Not interested in it | 15 (5%) | 4 (6%) | 2 (2%) |
| E-journals | Library doesn't provide it | 101 (31%) | 12 (17%) | 12 (14%) |
| | Unaware of it | 99 (30%) | 10 (14%) | 8 (9%) |
| | Not interested in it | 11 (3%) | 2 (3%) | 0 (0%) |
| Online catalogue | Library doesn't provide it | 117 (35%) | 18 (26%) | 9 (11%) |
| | Unaware of it | 116 (35%) | 14 (20%) | 18 (21%) |
| | Not interested in it | 19 (6%) | 8 (11%) | 6 (7%) |
| E-question papers | Library doesn't provide it | 144 (44%) | 44 (63%) | 23 (27%) |
| | Unaware of it | 108 (33%) | 20 (29%) | 35 (41%) |
| | Not interested in it | 8 (2%) | 4 (6%) | 0 (0%) |
| Digital Library/ Institutional Repository | Library doesn't provide it | 135 ( 41%) | 32 (46%) | 17 (20%) |
| | Unaware of it | 126 (38%) | 30 (43%) | 25 (29%) |
| | Not interested in it | 10 (3%) | 6 (9%) | 0 (0%) |
| E-project reports/ E-dissertations | Library doesn't provide it | 138 (42%) | 32 (46%) | 21 (25%) |
| | Unaware of it | 130 (39%) | 26 (37%) | 57 (67%) |
| | Not interested in it | 8 (2%) | 10 (14%) | 0 (0%) |
| Internet | Library doesn't provide it | 112 (34%) | 16 (23%) | 6 (7%) |
| | Unaware of it | 29 (9%) | 10 (14%) | 9 (11%) |
| | Not interested in it | 6 (2%) | 2 (3%) | 0 (0%) |

*The sum of the frequencies under each item gives the total number of non-users and the percentage corresponds to the n-values

### 5.10.5.2 Purposes for using E-resources

Analysis of the different purposes for using e-resources reveals a similar pattern between student users. Majority of the users (in all categories) opined that they use e-resource for their study and research. Student users' second major purpose is for aiding project/research work. As far as faculty members are concerned, their second major purpose for using e-resources is found to be updating subject knowledge. This is followed by aiding project/dissertation work and preparing lecture notes. Writing & presenting papers is another purpose for using e-resource. 66% of PG students used the e-resources for this purposes where as only a small number of UG students opted this purposes. The different purposes for using e-resources from the point of view of different categories of users are depicted in figure 5.35.




*This option was given only to the faculty members.

**Fig 5.35 Purposes for Using E-Resources**

### 5.10.5.3 Preferred Place for Using E-Resources

The student users' (particularly PG students) preferred place for using e-resources is their home with their personal computers/laptops. Whereas more than half of the teachers opined that their preferred place is the college library. Only 20% of the PG students and 31% of UG students prefer their college libraries for using e-resources. Some of the student users prefer internet café for accessing e-resources. The details are given in figure 5.36. Only 5% of the UG students and 11% of teachers prefer their computer labs for accessing e-resources and no PG student covered in this study use the computer labs for accessing e-resources.

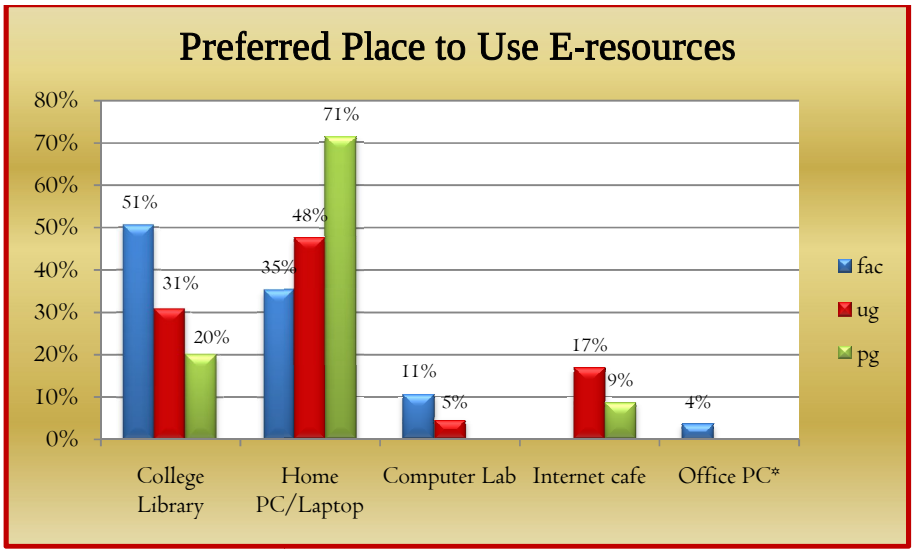



**Fig. 5.36 Preferred Place for Using E-Resources**

### 5.10.5.4 Frequencies of Using Different E-Resources

The frequencies of use of different e-resources by different categories of users were measured using a five point scale. The values obtained for each resource is plotted against each category of users and

is given in figure 5.37. The benchmark value is set at 2.5. A value equal to or greater than 2.5 is taken as frequent.

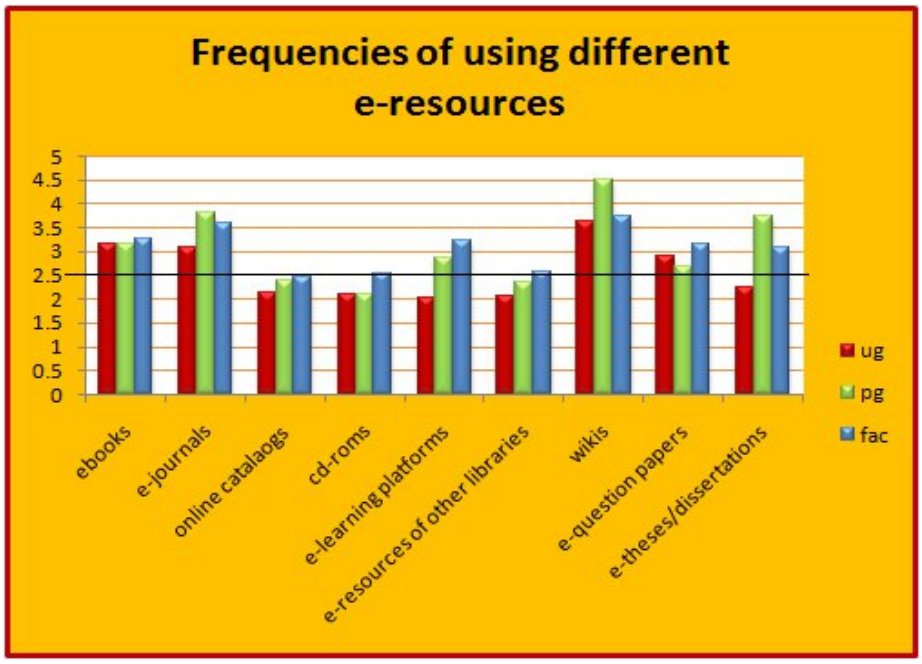



**Fig. 5.37 Frequencies of Use of Various E-Resources by Different User Categories**

It is clear from the figure that faculty members are the frequent users of all the e-resources. Out of the nine e-resources, the PG students frequently use 6 resources. UG students use only 4 types of e-resources frequently. The most frequently used resource by all the categories is the wikis. This is followed by e-journals and e-books. The next frequently used resource by all the categories is the e-question papers (Eqp). But the use of Eqp by PG students is found to be a little less when compared with that of other categories. A striking difference is observed in the frequency of use of ETDs by different categories. While the PG students and faculty members frequently use it, the UG students use it rarely. An important observation is that online catalog

(OPAC) is one among the less frequently used e-resources by all the user categories. Sivaprasad, Dhanalakshmi and Rao (2009) reported a similar finding. The figure also reveals that UG students are less frequent users of e-resources in comparison with the other two category of users.

### 5.10.5.5 Preferences of Different Formats

An analysis of the format preferences for different information resources is given in the figure 5.38

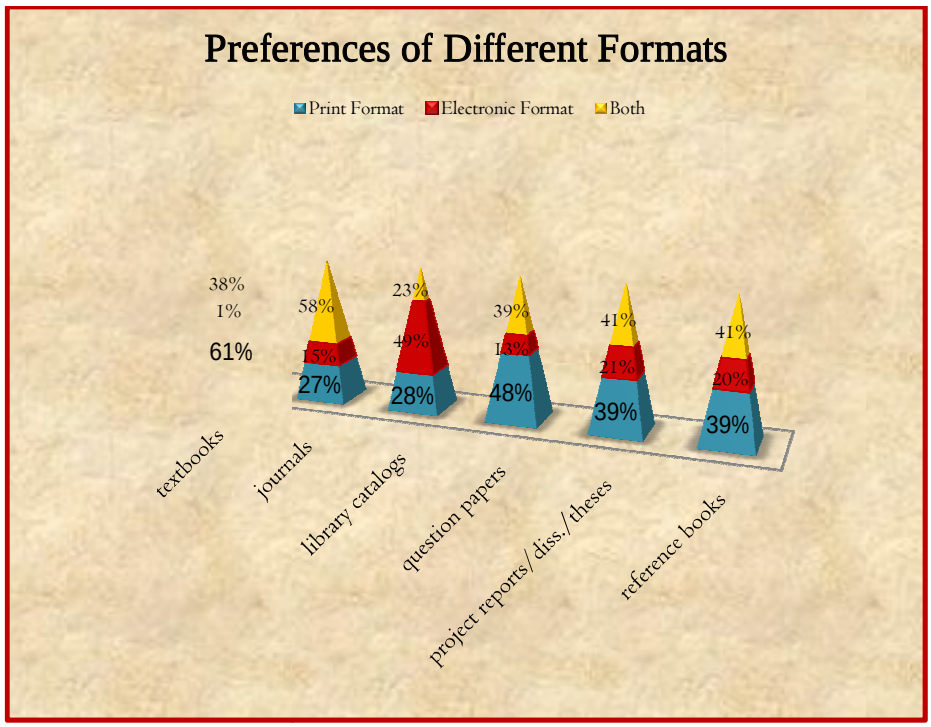



**Fig. 5.38 Preferences of Different Formats of Information Resources**

It is clear that print is the preferred format for textbooks. About half of the users preferred electronic format for library catalogs. Majority of the users selected 'Both" for journals. On an overall it is

observed that about 40% of the users prefer print formats, 20% prefer electronic formats and 40% prefer both formats of library resources. The number of preferences for 'both' the formats shows that many of the users are still preferring the print versions and at the same time they wanted to harness the advantages of electronic versions also. This also implies that the popularity of electronic format is growing among the academics. The finding is similar with that of Kumar and Kumar (2010), but with a diminishing trend in the preference for print version. The authors reported that even though the e-resources were much popular, 65% of the respondents still prefer print versions.

**Table 5.34 Preference for Different Formats of Information Sources Vs Category**

| ITEMS | FORMAT | UG (n=330) | PG (n=70) | FAC (n=85) | TOTAL (n=485) |
|---|---|---|---|---|---|
| Books | Print | 195 (59%) | 42 (60%) | 59 (69%) | 296 (61%) |
| | Electronic | 4 (1%) | 0 (0%) | 0 (0%) | 4 (1%) |
| | Both | 131 (40%) | 28 (40%) | 26 (31%) | 185 (38%) |
| Journals | Print | 104 (32%) | 20 (29%) | 7 (8%) | 131 (27%) |
| | Electronic | 41 (12%) | 24 (34%) | 10 (12%) | 75 (15%) |
| | Both | 185 (56%) | 26 (37%) | 68 (80%) | 279 (58%) |
| Library Catalogs | Print | 101 (31%) | 28 (40%) | 6 (7%) | 135 (28%) |
| | Electronic | 157 (48%) | 36 (51%) | 47 (55%) | 240 (49%) |
| | Both | 72 (22%) | 6 (9%) | 32 (38%) | 110 (23%) |
| Question Papers | Print | 155 (47%) | 30 (43%) | 47 (55%) | 232 (48%) |
| | Electronic | 33 (10%) | 14 (20%) | 18 (21%) | 65 (13%) |
| | Both | 142 (43%) | 26 (37%) | 20 (24%) | 188 (39%) |
| Project Reports/ Dissertatio-ns/ Theses | Print | 127 (38%) | 20 (29%) | 40 (47%) | 187 (39%) |
| | Electronic | 61 (18%) | 20 (29%) | 20 (24%) | 101 (21%) |
| | Both | 142 (43%) | 30 (43%) | 25 (29%) | 197 (41%) |
| Reference Books | Print | 134 (41%) | 26 (37%) | 30 (35%) | 190 (39%) |
| | Electronic | 68 (21%) | 14 (20%) | 14 (16%) | 96 (20%) |
| | Both | 128 (39%) | 30 (43%) | 41 (48%) | 199 (41%) |

Table 5.34 represents the format preferences for different resources by different categories of users. It is observed that almost similar patterns of preferences are shown by all the categories of users except in the case of library catalogs and journals where only 7% and 8% of the faculties preferred the print versions of the items respectively.

The main reason for preferring electronic format is found to be faster access. Figure 5.39 provides a picture of the different reasons behind preferring electronic format of documents. A category wise analysis of the reasons for preferring electronic formats is given in table 5.35.

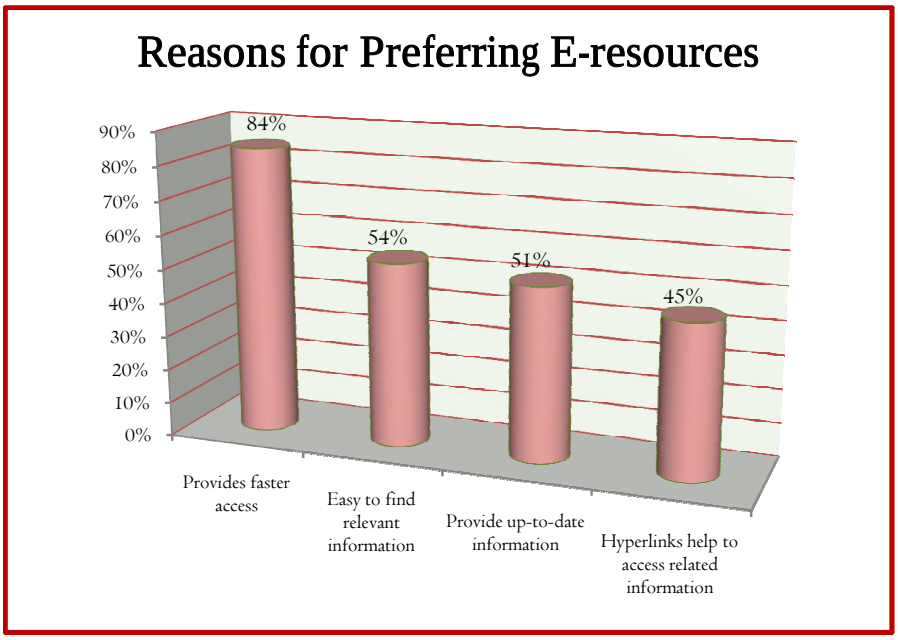



**Fig 5.39 Reasons for Preferring Electronic Formats of Documents**

**Table 5.35 Reasons for Preferring Electronic Format Vs Category**

| REASONS FOR PREFERRING E-RESOURCES | UG (n=330) | PG (n=70) | FAC (n=85) | TOTAL (n=485) |
|---|---|---|---|---|
| Provides faster access | 281 (85%) | 62 (89%) | 66 (78%) | 409 (84%) |
| Easy to find relevant information | 160 (48%) | 58 (83%) | 45 (53%) | 263 (54%) |
| Provide up-to-date information | 163 (49%) | 42 (60%) | 43 (51%) | 248 (51%) |
| Hyperlinks help to access related information | 151 (46%) | 36 (51%) | 32 (38%) | 219 (45%) |

*respondents were allowed to mark more than one option

### 5.10.5.6 Availability of Sufficient Number of Computers

The respondents (only students) were asked whether their libraries provide sufficient number of computers for accessing e-resources. 63% (252) of the respondents opined that their libraries do not provide sufficient number of computers. The responses were then analysed with the status of the institutions and is presented in table 5.36.

**Table 5.36 Availability of Sufficient Number of Computers Vs Status of Institution**

| AVAILABILITY | POOR | MEDIUM | RICH |
|---|---|---|---|
| Available | 14 (11%) | 47 (27%) | 87 (85%) |
| Not Available | 110 (89%) | 127 (73%) | 15 (15%) |
| Total | 124 (100%) | 174 (100%) | 102 (100%) |

A striking difference can be seen between the responses from facility rich and poor colleges. While a majority of the respondents from rich colleges agreed that their libraries provide sufficient number of computers, a wide majority from poor and medium colleges opined that their libraries do not provide sufficient number of computers for accessing e-resources.

#### 5.10.5.7 Problems Encountered while Using E-Resources

The study ascertained the problems encountered by student users while accessing e-resources in their libraries. The users were allowed to mark more than one option in this question. Lack of sufficient time for browsing (42%) is found to be the major problem. This is followed by retrieval of too much of information (32%). Figure 5.40 gives an overview of the different problems. An important observation is that inspite of the availability of a lot of e-resources in their libraries, 15% of the respondents opined that many of the resources they needed were not available. This points out the fact that the user opinions and requests may also be considered in the collection development process of e-resources. Satpathy and Rout (2010) also reported that non availability of required e-resources in the libraries as a major problem of users.

Lack of skills for effective search retrieval is pointed out by 29% of the users. This problem may be considered seriously by the librarians and the users may be imparted sufficient training to overcome this problem. Many studies (Ali (2005), Gowda and Shivalingaiah (2009), Dhanavandan, Esmail and Nagarajan(2012)) reported this problem and stressed the need for imparting training to the users.

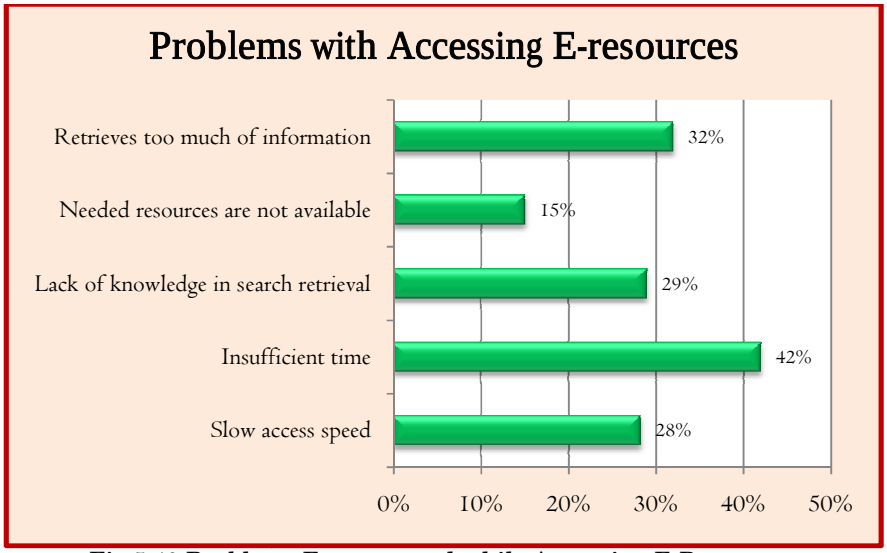



**Fig 5.40 Problems Encountered while Accessing E-Resources**

A category wise analysis of the problems encountered by the student users is presented in the table 5.37.

**Table 5.37 Problems Encountered While Accessing E-Resources Vs Category**

| PROBLEMS | UG (n=330) | PG (n=70) | Total (n=400) | Chi-Square |
|---|---|---|---|---|
| Slow Access Speed | 103 (31%) | 10 (14%) | 113 (28%) | 64.41 (df=8; p-value= 0.000) |
| Insufficient Time | 128 (39%) | 40 (57%) | 168 (42%) | |
| Lack of Knowledge in Search Retrieval | 98 (30%) | 18 (26%) | 116 (29%) | |
| Needed Resources are not Available | 25 (8%) | 34 (49%) | 59 (15%) | |
| Retrieves too much of Information | 110 (33%) | 19 (27%) | 129 (32%) | |

Apart from *insufficient time,* which is identified as the major problem, the PG students' major problem was that the *needed resources are not available*, where as that for the UG students' was *lack of knowledge in search retrieval.*

A $\chi^2$ test performed to test the dependency of the problems encountered with category resulted in a value much higher than the table value for degrees of freedom, df=4. Hence it is inferred that the problems encountered while accessing e-resources varies with the category of users. The dependency between the variables is found to be significant at 0.01 level.

## 5.11 Satisfaction of Users with Different Resources

The student users were enquired about their satisfaction with the various print and e-resources as well as with the ICT facilities in their libraries. The following section deals with the analysis of this.

### 5.11.1 Print Resources

Figures 5.41, 5.42 & 5.43 represent the satisfaction of users towards the print collection of their libraries viz; textbooks, reference books and print periodicals.

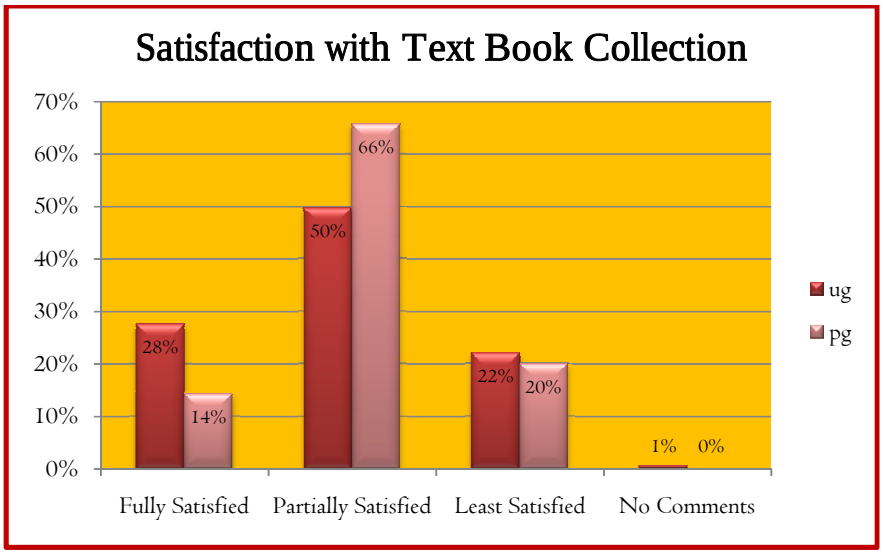



**Fig. 5.41 Satisfaction of Student Users with Textbook Collection of their Libraries**

The figure makes it clear that majority of the users are only partially satisfied with the textbook collection of their respective libraries.

Figure 5.42 reveals that about 50% of the users are partially satisfied with the reference book collection of their libraries. It is also evident that about 37% of the PG students are least satisfied about their reference books collection.

The level of satisfaction with the periodical collection varies with category of users as is evident from figure 5.43. It is seen that majority (54%) of the PG users are least satisfied with the periodical collection and only 9% of them opined that they are fully satisfied with this collection.

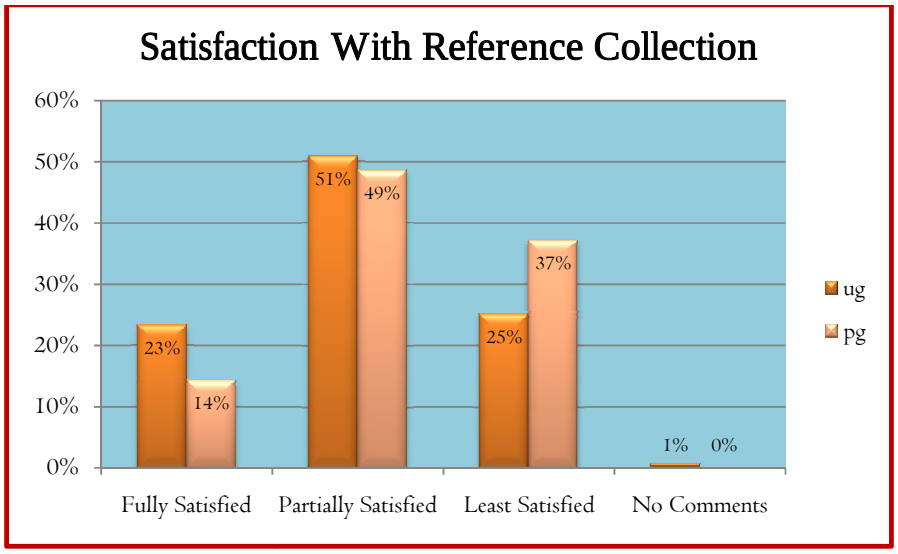



**Fig. 5.42 Satisfaction of Student Users with Reference Books of their Libraries**

On an overall, only a small number of users are fully satisfied with the print collection of their libraries. The satisfaction level is generally similar among the two categories of student users except for print periodicals as discussed above.

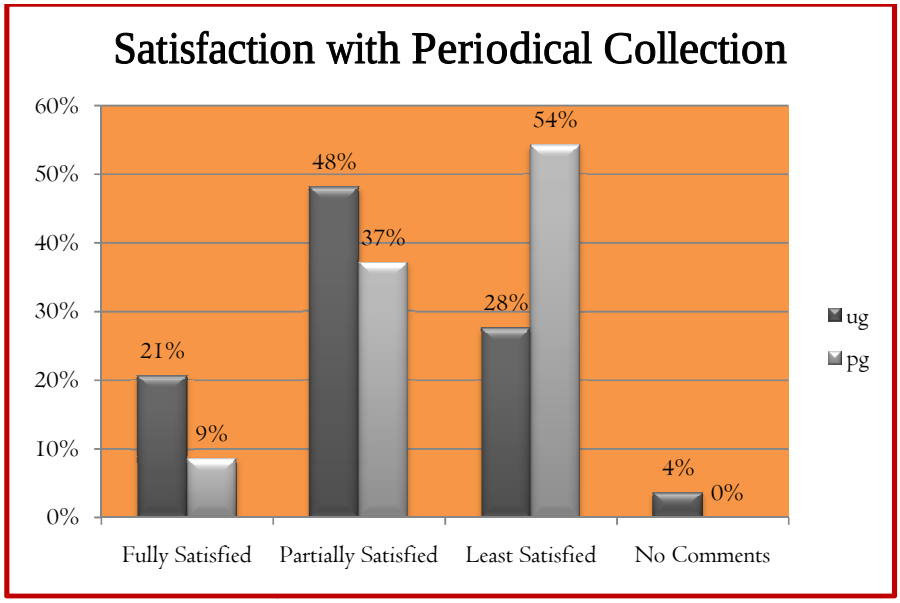



**Fig. 5.43 Satisfaction of Student Users with Periodical Collection of their Libraries**

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Table 5.38 represents the level of satisfaction and status of institution. It is clear that for all the items, the number of hits against *least* is more under the status 'Poor'. Whereas the hits against the same option is comparatively very less under the status 'Rich'. This shows a wide gap between the responses from the two groups. A $\chi^2$ analysis conducted to test the dependency of various levels of satisfaction with the status of the institutions proved that the variables are dependent. The $\chi^2$ values for all the three items are found to be greater than the table values for a degree of freedom, df=4. The corresponding p-values shows that there is a significant difference between the three groups with respect to their levels of satisfaction with the print resources provided by their libraries.

**Table 5.38 Level of Satisfaction with Print Resources Vs Status of Institutions**

| Item | Level of Satisfaction | Status of Institution | | | Chi-square; df=4 | p - value |
|---|---|---|---|---|---|---|
| | | Poor | Medium | Rich | | |
| TEXTBOOKS | Fully | 22 (18%) | 34 (19%) | 45 (48%) | 54.058 | 0.000 |
| | Partially | 55 (44%) | 115 (63%) | 40 (43%) | | |
| | Least | 47 (38%) | 33 (18%) | 9 (10%) | | |
| REFERENCE BOOKS | Fully | 15 (12%) | 24 (13%) | 48 (51%) | 92.659 | 0.000 |
| | Partially | 49 (40%) | 113 (62%) | 40 (43%) | | |
| | Least | 60 (48%) | 45 (25%) | 6 (6%) | | |
| PERIODICALS | Fully | 8 (6%) | 29 (16%) | 37 (39%) | 58.011 | 0.000 |
| | Partially | 53 (43%) | 85 (47%) | 47 (50%) | | |
| | Least | 63 (51%) | 68 (37%) | 10 (11%) | | |

### 5.11.2 E-resources

As evident from the discussions made in the Part-A of this chapter, the availability of e-resources in the libraries has increased. In this juncture, the study attempted to ascertain the user satisfaction with the e-resources in their libraries. All the three user categories were asked to mark their level of satisfaction with various e-resources and the results are shown in the figure 5.44.

From the figure it is clear that users are generally least satisfied with the e-resources provided by the libraries.

The satisfaction of users with respect to their category and status of institutions are depicted in the tables 5.39 and 5.40.

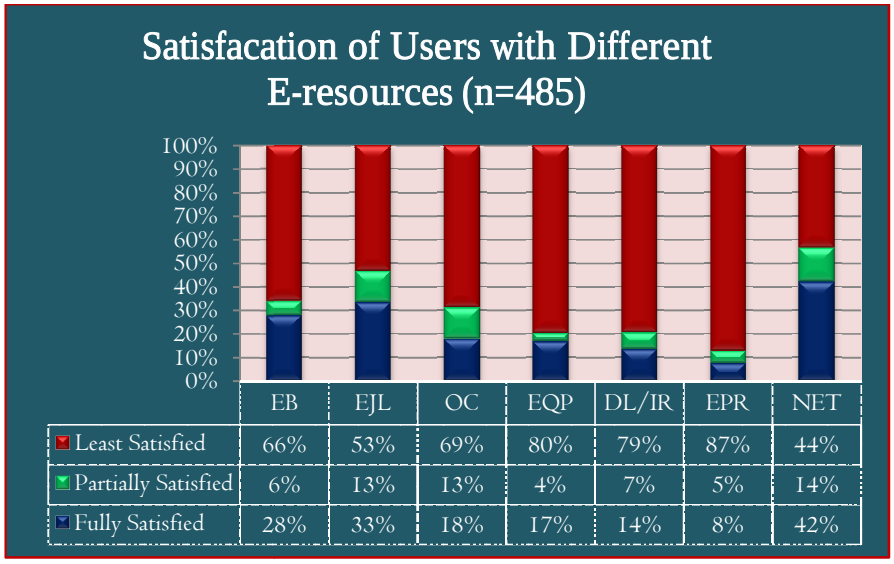


**Fig. 5.44 Satisfaction of Users with Different E-Resources in their Libraries**

The $\chi^2$ analysis of the levels of satisfaction of different categories of users shows a significant relation between the variables. The calculated values of $\chi^2$ are greater than the table values for a degree of freedom, df=4. The test for significance proved that the values are significant at 1% level except for e-projects/e-diss., where the dependence of satisfaction with category is significant at .05 level. Hence it is inferred that the levels of satisfaction with e-resources are dependent on the category of users at 0.05 level of significance.

The table 5.40 reveals that the level of satisfaction is dependent on the status of institutions. The calculated chi-square values are greater than the table values for 4 degrees of freedom and is found to be significant at 1% level . (The p-values of all the items are $\leq .01$).

**Table 5.39 Level of Satisfaction with Different E-resources Vs Category of Users**

| Items | Level of Satisfact-ion | Category | | | Chi-square; (df=4) | p - value |
|---|---|---|---|---|---|---|
| | | UG | PG | Faculty | | |
| E-books | Fully | 70 (21.2%) | 26 (37.1%) | 39 (45.9%) | 26.833 | 0.001 |
| | Partially | 21 (6.4%) | 2 (2.9%) | 7 (8.2%) | | |
| | Least | 239 (72.4%) | 42 (60.0%) | 39 (45.9%) | | |
| E-journals | Fully | 83 (25.2%) | 32 (45.7%) | 47 (55.3%) | 51.418 | 0.000 |
| | Partially | 35 (10.6%) | 12 (17.1%) | 17 (20.0%) | | |
| | Least | 212 (64.2%) | 26 (37.1%) | 21 (24.7%) | | |
| Online catalog | Fully | 54 (16.4%) | 14 (20.0%) | 19 (22.4%) | 58.677 | 0.000 |
| | Partially | 23 (7.0%) | 10 (14.3%) | 31 (36.5%) | | |
| | Least | 253 (76.7%) | 46 (65.7%) | 35 (41.2%) | | |
| E-question papers | Fully | 59 (17.9%) | 2 (2.9%) | 21 (24.7%) | 21.072 | 0.007 |
| | Partially | 11 (3.3%) | 0 (0.0%) | 6 (7.1%) | | |
| | Least | 260 (78.8%) | 68 (97.1%) | 58 (68.2%) | | |
| Digital library/ institut-ional reposito-ry | Fully | 43 (13%) | 2 (2.9%) | 21 (24.7%) | 66.734 | 0.000 |
| | Partially | 14 (4.2%) | 0 (0.0%) | 20 (23.5%) | | |
| | Least | 273 (82.7%) | 68 (97.1%) | 44 (51.8%) | | |
| E-project reports/ E-disst. | Fully | 35 (10.6%) | 0 (0.0%) | 2 (2.4%) | 15.986 | 0.042* |
| | Partially | 18 (5.5%) | 1 (1.4%) | 5 (5.9%) | | |
| | Least | 277 (83.9%) | 69 (98.6%) | 78 (91.8%) | | |
| Internet | Fully | 119 (36.1%) | 30 (42.9%) | 55 (64.7%) | 24.485 | 0.002 |
| | Partially | 49 (14.8%) | 10 (14.3%) | 11 (12.9%) | | |
| | Least | 162 (49.1%) | 30 (42.9%) | 19 (22.4%) | | |

***significant at 0.05 level**

**Table 5.40 Level of Satisfaction with Different E-resources Vs status of Institutions**

| Items | Level of Satisfaction | Status of Institution | | | Chi-square; (df=4) | p - value |
|---|---|---|---|---|---|---|
| | | Poor | Medium | Rich | | |
| E-books | Fully | 7 (5%) | 54 (26%) | 74(53%) | 100.995 | 0.000 |
| | Partially | 0 (0%) | 20 (10%) | 10 (7%) | | |
| | Least | 129 (95%) | 135 (64%) | 56 (40%) | | |
| E-journals | Fully | 21 (16%) | 62 (30%) | 79 (56%) | 62.845 | 0.000 |
| | Partially | 15 (11%) | 29 (14%) | 20 (14%) | | |
| | Least | 100 (73%) | 118 (56%) | 41 (30%) | | |
| Online catalogue | Fully | 16 (12%) | 32 (15%) | 39 (28%) | 36.201 | 0.000 |
| | Partially | 7 (5%) | 27 (13%) | 30 (22%) | | |
| | Least | 113 (84%) | 150 (72%) | 71 (50%) | | |
| E-question papers | Fully | 1 (1%) | 23 (11%) | 58 (41%) | 108.502 | 0.000 |
| | Partially | 1 (1%) | 5 (2%) | 11 (8%) | | |
| | Least | 134 (98%) | 181(86%) | 71 (51%) | | |
| DL/IR | Fully | 1 (1%) | 16 (8%) | 49 (35%) | 101.537 | 0.000 |
| | Partially | 1 (1%) | 16 (8%) | 17 (12%) | | |
| | Least | 134 (98%) | 177 (84%) | 74 (53%) | | |
| E-project reports/ E-dissert. | Fully | 1 (1%) | 6 (3%) | 30 (21%) | 80.696 | 0.000 |
| | Partially | 0 (0%) | 8 (4%) | 17 (12%) | | |
| | Least | 135 (99%) | 195 (93%) | 93 (66%) | | |
| Internet | Fully | 12 (9%) | 78 (37%) | 114 (81%) | 160.059 | 0.000 |
| | Partially | 25(19%) | 30 (14%) | 15 (11%) | | |
| | Least | 99 (72%) | 101 (49%) | 11 (8%) | | |

### 5.11.3 ICT Facilities

Table 5.41 represents the level of satisfaction of different categories of users with the ICT facilities. It is observed that the level of satisfaction varies among categories. Among the UG students, 41% opined that they are least satisfied with the ICT facilities while 60% of

PG students are partially satisfied. On the other hand majority of the faculty members opined that they are fully satisfied with the facilities. On an overall 27% of the total users are fully satisfied with the ICT facilities while 40% are partially satisfied and 33% of the total users are least satisfied with the ICT facilities. Hence it is concluded that users are generally partially satisfied with the ICT facilities of their libraries. Fig 5.45 gives a general overview of the respondents' satisfaction towards the ICT facilities in their libraries.

**Table 5.41 Level of Satisfaction with the ICT Facilities Vs Category**

| Level of Satisfaction | UG (n=330) | PG (n=70) | FAC. (n=85) | Chi-square ; (df=4) |
|---|---|---|---|---|
| Fully Satisfied | 75 (23%) | 10 (14%) | 46 (54%) | 60.401; (p-value= 0.000) |
| Partially Satisfied | 121 (37%) | 42 (60%) | 32 (38%) | |
| Least Satisfied | 134 (41%) | 18 (26%) | 7 (8%) | |

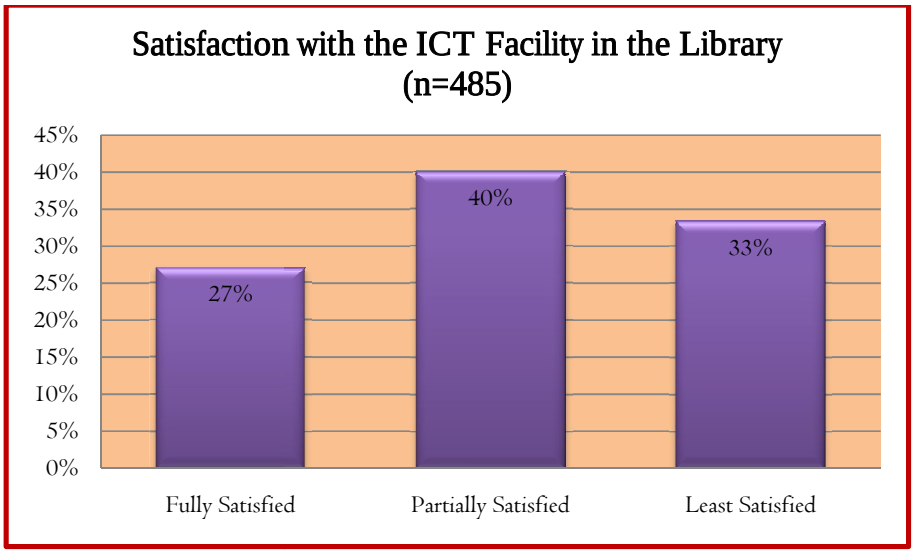


**Fig.5.45 Satisfaction of Users with the ICT Facilities in their Libraries**

The level of satisfaction with the ICT facilities is further analysed with the status of institutions. The details are presented in the table 5.42. It is seen that majority of the users from rich colleges are fully satisfied with the facility and majority of the respondents from poor colleges are least satisfied with the ICT facilities of their libraries. The chi-square analysis conducted to test the dependency of level of satisfaction with the status of institutions proved to be significant at 0.01 level.

**Table 5.42 Level of Satisfaction with ICT Facilities Vs Status of Institution**

| Level of Satisfaction | Poor | Medium | Rich | Chi-square |
|---|---|---|---|---|
| Fully Satisfied | 1 (1%) | 53 (25%) | 77 (55%) | 160.467; (df=4, p-value=0.000) |
| Partially Satisfied | 48 (35%) | 83 (40%) | 62 (44%) | |
| Least Satisfied | 87 (64%) | 73 (35%) | 1 (1%) | |
| Total | 136 (100%) | 209 (100%) | 140 (100%) | |

## 5.12 Adequacy of Library Resources

The users were enquired about the adequacy of the print and electronic resources provided by their libraries. The responses shows that the opinion regarding the adequacy of print resources varies among groups and that of e-resources are similar. Figures 5.46 and 5.47 depict the details of the responses.

It is clear from the diagram that for the faculty members (74%) the print resources provided by their libraries are adequate whereas for the majority of the student users, the print resources provided by their libraries are inadequate to satisfy their needs.

Regarding the e-resources, 54% of faculty members and a vast majority of the student users opined that the e-resources provided by their libraries are inadequate. The user opinion in this regard points

towards the need to review the present day acquisition policies of e-resources prevalent in the colleges.

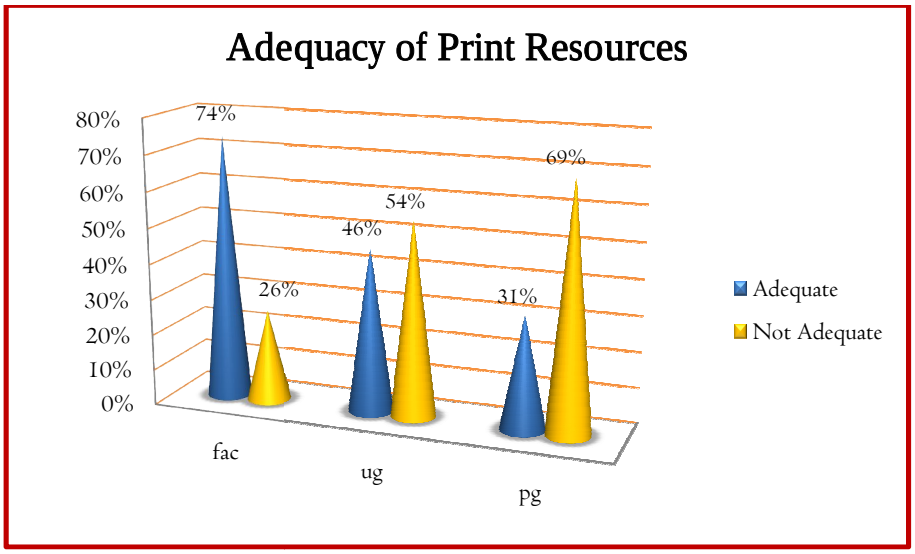


**Fig. 5.46 Adequacy of Print Resources Provided by the Libraries**

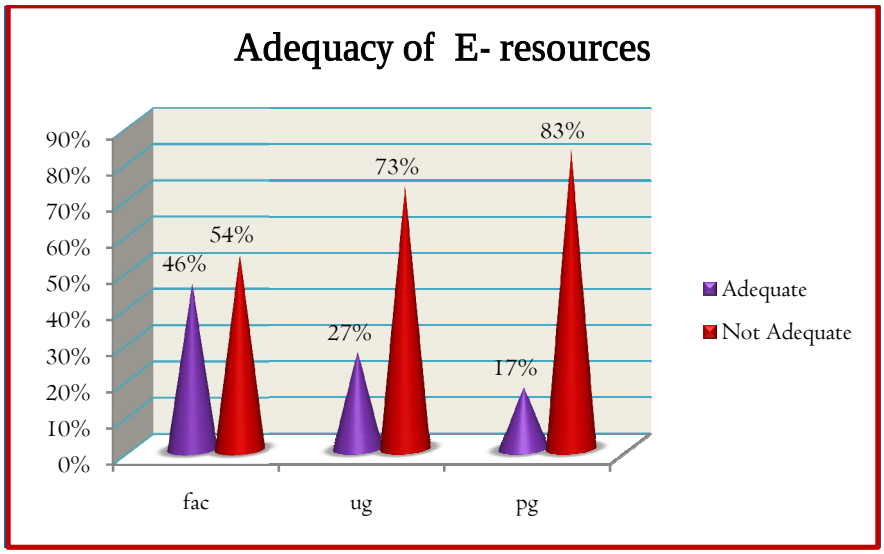


**Fig. 5.47 Adequacy of E-resources Provided by the Libraries**

It is concluded from the above discussions that the library resources are inadequate to satisfy the needs of the student users of the study units.

The responses to this question is also analysed with the status of institutions and is presented in the table 5.43.

**Table 5.43 Adequacy of Library Resources Vs Status of Institution**

| Type | Adequacy | Poor | Medium | Rich | Chi-Square (df=2) | P-value |
|---|---|---|---|---|---|---|
| Print | Adequate | 40 (29%) | 89 (43%) | 107 (76%) | 66.47 | 0.000 |
| | Not Adequate | 96 (71%) | 120 (57%) | 33 (24%) | | |
| Electronic | Adequate | 12 (9%) | 53 (25%) | 75 (54%) | 69.473 | 0.000 |
| | Not Adequate | 124 (91%) | 156 (75%) | 65 (46%) | | |

It is evident that the users of poor colleges opined that both the print and e-resources of their libraries are not adequate to satisfy their needs. On the other end, the users of the rich colleges are of the view that the print and e-resources provided by their libraries are adequate to satisfy their needs. The $\chi^2$ test proved that the opinion regarding adequacy of different library resources among different groups of users is significantly different.

**Table 5.44 Adequacy of the Number of Library Professionals Vs Status of Institutions**

| ADEQUACY | POOR | MEDIUM | RICH | TOTAL |
|---|---|---|---|---|
| Adequate | 30 (22%) | 109 (52%) | 102 (73%) | 241 (50%) |
| Not Adequate | 106 (78%) | 100 (48%) | 38 (27%) | 244 (50%) |
| Total | 136 (100%) | 209 (100%) | 140 (100%) | 485 (100%) |

The respondents were also inquired whether their libraries have adequate number of library professionals to cater to their needs. 50% gave a 'yes' and 50% opined 'no'. The responses when analysed according to the status of institutions revealed that majority of the respondents from 'rich' colleges felt that their libraries have adequate number of library professionals where as majority of respondents from 'poor' colleges felt the opposite. The table 5.44 gives the details of this analysis. It is also evident that responses from medium colleges show a neutral opinion in this regard.

## 5.13 Use of Inter Library Loan Services

The analysis of the data collected from the college librarians revealed that some of the libraries under study provide ILL and DDS. The study collected data from the student respondents to ascertain whether they were aware of these services and use them.

**Table 5.45 Does Your Library Provide ILL Service?**

| RESPONSE | UG | | PG | | TOTAL | |
|---|---|---|---|---|---|---|
| **Yes** | 21 | (6.5%) | 3 | (4%) | 24 | (6%) |
| **No** | 126 | (38%) | 22 | (31%) | 148 | (37%) |
| **Don't Know** | 183 | (55.5%) | 45 | (64%) | 228 | (57%) |
| **TOTAL** | 332 | (100%) | 70 | (100%) | 400 | (100%) |

The responses for the question, "*Does your library provide ILL facility?*" revealed that only 6% (24) of the total users knew that their libraries provided the service. The details of the responses are shown in

the table 5.45. It is clear that majority of the respondents do not know whether their libraries provided this service.

The respondents who have answered 'yes' (6%) were asked one more question whether they have requested for the service and availed it. The answers were

- Three (0.8%) of the total student respondents requested and availed the service
- Five(1.3%) of the total student respondents requested but did not avail the service
- Sixteen (4%) respondents who knew that their libraries provide the service have not yet requested for it.

The above discussions make it clear that there are no effective means of ILL activities in the study units.

## 5.14 Need for Resource Sharing

The users were asked whether their libraries need to share the resources with other libraries in order to satisfy their needs. Majority of the users opined that they need resource sharing as shown in figure 5.48. Only 12% of the users opined that they do not need resource sharing. It is concluded that users of the study units largely supports resource sharing of their libraries.

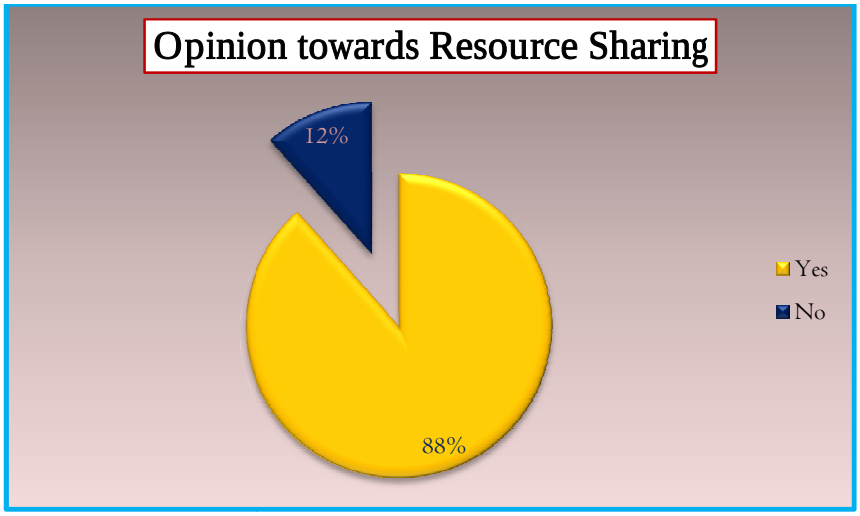


**Fig 5.48 Opinion of Users About the Need for Resource Sharing**

## 5.15 The Virtual Resource Sharing Centre

The discussions made in the previous sections of this chapter reveal an indispensable need for resource sharing among the college libraries. The study also revealed that there is not even a single consortium at any level for sharing the resources of engineering college libraries. With the introduction of mandatory subscription of electronic resources, many of the colleges are under great pressure to find lakhs of rupees each year for renewing the subscriptions of these resources. This is one of the reasons that 77% of college librarians are of the view that they need to share the resources with other libraries to cope up with the new environment.

Azeez (2007) reported that majority of the librarians of ECs in Kerala, covered under his study supported the formation of a regional consortium of ECs in the state. The present study designed a model for such a resource sharing- a virtual library for resource sharing of ECs- the VIRTUAL RESOURCE SHARING CENTRE (VRSC). The concept

of the VRSC was presented before the target users and librarians and their opinion regarding this was collected. The following section deals with the analysis of this data.

### 5.15.1 Likelihood to Access VRSC

When the users were enquired whether they would like to access a single platform that shares the resources of all the ECs under M.G. university, 98% gave a '**yes'** answer**.** The opinions of chief librarians of the study units in this regard are presented in the figure 5.49. It is seen that 77% of the librarians supported the idea and wanted to access the VRSC. 18% of the librarians opined that they personally supported the idea but they require the consent of their respective managements to respond officially to this matter. Only one librarian (5%) opined that the college is not interested in it since there exist a lot of competitions among the colleges and they do not want others to share their resources.

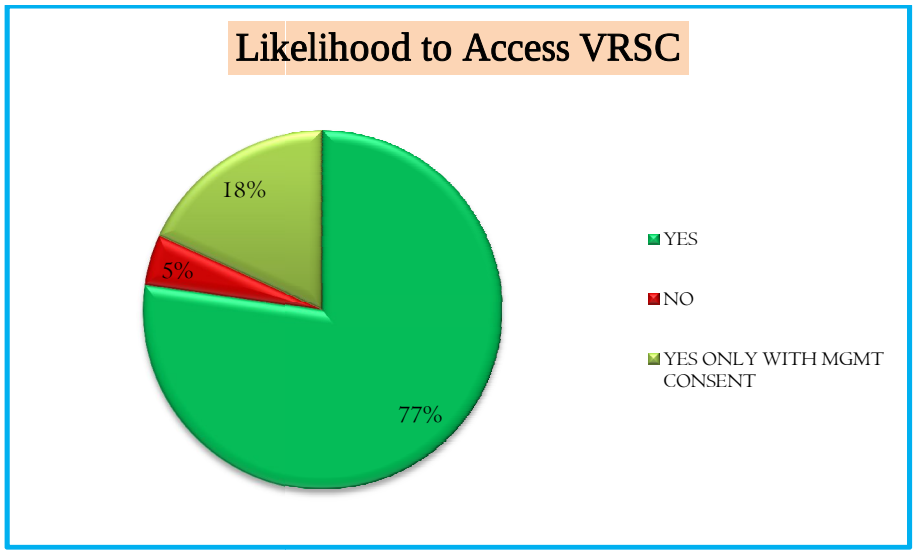


**Fig. 5.49 Likelihood of Librarians to Access VRSC**

### 5.15.2 Features of the VRSC as Required by the Users

The library users of the study units were given a list of the contents of the proposed VRSC and were asked to mark the items they needed to be included in the VRSC. The items and their corresponding frequencies are given in table 5.46. A set of 11 different items/content were presented before the respondents and in the table the items are presented in the decreasing order of their favour. The most interesting observation in this regard is that the least demanded item got a support from 50% of the respondents. In other words, all the items were supported by half to majority of the users. The most demanded item (88%) is the subscribed/purchased e-books. This supports the finding of this study that the usage of e-books among academics is increasing. Virtual reference service and Access to digital libraries are the last items in the order of demand. The investigator felt that many of the respondents did not understand the term *virtual reference service* and that may be the reason for its lesser demand.

**Table 5.46 User Preferences for the Different Contents of VRSC**

| ITEMS | FREQUENCY | % (n=485) |
|---|---|---|
| Subscribed/purchased e-books | 427 | 88% |
| Subscribed e-journals | 416 | 86% |
| E-learning platform/online lectures | 360 | 74% |
| Previous question papers | 343 | 71% |
| Communicate with experts | 313 | 65% |
| Online dictionaries/encyclopedia | 300 | 62% |
| E-project reports/dissertations | 291 | 60% |
| Syllabus of different courses | 276 | 57% |
| Links to free e-resources on the internet | 275 | 57% |
| Virtual reference service | 269 | 55% |
| Access to digital libraries | 244 | 50% |

### 5.15.3 Willingness of Teachers to Contribute to VRSC

The teacher respondents were asked whether they were willing to contribute learning objects to the proposed VRSC. The responses are depicted in the figure 5.50, which shows that teachers attitude toward this is positive. Only 2% responded that they are not willing to contribute. A small number of teachers (11%) did not comment to this. The remaining 87% opined that they are either willing to contribute or will try to contribute learning objects to the proposed VRSC.

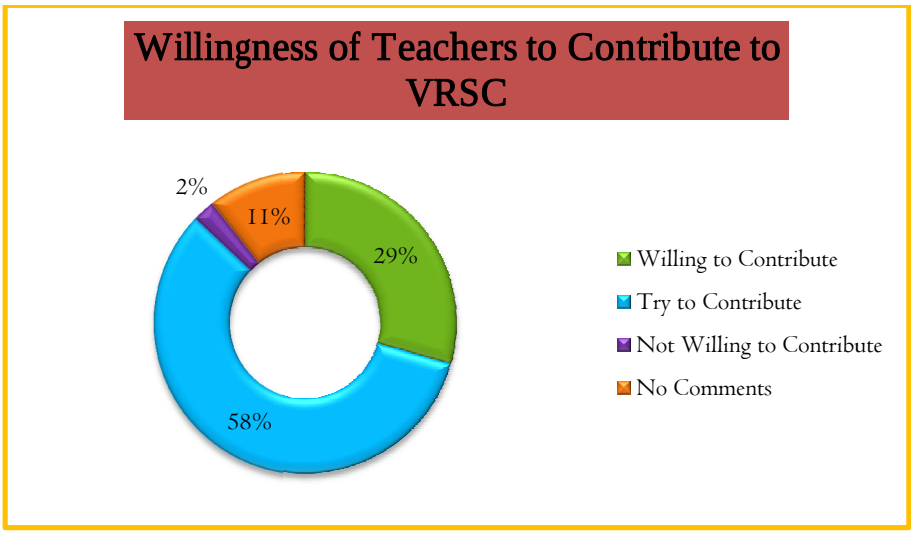


**Fig 5.44 Willingness of Teachers to Contribute to VRSC**

### 5.15.4 Expectation of Users About VRSC

The study collected the opinions of the users regarding their expectations about the proposed VRSC. Likert-type Scale was the instrument used for this purpose. For this 5 positive statements regarding the probable outcome of the proposed VRSC were listed and the student user's opinion in a five point scale was collected. The statements and their respective codes are presented in the table 5.47.

**Table 5.47 Instrument Used for Measuring the Expectations of Students About VRSC**

| Statements | Codes |
|---|---|
| VRSC will help to satisfy my information needs | VHSIN |
| VRSC will help to improve my studies and achieve better results in examinations | VHISBR |
| VRSC will help to complete my project work easily | VHCPR |
| VRSC will reduce the divide between 'facility' rich and poor colleges | VRDBC |
| All the engineering colleges must actively participate in the VRSC | AECPV |

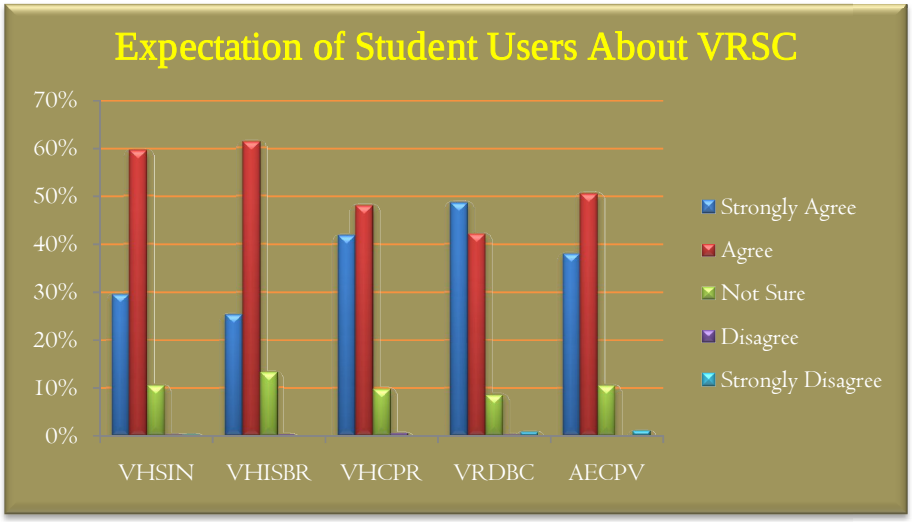


**Fig. 5.51 Expectations of Student Users About VRSC**

Figure 5.51 represents the scores obtained by each statement in the five point scale.The figure makes it clear that majority of the users agreed or strongly agreed with all the five statements. 9 to 13 percent of users neither agreed nor disagreed. Only 1 percent of the respondents disagreed with certain statements. In short it is concluded that nearly 90 percent of the respondents agreed with all the statements and they have a very high expectation about the VRSC.

**Table 5.48 Instrument Used for Measuring the Expectations of Teachers About VRSC**

| Statements | Codes |
|---|---|
| VRSC will help to satisfy my information needs | VHSIN |
| VRSC will help the students to improve their studies and achieve better results in examinations | VHISBR |
| VRSC will reduce the divide between 'facility' rich and poor colleges | VRDBC |
| All the engineering colleges must actively participate in the VRSC | AECPV |
| VRSC will support the career development of faculties. | VSCD |
| VRSC will help to improve the scientific productivity of faculties | VHISP |

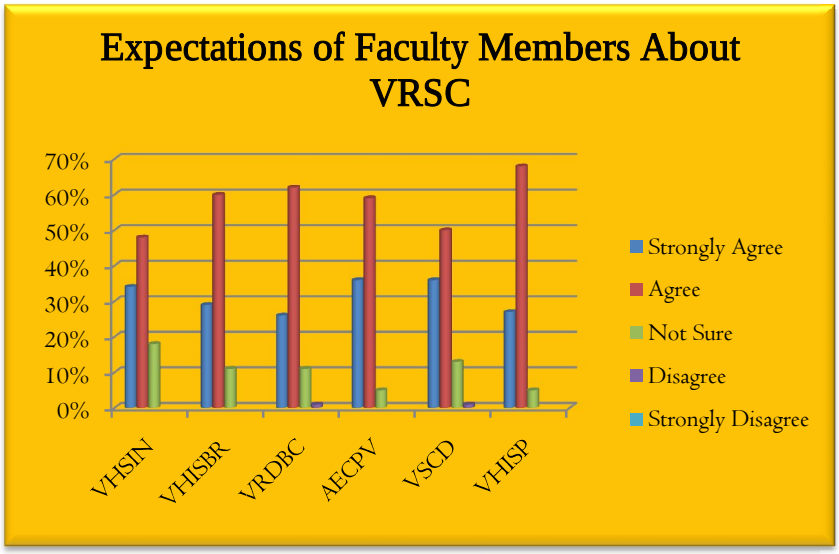


**Fig. 5.52 Expectations of Faculty Members About VRSC**

**Table 5.49 Level of Expectation of Users About VRSC**

| Level of expectation | No. of responses | % of responses |
|---|---|---|
| Very High | 220 | 45.4 |
| High | 240 | 49.5 |
| Medium | 23 | 4.7 |
| Low | 2 | 0.4 |
| Very Low | - | - |
| Total | 485 | 100 |

Similarly the opinions of faculty members were also taken on a 5 point scale. For this 6 positive statements related to the probable outcome of the VRSC were given. The statements and their respective codes are presented in the table 5.48.

The scores obtained by each statement is presented graphically in the figure 5.52. It is clear that majority of the teachers either agreed or strongly agreed with all the 6 statements. A good number (68%) of the teachers agreed to the statement "VRSC will help to improve the scientific productivity of faculties."Only 1% of the teachers disagreed with two statements. The respondents did not 'strongly disagree' with any of the statements.

The expectations of the total users measured by means of the summated Likert scale is depicted in the table 5.49. The score obtained by each respondent is calculated. The option 'strongly agree' is given a rank equal to 5 and option 'strongly disagree' is given a rank 1. The scores are expected to range from 5 to 25 for student users and 6 to 30 for faculty members. The scores are then divided into 5 equal parts and labeled as very high, high, medium, low & very low expectation levels.

## 5.16 Conclusion

A careful attempt has been made by the investigator in this chapter to analyse the data collected from the study units and to report the findings. The study compared the current status of the resources and services of the libraries of ECs affiliated to M.G. University, categorized the college libraries into three and found that a wide gap exist among the colleges in this regard. The use of the library resources by different categories of users were measured and tested to prove that the usage and user satisfactions with the library resources are

dependent on the category of users and the status of their respective institutions. The study collected the opinion of the users regarding the proposed VRSC and found that users have a very high expectation about it.

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# Chapter 6
# VIRTUAL RESOURCE SHARING CENTRE: A MODEL

## 6.0 Introduction

Resource sharing (RS) has become the matter of prime concern in the 21st century academic libraries. No library has ever been or will ever be self sufficient to satisfy its entire users due to various reasons like stringent budgets, escalating costs, publication explosion, diverse user needs, etc. The new modes of RS like e-journal consortia, brought revolutions in the velocity of information access among academics. Advances in digital preservation technologies coupled with the open access movement enhanced the visibility and accessibility of scholarly content over the globe. With the emergence of improved computer and communication technologies along with the introduction of electronic document delivery, RS took a new pace.

As far as engineering college libraries in India are concerned, no library (except national level institutions that receive huge financial support) is in a position to collect and provide adequate information sources to its clientele. In the country, library resource sharing initiatives were confined mainly to the universities and higher education institutions until recently (Now the UGC-INFONET consortium provides e-content to arts and science colleges). Though the INDEST–AICTE consortium was active with the participation of around 1000 engineering and technology institutions, in the year 2012, the consortium stopped its services to state-level and private institutions. In the true sense, at present there are no effective consortia activities at any level for these engineering and technology institutions.

The analysis part of this research brought to light that there is a wide gap between the ECs under the study with respect to their library resources. On the one side there are very rich libraries with established digital libraries, e-learning platforms and a lot of resources whereas on the other side there are libraries that even do not have adequate number of printed books for its users. Resource sharing is the only way to bridge this gap. The present study put forward a model (the Virtual Resource Sharing Centre) for such a resource sharing and the concept of the same was introduced before the respondents at the stage of data collection. The idea was widely accepted by the librarians, faculty members and students. In this chapter a potential model for the same is presented.

## 6.1 The Virtual Resource Sharing Centre (VRSC)

The model for RS proposed by this study is named as the Virtual Resource Sharing Centre (VRSC). It is envisioned as a virtual library portal that connects a user to the distributed contents over the network of EC libraries. The architecture of the centre is such that the VRSC, which holds three servers for catalogs, digital library and e-learning is connected with similar servers at different college libraries by means of a star-type of network.

### 6.1.1 Objectives of VRSC

The study revealed the status quo of the different EC libraries and identified the strengths and weaknesses of the study units. Some of the libraries are found to be at par excellence with that of a well established university library where as some others do not even have the basic infrastructure for a college library. In other words, it could be stated that students paying the same amount of annual fees, following

the same syllabus and exams are kept at different extremes with respect to access to information resources. The most viable and practical solution to overcome such a problem is cooperation. Inspite of all the competitions among the institutions, all the managements and authorities should consider this matter positively for upholding social justice. "Explore the possibilities and opportunities" is the motto of the era. The open source movement, open archive initiative, etc have opened new vistas of information access especially for the developing nations. A lot of open scholarly contents are now available on the web and what is needed is to identify, locate and validate the content to create paths for easy information access. It is always the duty of the information and library professionals to harness such information for their clientele. The proposed model of VRSC takes into consideration all these matters and put forward the following objectives:

- To facilitate federated searching of catalogs, DLs/IRs and e-learning portals of member libraries
- To provide a central database of free e-books, e-references and e-courseware on engineering and technology
- To provide validated links to scholarly engineering and technology contents available in open archives and over the web
- To provide virtual reference service
- To act as a platform for interaction between subject experts and students
- To act as a one stop point for access to scholarly engineering content
- To promote open source and open content for the common benefit of the academic community.

## 6.2 The Proposed Model

Keeping in view the above mentioned objectives the model of the VRSC is discussed in this section. The VRSC is designed as a virtual library portal that links to the digital libraries and OPACs of member libraries, open contents, e-learning portals, etc. The VRSC facilitates virtual reference service as well as provides a platform for communicating with subject experts. The design of the web portal of VRSC is depicted in the figure 6.1.


**Fig 6.1 Web Portal of VRSC**

### 6.2.1 Features of VRSC

The features of the VRSC are given in figure 6.2. The main feature of the model is federated searching of distributed member

catalogs, DLs/IRs and E-learning portals of members. The validated links to open archives and other scholarly contents is another feature. In addition the centre facilitates archiving of free e-books, software, courseware, etc in its own repository. A major feature proposed in the model is virtual reference service in which users can make online reference queries with dedicated library professionals.

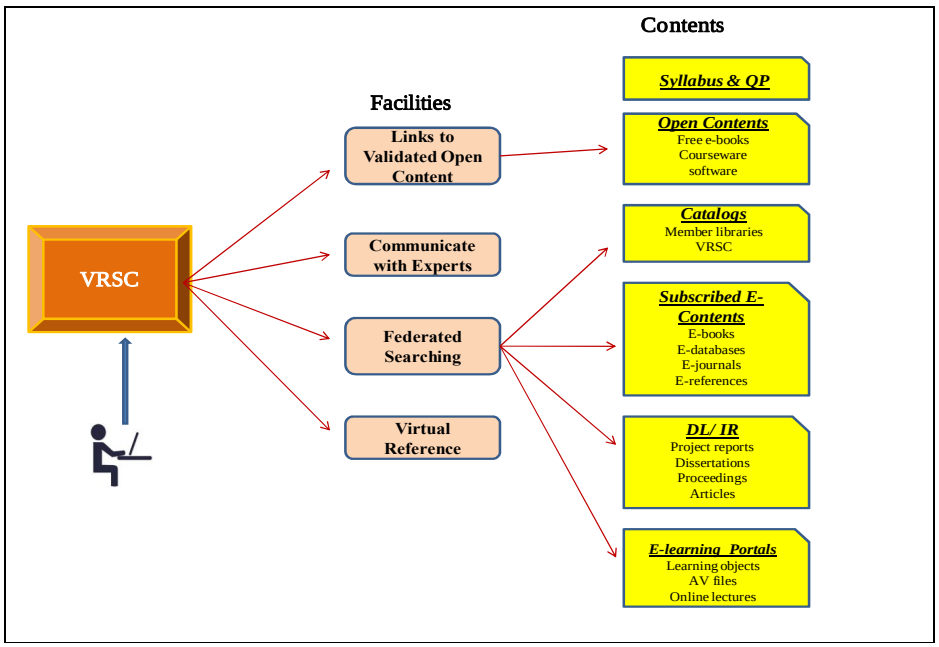


**Fig. 6.2 Features of VRSC**

### 6.2.2 Facilities

The model proposes the following facilities.

❖ **Virtual Reference Service**

Virtual reference service refers to a method of providing reference service online. The tools used for providing virtual reference include chat, videoconferencing, Voice over IP, co-browsing, e-mail, and

instant messaging. A good number of commercial software that facilitate real-time virtual reference service are now available. Virtual Reference ToolKit, Mosio for Libraries, LibraryH3lp, etc are some of the software common in American and European countries. These software (all proprietary) provide a combined platform for instant messaging, knowledge base and video conferencing. Some of the libraries around the world use a combination of free messenger software and e-mail services along with skype (a free software for audio/video communication via internet) for providing virtual reference service(Lankes et al., 2003). For the proposed model either a proprietary software could be acquired and installed for providing the service or use a combination of the free service mentioned above since there are no efficient open source solutions being available now for this purpose.

❖ **Links to Open Content**

A lot of open scholarly content in the form of e-books, e-journals, courseware, etc are available on the web at distributed locations. It is very difficult for the academic community to identify and harness such resources. The service of qualified and competent library professional(s) would be of great help for identifying, locating and validating such content for use by the academics. Downloading and saving all these content to a central location is not practical. On the other hand, creating and saving metadata (with abstracts) and links would facilitate improved and easy access to open contents and archives.

❖ **Communicate with Experts**

This feature of the VRSC facilitates communication of students with experts in various fields of engineering. For this a panel of subject experts (including retired faculty members) from within and outside

the member institutions on different branches of engineering is to be made and uploaded in the VRSC portal. Creating discussion forums, chat rooms, etc would enhance this type of communication between experts and users/students.

❖ **Federated Searching**

Union cataloging has been a common feature of any RS activity. Catalogs of individual libraries are compiled together to a single entity to form the union catalog of the group. The same is updated periodically to maintain currency. With the advent of online catalogs, this process became a little easier where the members could upload their catalogs periodically on a central database. All these techniques are having a common drawback. They only mention the location of a particular item but do not convey the status of the items. The items may be in circulation, long overdue or so. For an effective RS, prompt delivery of documents is necessary for which information regarding the status of items is important. Keeping in view such requirements, the study proposes a model for federated searching of online catalogs as depicted in figure 6.3.

A query initiated by a user at the VRSC portal will be send simultaneously to the different member catalogs and the retrieved records will be presented to the user. For putting this into action, the following pre-requisites are to be satisfied.

- All the member catalogs must be compatible to some standard (eg: MARC21)
- All the member libraries should make their catalogs online
- Specialised software that facilitates cross domain searching will have to be incorporated in the VRSC.

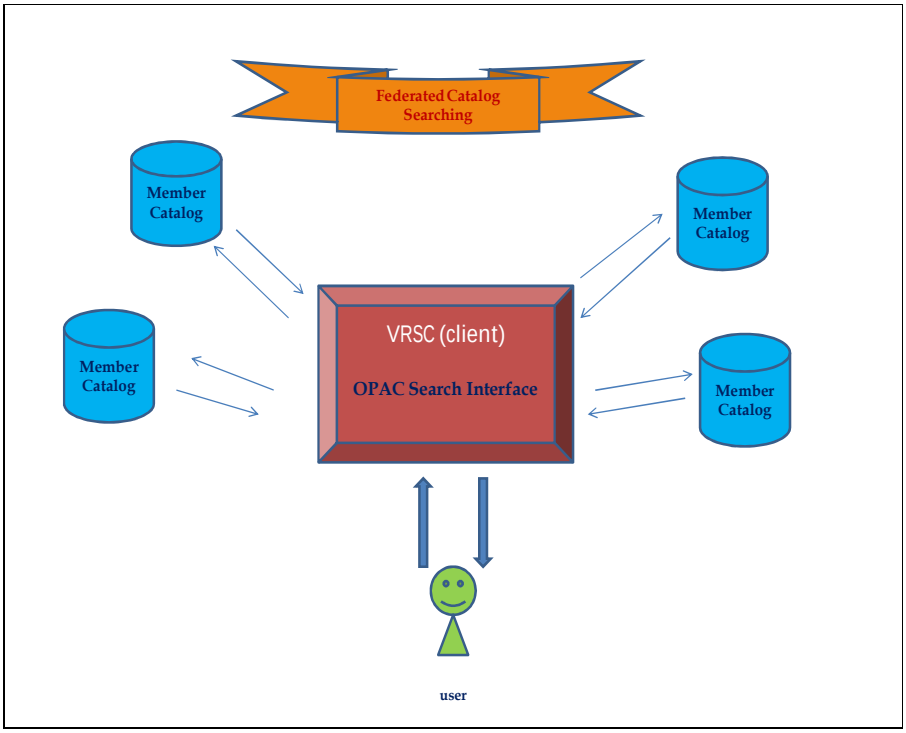


**Fig. 6.3 Federated Searching of Online Catalogs**

In addition, federated searching of DLs/IRs and e-learning portals of member libraries is also proposed. For this Open Archive Initiative/Protocol for Metadata Harvesting (OAI/PMH) can be used.

### 6.2.3 Contents

The VRSC would deliver the following contents

- **Open Contents**

This includes free e-books, e-references, online lectures, learning objects, software, etc. For contents such as open journals, open theses and dissertations, etc, saving their descriptive metadata along with a link to the full-text content is practical.

### Catalogs

The VRSC holds the catalog records of its e-books and at the same time provides access to the online catalogs of the member libraries. The OPAC interface of the proposed model is represented in the figure 6.4.


**Fig 6.4 OPAC Interface of VRSC**

### Subscribed E-content

This includes subscribed e-books, databases, e-journals, e-references, etc. Consortial pricing of subscribed content is usually calculated on the basis of the number of participating institutions. The more the number of institutions, the less the unit price for content.

### Digital Libraries/Institutional Repositories (DLs/IRs)

The centre maintains a server (DL) for archiving open content. Contents of the DLs/IRs of the member libraries will also be made available through the portal. These include project reports, dissertations, conference proceedings, student and faculty publications, etc. The digital library interface of VRSC is depicted in figure 6.5.

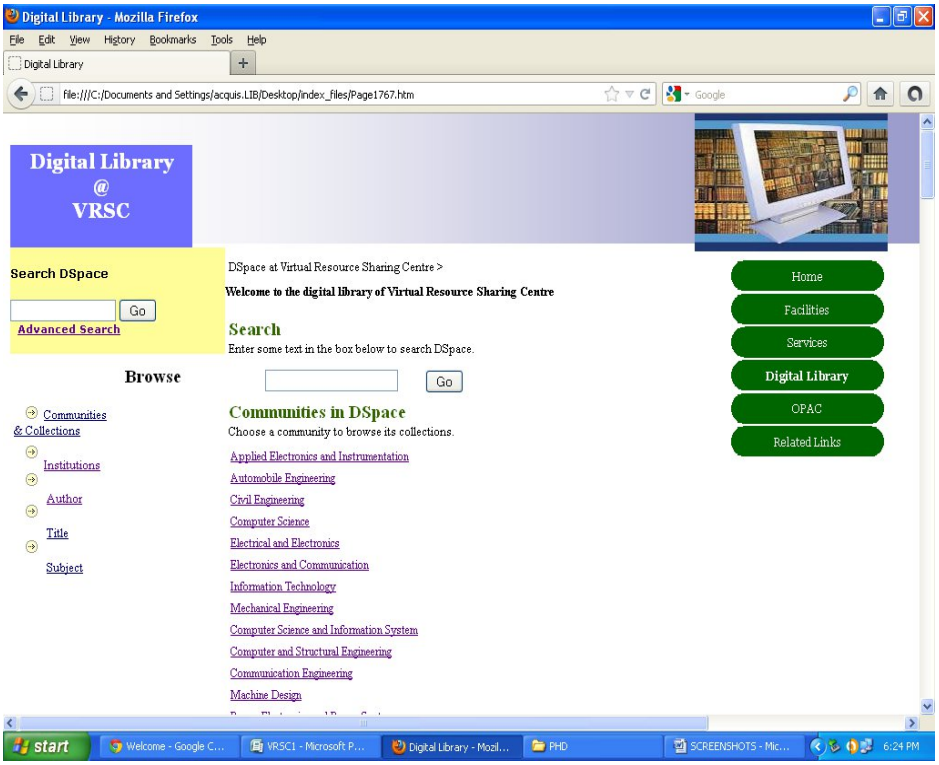


**Fig. 6.5 Digital Library of VRSC**

### E-learning Courseware

The study revealed that a few number of the colleges have uploaded learning objects in their DLs and one college maintains a separate server for e-learning built on Moodle software. But majority of the libraries are not providing such facility. So it is proposed that the VRSC maintains a central server for archiving and managing learning

objects, video lectures, audio/video resources, online lectures, etc so that all the member libraries get access to such content. Federated searching of e-learning portals of members will also help to locate and access contents at various levels.

- **Syllabus and Question Papers**

A considerable number of respondents of the study recommended to include the previous years' question papers and syllabuses of various courses in the VRSC. Some of the colleges have digitized previous question papers and uploaded in their DLs/IRs. The availability of this content at a central location would be of great help to the entire community.

## 6.3 System Architecture

The figure 6.6 depicts the system architecture of the centre.

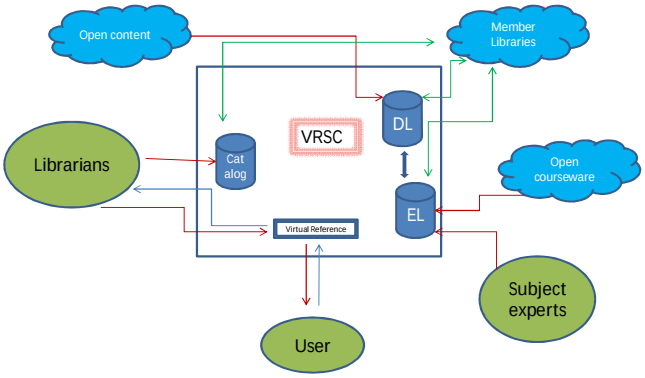


**Fig. 6.6 System Architecture**

The system architecture comprises of a web portal of the VRSC that is connected to 3 servers for DL, EL and catalog. Open contents,

content creators (subject experts), content managers (librarians), member libraries and users form the core components of the system architecture.

## 6.4 Network Architecture

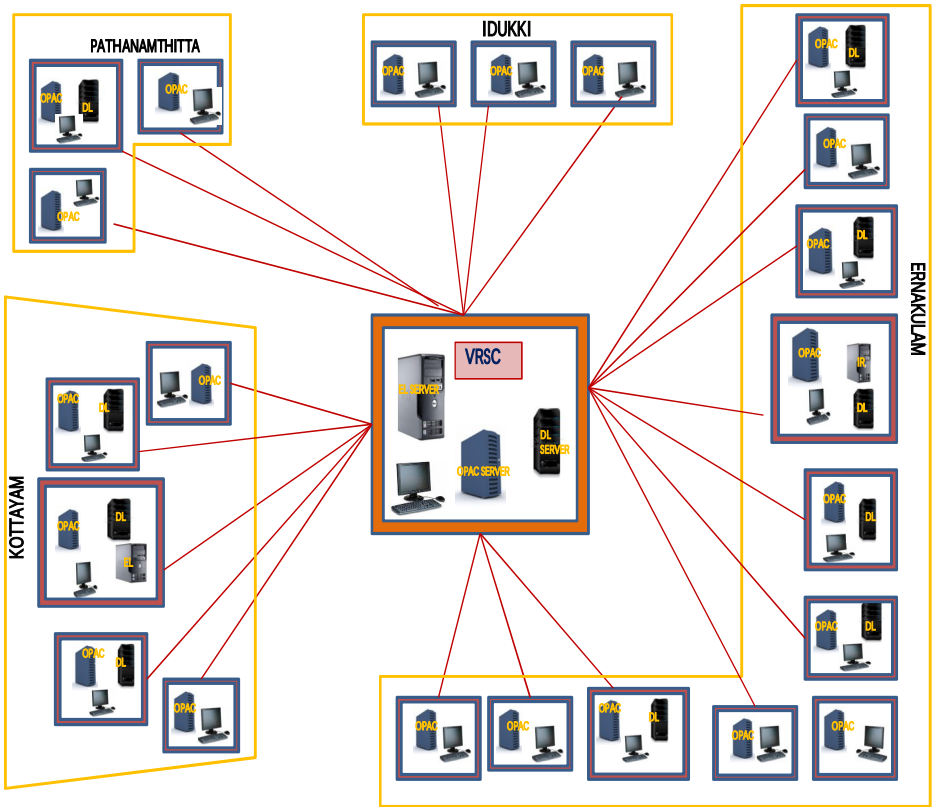


**Fig 6.7 Network Architecture**

The network architecture is based on a star topology with VRSC as the central unit. The catalogs, DLs/IRs, e-learning servers of the member libraries will be connected with the respective servers of the

VRSC. Federated searches can be facilitated through the central point over the network. The network architecture is given in the figure 6.7.

This architecture is based on the status quo of the DLs, IRs and E-learning systems available at different study units. A district wise presentation of the availability of different databases in the study units is depicted in the figure. The catalogs of only six libraries are found to be technically feasible for sharing. So network architecture gives a prospective outcome of the proposed model with respect to sharing of catalogs.

## 6.5 Workflow

The workflow represents the blueprint of how the system works. The work flow of the proposed centre will start with the identification, location and validation of open contents from the web. Since the centre maintains a database for free e-books, these will be downloaded and saved in the digital library server. At the same time catalog records of the e-books will be uploaded in the system catalog database. For other types of open contents, the links (DOI) will be validated and managed. Metadata for such items will be uploaded in the concerned databases. The e-learning modules and objects created by the authorized faculty members will be uploaded to the e-learning database. The system administrators (content managers) will then create the appropriate metadata, create links to the resources in the system digital library and to open contents and finally store the content in the e-learning database. The services will be provided through the user interface of the VRSC portal. Figure 6.8 represents the proposed workflow of VRSC.

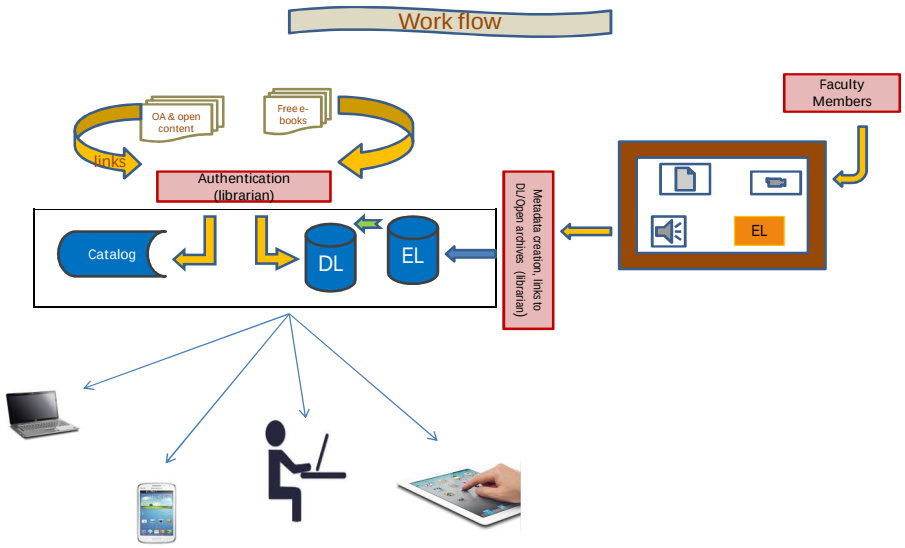


**Fig 6.8 System Workflow**

## 6.6 Technical Infrastructure

The proposed model requires three server machines for installing a digital library, e-learning platform and catalog management. Sufficient number of workstations for the use of library professionals is also necessary. High-end scanners for digitizing content and printers also add to the hardware infrastructure. As far the software requirements are concerned the study recommends installing open source software (OSS) for the different functions. There are well established OSS (which are common in the study units) for establishing all these entities. The study recommends DSPACE, MOODLE and KOHA respectively for digital library, e-learning and library

management. The hardware specification for installing these software are discussed below:

A mid range *DSpace* production system requires 4 GB of Random Access Memory (RAM) and 200 GB of Storage. (DSpace, 2014)

The hardware requirements for *Koha* are Pentium-4, 2.6 GHz or higher processor of RAM 2 GB and HDD 80 GB (Delnet,2014).

For *Moodle*, the hardware specifications are a 2 x Dual Core AMD Opteron (tm) Processor 265 and 4GB DDR 400 ECC Reg memory and 4GB swap partition (Moodle, 2014).

## 6.7 Organisational Set up

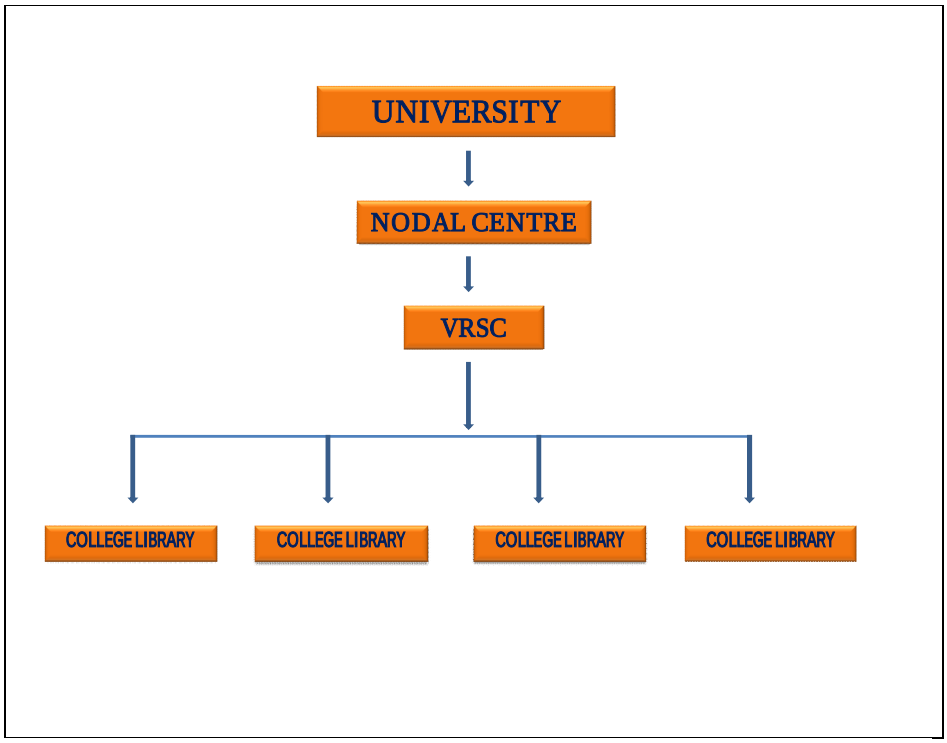


**Fig.6.9 Organisational Set Up of VRSC**

For any cooperative effort, it is desirable to have an apex body to monitor its functioning. Since the network proposed in this study covers the college libraries under a particular university, the most effective system is to have the university at the apex. It is essential to have a nodal centre with sufficient leadership and manpower to control and maintain the network. The study recommends that the nodal centre shall be maintained at the university campus. The organizational set up of the resource sharing centre is depicted in the figure 6.9.

### 6.7.1 Administrative Structure

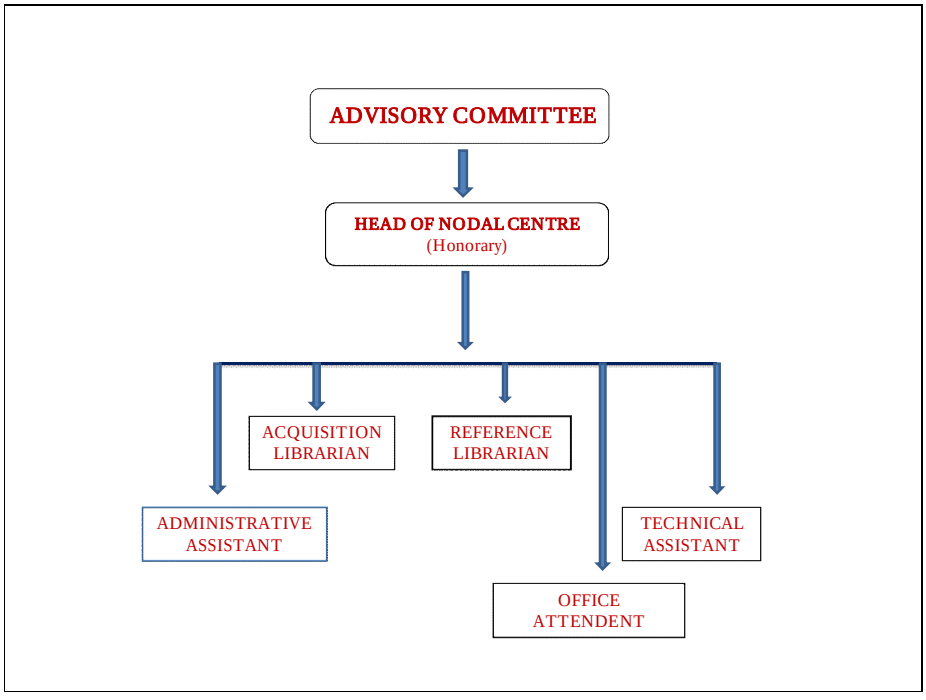


**Fig. 6.10 Administrative Structure of VRSC**

Since the organizational units are scattered at different geographical locations it is important to have an effective administrative mechanism to interlink the units and ensure a proper coordination. The administrative structure for the VRSC is given in the figure 6.10.

The different units of the administrative structure are discussed below.

❖ **Advisory Committee**

This is the apex committee responsible for framing policies, rules and regulations of the network. This committee may be constituted with the following number of members.

| | | |
|---|---|---|
| University Professor in the faculty of Engineering | - Chairman | (1) |
| Principals of Participating Colleges | - Members | (6) |
| Representative of Librarians of Participating Colleges | - Member | (1) |
| Head of Nodal Centre | - Convener | (1) |

❖ **Head of Nodal Centre**

As discussed above, the nodal centre is responsible for maintaining the VRSC. The head of the Nodal Centre should be an experienced and eminent personality from the field of Library and Information Science. The study recommends that a Deputy Librarian from the university library system may be given the honorary headship of the centre. Two qualified library professionals may be appointed in the centre for handling the different functions of the centre as mentioned in the figure 6.10. The Reference Librarian may be given the charge for handling the Virtual Reference Desk and Acquisition Librarian may be given charge for handling content acquisition and metadata creation of contents (free, subscribed and e-learning).

Appointing a qualified technical assistant for handling the hardware and software may be helpful in the long run.

## 6.8 Implementation

The implementation of the VRSC shall be done at multiple phases. The present study could establish only the willingness of the librarians for RS and the acceptance of the proposal for VRSC by the librarians and user communities. The final decision regarding whether to take part in such a cooperative effort and the extent of cooperation depends on the attitude of the managements/authorities of the institutions. So the first step in the implementation of the proposal is establishment of a RS agreement by the colleges regarding the type and extent of cooperation. Discussions at various levels will have to be conducted and the managements/authorities should show an open-minded approach for the common benefit of the community. Once such a consensus is reached the proposal shall be implemented as follows:

### 6.8.1 Pre-Phase

1) Constitute a governing body comprising of administrators, academicians and librarians for managing and monitoring the VRSC.
2) Depute and appoint competent library professional(s) for managing the centre.
3) Establish the nodal centre at the university campus.
4) Develop the VRSC portal with central databases for handling e-content and e-learning objects.
5) Prepare the policies, terms and conditions on the extent of content sharing among the institutions.

6) Prepare the panel of subject experts on different branches of engineering for developing learning objects.

### 6.8.2 Phase-I

1) Locate free e-books and e-references and upload them in the central server. Enter the catalog records of the same in the respective server.
2) Identify open content, open archives and open courseware related to engineering and create the metadata and links for them and upload in the central server.
3) Expose the MARC compatible catalogs of the member libraries for facilitating federated searching.
4) Initiate steps to convert the remaining catalogs to MARC compatible format using suitable programmes or shift the library management system to some open source software that supports MARC format (eg. KOHA).
5) Index and upload the e-learning content developed by the panel of experts.
6) Initiate appropriate training programmes for librarians, content developers and users for promoting and optimizing the services of VRSC.

### 6.8.3 Phase-II

1) Complete the conversion of non compatible catalogs to MARC format.
2) Include all the ECs under the university in the network.

## 6.9 Expected Outcome of VRSC

- ✓ Provides an enhanced platform for RS of EC libraries

- ✓ Improves access to scholarly information
- ✓ Ensures faster delivery of services
- ✓ Interlending and document delivery can be carried out efficiently and quickly
- ✓ Access to information results in improved usage which in turn leads to improved productivity of the academics
- ✓ Helps to avoid duplication of research

## 6.10 Probable Challenges

Commitment, tolerance and genuineness are the basic success factors of a RS activity. Open-mindedness to co-operate with competitors is vital to accomplish such an effort. Bringing together competing institutions, and materializing a public –private institution level cooperation involves greater challenge. But an affiliating university can initiate steps to achieve this goal. Discussions at various levels will have to be conducted for reaching consensus in the matter.

It is imperative that all the participating institutions must have a clear understanding of their responsibilities, obligations, benefits and obstacles of the cooperation. Lack of standards in existing systems is the next challenge. Conversion of catalogs into compatible formats or moving on to new platforms for integrated library management requires expertise and policy decisions to be made at unit level. A lot of effort is required to overcome these challenges. The beneficiaries, especially the medium and poor libraries should understand the importance and benefits of cooperation and work dedicatedly and ambitiously to accomplish the task. For this, cooperation from political circles, government agencies, non-governmental funding agencies, voluntary agencies, etc should be sought.

When almost all these challenges are tackled, a formal agreement (Memorandum of Understanding) should be drafted stating the responsibilities of the participants, the rules for content sharing, inter library lending, etc.

## 6.11 Conclusion

It is a matter of fact that academic libraries can not function effectively on its own without any cooperation or collaboration. With the escalating costs of publications, variety of contents and diverse user demands libraries find it difficult to satisfy all its clientele. The present study also revealed that most of the users are either partially satisfied or dissatisfied with their library facilities. The only solution to overcome this situation is cooperation. Exploring the possibilities of sharing open contents is another viable solution. The RS model put forward by the study covers both these aspects. It is also essential to satisfy the required technical infrastructure including high speed internet connectivity and sufficient number of terminals by all the institutions for the successful functioning of the system.

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# Chapter 7

# FINDINGS AND CONCLUSION

## 7.0 Introduction

The present study was intended to report the status quo of the EC libraries affiliated to M.G. University with an aim to identify and study the resource sharing activities by these libraries. A detailed analysis of the various aspects of the above mentioned attributes are made in chapter 5. This chapter aims to present a summary of the major findings of the study, test the formulated hypotheses, provide recommendations based on the findings and to suggest areas of further research.

## 7.1 Summary of Findings

### 7.1.1 General Information

1. Among the 22 colleges under study 86% (19) come under the self financing (S.F.) sector, 9% (2)are run directly by the government of Kerala and 5% (1) fall under the government aided sector.

2. All the colleges under the government and aided sector, and 74% (14) colleges in the S.F. sector are PG level colleges.

3. The total number of library memberships ranges from 1501-2000 in 50% of the colleges. Four (18%) libraries have a membership of 1000-1500 and seven (32%) libraries have members ranging from 2001-2500.

### 7.1.2 Library Collection

4. The number of printed books in the libraries ranges from 10000 to 50000. Majority (81%) of the colleges have a collection of less than 30000 books. The aided college, one government college and one S.F. college possess a collection of more than 40000 books.

5. In all the libraries the collection of books are fully organised using different editions of Dewey Decimal Classification and catalogued according to AACR2.

6. The print periodical collection in different libraries ranges from 45 to 250.

7. The number of Indian journals subscribed by the college libraries ranges from 0 to 125 and majority of the libraries subscribe less than 75 Indian journals.

8. The number of foreign periodicals subscribed by the libraries ranges from 0 to 100. Among the study units, 23% of the libraries including a government college do not subscribe to any foreign journal and another 23% libraries subscribe to more than 50 to 100 foreign journals.

9. Popular magazines are not subscribed by 23% of the libraries under study whereas two colleges in the S.F. sector subscribe more than 50 popular magazines.

10. With respect to the number of subscriptions of periodicals and popular magazines, the S.F. colleges are far ahead than other types of colleges.

11. It is observed that majority of the college libraries have no regular policy for collecting and maintaining the student project reports. Only 36% of the college libraries maintain a collection of student project reports.

12. The number of electronic databases subscribed by the libraries ranges from 0 to 9. Majority of the libraries (73%) subscribes to 5 or more e-databases and 50% of the total number of libraries (all in S.F. sector) subscribe to 7 to 9 databases.

13. IEEE (ASPP) is the widely (77%) subscribed database followed by JGate and Elsevier Science Direct (both 59%).

14. More than half (59%) of the libraries under study have a collection of e-books in their libraries. The collection ranges from 1700 to 8700

15. None of the study units is having a regular policy for the collection development of CDs/DVDs. There are around 300 to 3000 CDs/DVDs in different libraries.

### 7.1.3 Annual Budget

16. The study identified that 14% of the colleges do not have a regular annual budget whereas on the other end 9% of the colleges have an annual budget of more than 50 lakhs. All these colleges come under the S.F. sector.

17. Majority of the libraries (55%) have an annual budget of below 20lakhs. The government and aided college libraries fall in this category.

18. In the case of budget allocation also the S.F. colleges score high. A wide gap is visible between the colleges with respect to the annual budget allocation for libraries.

### 7.1.4 ICT Infrastructure

19. Majority (95%) of the libraries are having server machines. Out of these 32% colleges (all S.F.) have 2 servers, one dedicated for their Digital Library/ Institutional Repository.

20. All the colleges are having networked computers in their library. But a wide gap is noticed with respect to the number of computers that ranges from 2 to 98.

21. Only 50% of the colleges under study possess a scanner and all these are S.F. colleges.

22. The number of Bar Code Readers (BCR) in the study units ranges from 1 to 4 and one govt. college and three S.F. colleges do not have any BCR.

23. All the colleges except one in the S.F. sector have UPS facility. Out of these 17 colleges have a centralized UPS facility.

24. All the libraries are having internet connectivity and 59% of the total number of libraries including the aided college library is having WiFi enablance in their campus/library.

25. Only 18% of the libraries are having a library website. These 4 libraries are in the S.F. sector. Majority of the libraries (77%) are having a link and a page for the library in their college website. Libraries that do not have a web presence is 5%.

26. All the libraries have automated their library housekeeping operations but no single library has completely shifted to a fully automated library system. Generally the circulation and cataloging/technical processing operations are found to be automated in all the libraries.

27. A variety of automation software are used in the libraries that includes integrated library management systems (ILMS) and locally developed software for automating certain operations.

28. Locally developed software are used in 18% of the libraries and the majority of the libraries (82%) use ILMS for library automation. The most popular software is SOUL followed by KOHA and LIBSOFT.

29. Only 3 libraries (14%) provide webopac facility.

30. The library catalogs of 32% of the colleges are compatible with certain international standards.

31. A digital library/institutional repository (DL/IR) is present in 46% of the colleges. All these colleges are in the S.F. sector. E-question papers are the popular content (90%) in the DL/IR followed by e-books (80%). Only one DL uses web 2.0 applications in the form of RSS feeds.

32. DSpace is used in 60% of the colleges to build their DL and 20% of the libraries use Greenstone for building their DL. Another 20% of the DLs are built on a proprietary software viz; e-shelf.

### 7.1.5 Services

33. Lending of books is the only traditional service that all the libraries provide. This is followed by reprographic (86%) and reference (82%) services.

34. The most common e-information service is access to e-journals and databases (91%). This is followed by OPAC service (82%). NPTEL is the most common E-learning service provided by these libraries.

35. Online User Education Programme is the least common e-information service. Online reservation, chat reference/virtual reference service, etc are not been provided by any of these libraries.

### 7.1.6 Library Personnel

36. There is no regular pattern for professional staff positions, salary and designation in these libraries. Majority of the colleges have four or more library professionals.

37. In one college there is only one library professional, a retired person. This library is managed by 3 library attendents.

38. Majority of the library professionals are post graduates in Library and Information Science and 2% of the library professionals hold a PhD degree. But they are retired persons serving their libraries on contract basis.

39. Majority of the professionals are found to be having an average knowledge in handling computers. About 5% of the professionals are highly skilled and 5% are not at all skilled in handling computers.

40. Librarians of 5 colleges claimed that they receive AICTE pay scale with local dearness allowance. Some of the librarians are getting salary in state pay scale for their corresponding positions. Nearly 50% of the professionals receive a salary between Rs.10000/- and Rs.20000/-.

### 7.1.7 Resource Sharing

41. Only one third of the total libraries are involved in some RS activities. All these libraries are members in DELNET consortium. Four libraries participate in the union catalog of DELNET.

42. The libraries are involved in inter library loan (ILL), document delivery service (DDS), union cataloging (UC), sharing of expertise (SE) and exchange of publications (EP). The libraries that are involved in ILL (3 libraries) & EP (1 library) are co-operating with the sister institutions of their respective managements in this aspect.

43. About 77% of the librarians opined that their libraries need RS to effectively satisfy the user needs and 86% expressed their willingness to join a regional consortium. Two (9%) of the librarians doubted whether their respective managements will be willing to join the consortium. But these librarians personally expressed their willingness to join.

44. Sharing of expertise, ILL/DDS and staff training are the preferred RS activities by the librarians. Lack of uniform standards in technical organization of collection is pointed out by the librarians as the major hindrance towards effective cooperation.

### 7.1.8 Categorization of Libraries

45. Grouping of college libraries based on certain criteria developed for this study revealed that 32% of the colleges are 'poor' with respect to their library facilities, 41% of the libraries come under the group 'medium' and the remaining college libraries (27%) fall under the group 'rich'.

46. A wide gap is visible among the study units with respect to their resources and services and nearly one third of the colleges under the study are poor with respect to the library facilities.

### 7.1.9 Use of Library

47. The primary purpose of library visit by users is found to be reference. Student users rarely use their libraries for general reading. All the student users make use of the textbook collection in their libraries.

48. Majority of the respondents are regular visitors to their libraries- either daily, on alternate days or weekly.

49. Majority of the student users spend less than 1 hour in their libraries, whereas majority of the faculty members spend an average of 1 to 3 hours in the libraries.

50. Majority (90%) of the users are aware about the internet facility provided by their libraries. This is followed by e-journals and databases. World Wide Web is the widely used e-resource followed by e-journals and databases.

51. Use of different e-resources is found to be dependent on the category of the users and status of institutions. The Chi-square **($\chi^2$)** analysis conducted to test the dependency proved to be significant at 0.05 level. Usage of e-resources is found to be less in poor colleges. Majority of the users from 'poor' colleges pointed out the unavailability of e-resources as the main reason for their non-use of e-resources.

52. Wikis are the most frequently used e-resources by all the categories. This is followed by e-journals and databases. UG students less frequently use e-resources than the other category of users.

53. The reasons for non-use of e-resources are found to be unawareness about the available resources as well as unavailability of needed resources.

54. Majority of the users (in all categories) opined that they use e-resource for the purpose of study and research. Student users' second major purpose was for aiding project/research work. Whereas for faculty members, their second major purpose was updating subject knowledge.

55. The student users' (particularly PG students) preferred place for using e-resources is their home with their personal computers/laptops. Whereas more than half of the teachers opined that their preferred place for using e-resources is the college library.

56. Problems encountered while accessing e-resources varied among categories. Chi-square **($\chi^2$)** test performed to test the dependency of the problems encountered with category proved to be significant at 0.01 level.

57. Print is the preferred format for textbooks. About half of the users preferred electronic format for library catalogs. Majority of the users selected 'Both" for journals. On an overall it is observed that about 40% of the users prefer print formats, 20% prefer electronic formats and 40% selected both for their library resources.

58. Majority (63%) of the respondents opined that their libraries do not provide sufficient number of computers to access e-resources. A striking difference is observed between the responses from facility rich and poor colleges in this regard.

### 7.1.10 Satisfaction with Library Resources

59. Only a few numbers of users are fully satisfied with the print collection of the libraries. There is a significant difference between categories with respect to their level of satisfaction with print resources. The Chi-square **($\chi^2$)** analysis conducted to test the dependency of status of institution with the level of

satisfaction of print resources proved to be significant at 0.01 level.

60. All the categories of users are generally least satisfied with the e-resources provided by the libraries. But the level of satisfaction varied with categories and status of institutions. The Chi-square **($\chi^2$)** analysis to test the dependency of these variables proved to be significant at 0.05 level.

61. In spite of the availability of a considerable e-resource collection, majority of the respondents opined that the e-resources provided by their libraries are inadequate to satisfy their needs. There is a significant difference in opinion between the users from rich and poor colleges about the adequacy of their library resources.

62. The level of satisfaction with ICT facilities are also dependent on category and status of institutions and the Chi-square **($\chi^2$)** analysis to test the same proved to be significant at 0.01 level.

63. More than half (54%) of faculty members and a vast majority of the student users opined that the e-resources provided by their libraries are inadequate. The users of poor colleges opined that both the print and e-resources of their libraries are not adequate to satisfy their needs. Whereas the users of the rich colleges are of the view that the print and e-resources provided by their libraries are adequate to satisfy their needs. The $\chi^2$ test proved that the opinion regarding adequacy of different library resources among different groups of users is significantly different.

64. Majority of the respondents from poor colleges opined that the number of library staff is inadequate in their libraries.

### 7.1.11 Use of Inter Library Loan Service

65. Majority of the respondents opined that they do not know whether their libraries provided this service. Only 6% of the total users knew that their libraries provided the service.

66. Among these 24 users, only 3 users have availed the service. 5 respondents replied that they have requested for the service but not availed it.

### 7.1.12 Need for Resource Sharing

67. Majority of the users felt that RS is needed to satisfy their information needs. Only 12% of the users opined that they do not need resource sharing.

68. The idea of a Virtual Resource Sharing Centre is supported by 77% of the college librarians and 98% of the users and opined that they wanted to access the VRSC. Among the rest of the librarians, 18% opined that they personally supported the idea but they require the consent of their respective managements to respond officially to this matter.

### 7.1.13 Likelihood to Access VRSC

69. Subscribed/purchased e-books is found to be the most demanded item by the users (88%), to be included in the VRSC. This is followed by subscribed e-journals and e-learning platform.

70. Majority (87%) of the teacher respondents opined that they are willing to or will try to contribute learning objects to the VRSC.

71. About 95% of the respondents are having a high expectation about the VRSC.

## 7.2 Testing of Hypotheses

The study put forward 7 hypotheses related to the research problem. Different types of descriptive and inferential statistics are applied to prove all these hypotheses. Chi-square **($\chi^2$)** analysis as a non-parametric test is done in most cases to test the hypotheses.

**H1: There is a significant gap between the colleges with respect to their library facilities**

From the inference drawn from the tables 5.4, 5.5, 5.6, 5.7, 5.9, 5.10, 5.11 and the ranking of the college made vide table 5.26 and from the inferences drawn from the figures 5.2, 5.3, 5.5, 5.19, and 5.28 a wide gap is visible between the colleges with respect to their library facilities. Hence, it is concluded that *H1 stands valid.*

**H2: There is no uniform pattern for staff strength and salary among these libraries**

The discussions made under 5.6.1 and the figure 5.19 makes it clear that there is a wide gap among the libraries with respect to their staff strength since the number of professional staff in each library ranges from 1 to 6. It is also evident that there is no uniform pattern for professional staff strength among the libraries. The discussions made under 5.6.4 reveals that the salary of the professional staff varies to a great extent and there are no standards for designation and salary of

library professionals in these college libraries. *Hence H2 stands valid.*

**H3: There is no effective means of cooperation among these libraries**

Discussion under 5.7.1 and the figure 5.23 shows that only one third of the libraries are involved in some RS activities (ie., a membership in the DELNET consortium). It is also clear that there do not exist any type of cooperation among the study units or with similar libraries in the state. Discussions under 5.7.2 and the figure 5.25 also reveals that there are no effective means of cooperation among the study units and majority of the librarians are willing to join a regional consortium of EC libraries. *Hence H3 is found to be valid.*

**H4: Usage and user satisfaction regarding e-resources are dependent on their category and status of institution**

For the purpose of analysis and testing, H4 is split up into 2 as follows:

H4a: Usage of e-resources is dependent on the category and status of institution.

H4b: Users' satisfaction with e-resources is dependent on their category and status of institution

**H4a: Usage of e-resources is dependent on the category and status of institution.**

Here the null hypothesis is taken as the 'usage of e-resources is independent of the category and status of institution'. Separate chi-square tests are conducted to test the dependency of usage of e-resources with the other 2 variables which are presented in tables 5.30 and 5.31. The calculated value of $\chi^2$ for a degree of freedom 2 is found to be above the table values in both the cases at 0.05 level of significance.

The frequencies of use of various e-resources is further compared with the category of users and is presented in the table 7.1

**Table 7.1 Frequencies of Use of E-Resources Vs Category of Users**

| Item | Usage | UG | | PG | | FAC. | | Chi-square; df=4 | p-value |
|---|---|---|---|---|---|---|---|---|---|
| | | freq. | % | freq. | % | freq. | % | | |
| E-books | Frequently | 118 | 36% | 28 | 40% | 29 | 34% | 5.498 | 0.700 |
| | Occasionally | 135 | 41% | 26 | 37% | 44 | 52% | | |
| | Rarely | 77 | 23% | 16 | 23% | 12 | 14% | | |
| E-journals | Frequently | 103 | 31% | 40 | 57% | 49 | 58% | 42.83 | 0.000 |
| | Occasionally | 144 | 44% | 24 | 34% | 34 | 40% | | |
| | Rarely | 83 | 25% | 6 | 9% | 2 | 2% | | |
| Online cat. | Frequently | 57 | 17% | 22 | 31% | 13 | 15% | 19.94 | 0.010 |
| | Occasionally | 48 | 15% | 4 | 6% | 23 | 27% | | |
| | Rarely | 225 | 68% | 44 | 63% | 49 | 58% | | |
| Cd-roms | Frequently | 27 | 8% | 0 | 0% | 12 | 14% | 18.49 | 0.017 |
| | Occasionally | 81 | 25% | 26 | 37% | 31 | 36% | | |
| | Rarely | 222 | 67% | 44 | 63% | 42 | 49% | | |
| E-learning platforms | Frequently | 26 | 8% | 12 | 17% | 28 | 33% | 93.87 | 0.000 |
| | Occasionally | 75 | 23% | 36 | 51% | 40 | 47% | | |
| | Rarely | 229 | 69% | 22 | 31% | 17 | 20% | | |
| E-resources of other libraries | Frequently | 7 | 2% | 4 | 6% | 7 | 8% | 28.11 | 0.000 |
| | Occasionally | 106 | 32% | 32 | 46% | 46 | 54% | | |
| | Rarely | 217 | 66% | 34 | 49% | 32 | 38% | | |
| Wikis | Frequently | 196 | 59% | 64 | 91% | 50 | 59% | 47.35 | 0.000 |
| | Occasionally | 75 | 23% | 2 | 3% | 33 | 39% | | |
| | Rarely | 59 | 18% | 4 | 6% | 2 | 2% | | |
| E-question papers | Frequently | 93 | 28% | 10 | 14% | 32 | 38% | 16.12 | 0.040 |
| | Occasionally | 126 | 38% | 29 | 41% | 37 | 44% | | |
| | Rarely | 111 | 34% | 31 | 44% | 16 | 19% | | |
| ETDs | Frequently | 33 | 10% | 46 | 66% | 21 | 25% | 160.00 | 0.000 |
| | Occasionally | 97 | 29% | 18 | 26% | 50 | 59% | | |
| | Rarely | 200 | 61% | 6 | 9% | 14 | 16% | | |

*The frequencies were measured in a 5point scale and reduced to the 3point scale

The $\chi^2$ values are much greater than its tabled value for df=4 which makes it clear that frequencies of use of all the e-resources except
E-books are dependent on the category of users at 0.05 level of significance.
Hence the null hypothesis is rejected and the alternative hypothesis *H4a is accepted*.

**H4b: Users' satisfaction with e-resources is dependent on their category and status of institution**

Here the null hypothesis is stated as 'Users' satisfaction with e-resources is independent of their category and status of institution'. Testing of this hypothesis is done from two points of views:

i)Analysis of users' satisfaction with individual items &

ii)Analysis of individual user's satisfaction with all the types of e-resources

For this a list of seven different types of e-resources were presented before the users and their satisfaction with each item was recorded.

The $\chi^2$ tests were conducted to test the dependency of satisfaction with individual e-resources against category and status of institution. Tables 5.39 and 5.40 shows that the $\chi^2$ values are greater than the table value for a degree of freedom, df=4 at 0.05 level of significance.

The analysis of individual user's satisfaction against user category and status of institution for all the e-resources is presented in the table 7.2 and 7.3 respectively.

The calculated values of $\chi^2$ in both the cases are greater than the table values for df=4 for a significance level of 0.01.

**Table7.2 Individual User's Satisfaction with E-Resources Vs Category**

| Level of Satisfaction | Category | | | Chi-Square (df = 4) | p - value |
|---|---|---|---|---|---|
| | UG | PG | FAC | | |
| FULLY SATISFIED | 40 (12.1%) | 2 (2.9%) | 16 (18.8%) | 32.489 | 0.000 |
| PARTIALLY SATISFIED | 70 (21.2%) | 28 (40%) | 36 (42.4%) | | |
| LEAST SATISFIED | 220 (66.7%) | 40 (57.1%) | 33 (38.8%) | | |

**Table7.3 Individual User's Satisfaction with E-Resources Vs Status of Institution**

| Level of Satisfaction | Status of Institution | | | Chi-Square (df = 4) | p - value |
|---|---|---|---|---|---|
| | Poor | Medium | Rich | | |
| FULLY SATISFIED | 2 (1%) | 14 (6%) | 42 (30%) | 171.373 | 0.000 |
| PARTIALLY SATISFIED | 5 (4%) | 60 (29%) | 69 (49%) | | |
| LEAST SATISFIED | 129 (95%) | 135 (65%) | 29 (21%) | | |

From the above inferences the null hypothesis is rejected and *H4b is accepted.*

*Hence H4 is proved to be valid.*

### H5: Majority of the users are dissatisfied with their library resources

The library resources of the study units are generally divided into print, electronic, ICT facilities and Personnel for the purpose of testing of this hypothesis. The level of satisfaction of users with the print resources provided by the libraries is presented in figure 7.1

The figure makes it clear that satisfaction of users with different print resources shows a uniform pattern and more number of users are partially satisfied with all the print resources of their libraries.

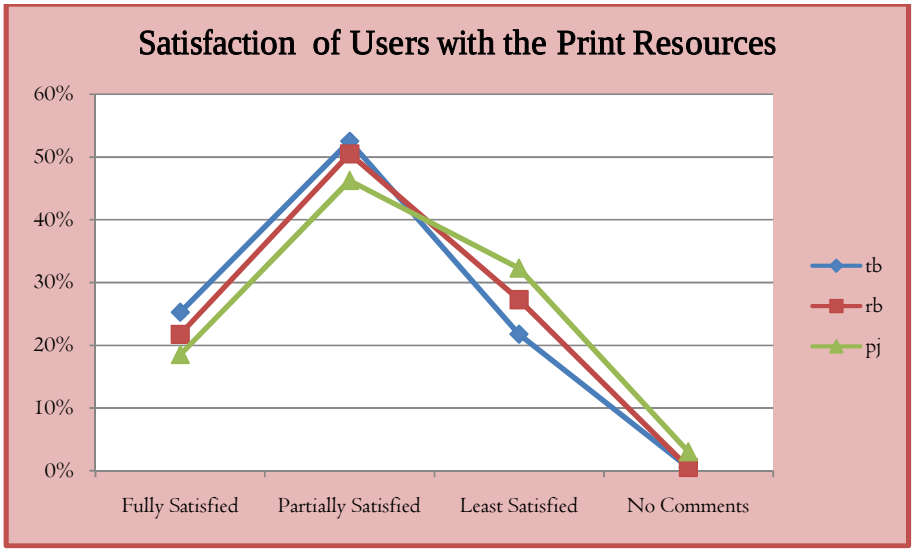


**Fig 7.1 User Satisfaction with Print Resources of their Libraries**

Figure 5.44 represents the level of user satisfaction with e-resources and is evident that the users are least satisfied with it. Figure 5.45 represents the level of user satisfaction with ICT facilities and shows that more number of users (40%) are partially satisfied with it. With respect to the adequacy of number of professional staff, a particular inclination is not observed (table 5.44). Half (50%) of the users opined that the staffs are adequate whereas another 50% opined that the number of professional staff is inadequate.

From the above discussions it is inferred that **the users are partially satisfied with the library resources** thereby rejecting the hypothesis.

*Hence H5 is found to be invalid.*

**H6: Satisfaction of users with their library resources is dependent on category and status of institution**

The null hypothesis for this case is stated as 'Satisfaction of users with their library resources is independent on their category and status of institutions'. The $\chi^2$ tests conducted vide tables 5.38, 5.40 and 5.42 to test the dependency of satisfaction with status of institution show that the calculated values of $\chi^2$ are greater than the table values at 0.05 level of significance. Similarly the $\chi^2$ analyses conducted vide tables 5.39 and 5.41 to test the dependency of satisfaction with category also show a value for $\chi^2$ which is greater than the table values at 0.05 level of significance. Thus the null hypothesis is rejected and found that the satisfaction of users is dependent on the variables.

*Hence H6 is proved as valid.*

**H7: Users have a positive attitude towards the VRSC**

The discussions made under 5.15.1, 5.15.3, 5.15.4; the figures 5.49, 5.50, 5.51, 5.52; and the table 5.49 makes it clear that the users have a very high expectation about the proposed VRSC. The attitude of the users is further depicted in table 7.4

**Table 7.4 Users' Attitude towards VRSC**

| Attitude towards VRSC | UG | PG | FAC. |
|---|---|---|---|
| POSITIVE | 320 (97%) | 70 (100%) | 83 (98%) |
| NEUTRAL | 7 (2%) | - | 2 (2%) |
| NEGATIVE | 3 (1%) | - | - |
| TOTAL | 330 (100%) | 70 (100%) | 85 (100%) |

From the table it is evident that users have a very positive attitude towards the VRSC.

*Hence H7 is valid*

## 7.3 Recommendations of the Study

Based on the observations and findings of the present investigation, the following recommendations are being put forward.

- Libraries in the government and aided sectors should be allotted adequate financial assistance for building equivalent facilities as their S.F. counterparts do.
- Effective user orientation and information marketing programmes may be conducted by each library to promote the use of e-resources.
- User-friendly library web portals that serve as a gateway to subscribed and open contents should be designed by each library.
- Regular policies should be framed at college level to collect and archive the electronic versions of the final year BTech project reports and MTech dissertations by the college libraries.
- Compatible library catalogs and web OPACs are the essential components of an effective resource sharing environment. It is highly recommended that the catalogs of the ECs should be made compatible with some international standards. For those libraries using local software, shifting towards some open source integrated library management system is recommended.
- The established digital libraries should explore the possibilities of metadata harvesting between similar libraries.
- The managements and government should take initiatives to sanction sufficient number of professional staff positions for the smooth running of the libraries.
- The designation, salary and allowances of the professionals may be defined clearly and follow uniform standards. To cope up with the technological challenges and to harness new technologies,

librarians may be given proper training as well as sponsorships for attending training programmes conducted by reputed institutions.

- Stipulations made by the AICTE regarding the annual subscription of e-databases exult great pressure to the institutions in finding lakhs of rupees each year. Finding a viable solution to this problem is the need of the hour. It is recommended that the institutions should seriously take up this matter and make discussions at various levels to negotiate the price of subscribed contents along with alternate ways for shared acquisition and access.

## 7.4 Areas of further Research

- The availability and usage of different types of e-resources by different groups of engineering academics belonging to different branches can be studied to identify the strengths and weaknesses of e-resources available in different fields of engineering.
- The cost effectiveness and cost benefit analysis of consortial purchases of electronic resources shall be made to review the existing purchase options.
- The success and problems of established national and regional consortium.
- The impact of e-journals and databases on the academic output of engineering students and teachers can be studied.

## 7.5 Conclusion

The study succeeded in accomplishing its objectives. The analysis proved that a wide gap exist between the colleges in terms of their resources and facilities. It is also revealed that some of the self financing colleges are far ahead than the government and aided colleges that has been established decades ago. Users generally felt that their library resources are inadequate to satisfy their needs and opined that an effective resource sharing will help to solve this problem. Many of the college librarians expressed their willingness to share their resources for the common benefit of the community. Since the study collected a census type data of the colleges (established before 2009) under M.G. University, the findings can be generalized for the Kerala state as a whole.

The proposed model of the VRSC, if implemented will result in the optimum utilization of existing resources, open content and linked data. Users and librarians are enthusiastic to reap the benefits of the centre. The same model can be implemented for other universities or for the Kerala state as a whole.

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# Appendix-I

## Questionnaire

(To Librarians in charge of the College Library)

## I. GENERAL INFORMATION

**1. Name of the Institution**

**2. Year of establishment**

**3. Type of institution**

Govt.[ ] Aided[ ] Self financing[ ]

4. **Level of institution**

Under graduate [ ] Post Graduate[ ]

5. **Please specify the total annual intake of student**

| Name of Course | Annual intake |
|---|---|
| B.Tech | |
| M.Tech | |

**6. Library Users**

| Category | Number |
|---|---|
| Students | |
| Teachers | |
| Non-teaching staff | |
| **Total** | |

## II. LIBRARY COLLECTION

7. **Please give the details of your library collection**

**Periodicals**

| Sl. No. | Item | Number |
|---|---|---|
| 1 | Indian Journals purchased | |
| 2 | Foreign Journals purchased | |
| 3 | Popular magazines | |
| 4 | Newspapers | |
| 5 | Bound Volumes | |

**Books and other Print Collection**

| Sl. No. | Item | Number |
|---|---|---|
| 1 | Books (purchased) | |
| 2 | Books (gift) | |
| 3 | Thesis/Dissertations | |
| 4 | Project reports | |
| 5 | Any special collections (Please specify) | |
| | **TOTAL** | |

**8. Do you subscribe electronic resources?**
Yes [ ] No [ ]

If **Yes**,

a) **Mention the number of e-resources subscribed / purchased by your institution**

| Sl. No. | Item | Number |
|---|---|---|
| 1 | E-books | |
| 2 | E-journals | |
| 3 | CD-ROM databases | |
| 4 | Online full-text databases | |
| 5 | Online bibliographic databases | |
| 6 | CDs/DVDs | |
| 7 | Others(Please specify) | |

b) **The following are some of the electronic resources being subscribed in libraries.**

Please tick mark the items your library posses.

| Sl. No. | E-journal/Database | Please (√) mark if subscribed/ purchased | No. of e-journals/e-books received |
|---|---|---|---|
| 1 | ACM Digital Library | | |
| 2 | ASCE Journals | | |
| 3 | ASTM digital library | | |
| 4 | ASME | | |
| 5 | Elsevier (Science Direct) | | |

| | | | |
|---|---|---|---|
| 6 | Mc Graw Hill | | |
| 7 | Engineering Science Data Unit(ESDU) | | |
| 8 | Engineering Village | | |
| 9 | IEEE/IET Electronic Library(IEL ONLINE) | | |
| 10 | J Gate | | |
| 11 | JCCC@INDEST-AICTE | | |
| 12 | JSTOR | | |
| 13 | Proquest | | |
| 14 | Wiley Blackwell | | |
| 15 | Springer | | |
| 16 | | | |
| 17 | | | |

**9. Is your library collection classified?**

Fully classified [ ] Partially classified [ ] Not classified [ ]

**10. Please specify the classification scheme and cataloguing rules followed in your library**

…….. - for classification

……..- for cataloguing

## III. LIBRARY BUDGET

**11. Please furnish the details about your annual budgetary allocations for the following years**

| **Annual Budget** | **Current Year (2011-2012) Rs.** | **2010-2011 Rs.** | **2009-2010 Rs.** |
|---|---|---|---|
| Books | | | |
| Journals | | | |
| E-resources | | | |
| ICT infrastructure | | | |
| Others (Please specify) | | | |
| **TOTAL** | | | |

## IV. ICT INFRASTRUCTURE IN THE LIBRARY

**12. Is your library automated?**

Yes, Fully automated [ ] Yes, Partially automated [ ] Not automated [ ]

**13. If partially automated, please tick (√) the sections that are automated**

| | | | |
|---|---|---|---|
| Acquisition | | Technical | |
| Circulation | | Serials Control | |

**14. Hardware Infrastructure**

| Sl. No. | Item | Quan-tity | Sl. No. | Item | Quan-tity |
|---|---|---|---|---|---|
| 1 | Server(s) | | 8 | Laptop systems | |
| 2 | Network computers | | 9 | LCD Projectors/OHP | |
| 3 | Stand-alone computers | | 10 | UPS | |
| 4 | Scanner(s) | | 11 | RFID Technology | |
| 5 | Bar-code reader(s) | | 12 | Web Camera | |
| 6 | Bar-code printer(s) | | 13 | Photocopier | |
| 7 | Printer(s) | | 14 | CD-Net server | |

15. **Software used**

| Purpose | Product Name | Cost of the product | AMC (Rs.) |
|---|---|---|---|
| Library Management | | | |
| Digital Library | | | |
| Others (specify) | | | |

16. **Do you have the following telecommunication facilities in your library?**

| Item | Yes | No |
|---|---|---|
| Telephone | | |
| LAN | | |
| Wi Fi | | |
| Internet | | |

**17. Name the internet service provider(s)**

**…….**

**18. Mention the type of internet connection**

Broadband[ ] Dialup[ ] Leased Line [ ] VSAT [ ]
Others [ ]

**19. Do you have a library network?**

Yes [ ] No [ ]
**If *Yes*,**
Independent Network [ ] Part of Institution's Network [ ]

**20. Does your library have a website?**
Yes [ ] No [ ]
**If *Yes*,**
A separate website [ ] Only a link and a page in the college website [ ]

**OPAC**

21. **Do you have OPAC facility?**
Yes [ ] No [ ]
**If *Yes*,**
WEB OPAC [ ] Available only on college intranet[ ]
Available only on library intranet[ ]

22. **Out of the following, which international standard does your library catalog support?** (Please tick (√))

| | |
|---|---|
| MARC21 | |
| UNIMARC | |
| CCF | |
| ISO 2709 | |
| Others…… | |
| None | |
| Don't know | |

23. **Do you have a digital library/ institutional repository?**
Yes [ ] No [ ] Planning to start [ ]

## V. LIBRARY SERVICES

24. **Please tick the services provided by your library**

| | | | |
|---|---|---|---|
| Lending of books | | New Additions Alert Service | |
| Lending of periodicals | | Conference Alert Service | |
| Lending of non-book materials(cd-rom, DVD, cassettes, etc.) | | Inter Library Loan | |
| Reference Service | | User Orientation | |
| Reprographic Service | | Current Awareness Service | |

24. **What are the electronic information services provided by your library?**

| | | | |
|---|---|---|---|
| Access to e-journals and databases | | Courseware/E-learning systems | |
| Access to e-books | | Virtual Reference Service | |
| CD-ROM Search service | | Online User Education Programmes | |
| E-project reports | | Access to Digital library/Institutional repository | |
| E-question papers | | Online reservation | |
| Online renewal | | OPAC | |

## VI. LIBRARY PERSONNEL

**26. Please give the details about the library staff**

| **Category** | **No. of post** | **Pay Scale** |
|---|---|---|
| Librarian | | |
| Assistant Librarians | | |
| | | |
| | | |

**27. Qualifications of library personnel (only professionals)**

| **Designation** | **General & Professional qualifications** | **Computer Knowledge(Please (√))** | | | | | |
|---|---|---|---|---|---|---|---|
| | | Certificate | Diploma | P.G.Diploma | Self learnt | Learnt from friends/ colleagues | Any other formal training (specify) |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**28. Computer proficiency (Indicate the level of skills by writing the appropriate number)**

(**3**-Highly skilled, **2**-Skilled, **1**-somewhat skilled, **0**-not skilled)

| **Category** | **Designation(Please write)** | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Programming | | | | | | | |
| Networking | | | | | | | |
| Linux platform | | | | | | | |
| Windows | | | | | | | |
| Webpage designing | | | | | | | |
| Online searching | | | | | | | |
| Downloading | | | | | | | |
| Uploading | | | | | | | |
| Installing computer programmes | | | | | | | |
| Automation software used in your library | | | | | | | |

## VII. RESOURCE SHARING

29. **Is your library involved in any resource sharing activity?**

Yes [ ] No [ ]

29. **If Yes, Please *tick* the items relevant to your library**

| | |
|---|---|
| Inter Library Loan of books | |
| Inter Library Loan of Print Journals | |
| Document Delivery Service | |
| Co-operative acquisition | |
| Co-operative cataloguing | |
| Union cataloguing | |
| Union Lists of serials | |
| Sharing of expertise | |
| Exchange of publications | |
| Digital Preservation | |

**30. Is your library a member of any library consortium?**

Yes [ ] No [ ]

*If Yes,*

| Name of Consortium | Products/services you receive |
|---|---|
| | |
| | |
| | |

**31. Is your library involved in any informal means of cooperation?**

Yes [ ] No [ ]

*If Yes, Please mention the purposes for which cooperation is sought*

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32. **Are you interested/willing to join a regional consortium of engineering libraries in Kerala**

Yes [ ] No [ ] Don't Know [ ]

*If Yes,* please mentioned the areas of co-operation from the following list, that you would prefer

| | |
|---|---|
| Participate in Inter Library Loan/ Document Delivery | |
| Co-operative acquisition | |
| Co-operative cataloguing | |
| Union cataloguing | |
| Union Lists of serials | |
| Sharing of expertise | |
| Staff training | |

**34. Out of the following, Please rank(1,2,3,..) the factors that you may think will hinder the effective sharing of resources among engineering college libraries(with "1" for the most important factor)**

| | |
|---|---|
| Paucity of Fund | |
| Lack of sufficient ICT infrastructure | |
| Lack of interest from the part of management | |
| Lack of uniform standards in the technical organization of the library | |
| Unwillingness of the authorities to share the resources | |
| Lack of adequate manpower | |

**35. Do you think that an effective means of resource sharing is needed to properly cater to the needs of your students?**

Yes [ ] No [ ] Don't know [ ]

**36. Would you like to have access to a single platform (a Virtual Resource Sharing Center) that shares the e-resources of other Engineering colleges and that provide access to e-books, e-journals, e-databases, etc (subscribed and freely available)?**

Yes [ ] No [ ]

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Appendix-II

**Questionnaire**
(Library users)

## I. GENERAL INFORMATION

1. **Name of college**

2. **Category (Please tick (√) mark)**
UG student[ ] PG student[ ]

3. **Sex**: F/M

4. **Branch** .....

## II. LIBRARY USE

5. **Purpose of library visit**
Study[ ] Research[ ] Reference[ ] Others[ ]

6. **Frequency of library visit**

| | | | |
|---|---|---|---|
| Daily | [ ] | Alternate days | [ ] |
| Once in a week | [ ] | Once in two weeks | [ ] |
| Monthly | [ ] | As and when needed | [ ] |
| Rarely | [ ] | Never | [ ] |

7. **Average time spent in the library**
Less than 1hr. [ ] Between 1 to 3hrs. [ ]
Between 3to 5hrs. [ ] More than 5 hrs. [ ]

### Use of Print Resources

8. **Do you use the following print resources in your library? Please indicate the level of your satisfaction with each resource(Please tick (√) mark).**

| Sl. No. | Item | Fully satisfied | Partially satisfied | Least satisfied | No comments |
|---|---|---|---|---|---|
| 1 | Number of Text books | | | | |
| 2 | No. of Reference books | | | | |
| 3 | No. of Print journals/ periodicals | | | | |

## III. USE OF ELECTRONIC RESOURCES

9. **Do you use the following electronic resources in your library? (Please tick (√)). Also indicate your level of satisfaction with these items.**

| Item | Use | | | | Satisfaction | | |
|---|---|---|---|---|---|---|---|
| | Yes | No | | | | | |
| | | *Because my library doesn't provide it* | *Because I am unaware of it* | *Because I am not interested in it* | *Fully satisfied* | *Partially satisfied* | *Least satisfied* |
| E-books | | | | | | | |
| E-journals | | | | | | | |
| Online catalogue | | | | | | | |
| E-question papers | | | | | | | |
| Digital Library/ Institutional Repository | | | | | | | |
| E-Project reports/ E-dissertations | | | | | | | |
| Internet/www | | | | | | | |

10. **Which is your preferred place to use e-resources? (Please tick (√)).**

| | | |
|---|---|---|
| 1 | College library | |
| 2 | Home PC/laptop | |
| 3 | Internet Café | |
| 4 | Computer Lab/computer center | |
| 5 | Others(specify) | |

11. **Of the following please indicate the purposes for which you use e-resources (Please (√) all relevant items)**

| | | |
|---|---|---|
| 1 | Study & Research | |
| 2 | Aiding project/dissertation work | |
| 3 | Writing & Presenting articles/papers | |
| 4 | Updating subject knowledge | |

12. **Please mention the frequency of using the following electronic resources**

| Sl. No | Item | Very Frequently | Frequently | Occasionally | Rarely | Never |
|---|---|---|---|---|---|---|
| 1 | e-books | | | | | |
| 2 | e-journals | | | | | |
| 3 | Online catalogue of your library | | | | | |
| 4 | CD-ROMs | | | | | |
| 5 | NPTEL/ Other e-learning platforms | | | | | |
| 6 | E-resources of other libraries | | | | | |
| 7 | Wikis | | | | | |
| 8 | E-question paper | | | | | |
| 9 | Electronic theses /dissertations/project reports | | | | | |

**13. Which format of the following information sources would you like to prefer? (Please tick (√)).**

| Sl.No. | Item | Print format | Electronic format | Both |
|---|---|---|---|---|
| 1 | Books | | | |
| 2 | Journals | | | |
| 3 | Library Catalogues | | | |
| 4 | Question Papers(previous) | | | |
| 5 | Project reports/ dissertations/ theses | | | |
| 6 | Reference Books(eg: dictionary) | | | |

14. **What are the reasons for preferring e-resources? (Please tick (√) whatever applicable)**

| | | |
|---|---|---|
| 1 | Provides faster access | |
| 2 | Easy to find relevant information | |
| 3 | Provide up-to-date information | |
| 4 | Hyperlinks help to access related information | |

**ICT** (Computers and networking) **FACILITIES IN LIBRARY**

15. **Does your library provide sufficient number of computers for accessing e-resources? (Please tick (√) mark).**
Yes [ ] No[ ]

16. **Please tick (√) mark the problems you encounter while using e-resources in your library**

| | | |
|---|---|---|
| 1 | Slow access speed | |
| 2 | Insufficient time | |
| 3 | Lack of knowledge for finding information on the internet | |
| 4 | Frequent disconnection of server | |
| 5 | Unstable power supply | |
| 6 | Any other(Please specify) | |

17. **Indicate the level of your satisfaction with the ICT facilities in your library**
Fully satisfied [ ] Partially satisfied [ ] Least satisfied [ ]

## IV. RESOURCE SHARING

18. **Do you think that the resources (print and electronic) in your library are adequate to your needs?**

| Type | Adequate | Not Adequate |
|---|---|---|
| Print resources | | |
| Electronic resources | | |

19. **Do you think that your library has adequate number of professional staff to cater to your needs?**
Yes [ ] No [ ]

**20. Does your library provide Inter Library Loan of books? (Please tick (√) mark).**
Yes [ ] No [ ] Don't Know [ ]

**If Yes,**

**Have you requested for Inter Library Loan (ILL)? (Please tick (√) mark).**
Yes, requested and availed ILL [ ] Yes, requested but not availed ILL [ ] Not requested [ ]

21. **Do you think that your library needs to cooperate and share the resources with other libraries for satisfying your needs?**

Yes [ ] No [ ]

22. **Would you like to have access to a single platform (a Virtual Resource Sharing Center) that shares the e-resources of other Engineering colleges and that provide access to e-books, e-journals, e-databases, etc (subscribed and freely available)?**

Yes [ ] No [ ]

23. **The following are some of the features of the proposed Virtual Resource Sharing Center. Please tick (√) the items you wanted to be included in the center.**

| | | |
|---|---|---|
| 1 | Subscribed/Purchased e-books | |
| 2 | Subscribed e-journals | |
| 3 | Online dictionaries/encyclopedia | |
| 4 | Links to free e-resources on the internet | |
| 5 | E-project reports/dissertations | |
| 6 | Access to digital libraries | |
| 7 | Virtual Reference Service | |
| 8 | E-Learning platform /Online lectures (audio/video/written) | |
| 9 | Communicate with experts | |
| 10 | Previous Question papers | |
| 11 | Syllabus of different courses | |
| | Others (specify) | |

24. **Following are some statements regarding the proposed Virtual Resource Sharing Centre (VRSC). Please indicate (√) your opinion/perception towards the VRSC**

| Sl. No. | Statement | Strongly Agree | Agree | Not Sure | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 1 | VRSC will help to satisfy my information needs | | | | | |
| 2 | VRSC will help to improve my studies and achieve better results in examinations | | | | | |
| 3 | VRSC will help to complete my project work easily. | | | | | |
| 4 | VRSC will reduce the divide between "facility" rich and poor colleges | | | | | |
| 5 | All the Engineering colleges must actively participate in the VRSC | | | | | |

25. **Please give your suggestions/expectations regarding the Virtual Resource Sharing Centre**

……
……
.....

**********

# Appendix-III

## Questionnaire
(To Faculty members)

## I. GENERAL INFORMATION

1. **Name of college**

2. **Qualification of the faculty Member**

3. **Sex**: F/M

4. **Branch** .....

## II. LIBRARY USE

5. **Purpose of library visit**
   Study[ ] Research[ ] Reference[ ] General reading[ ]

6. **Frequency of library visit**

| | | | |
|---|---|---|---|
| Daily | [ ] | Alternate days | [ ] |
| Once in a week | [ ] | Once in two weeks | [ ] |
| Monthly | [ ] | As and when needed | [ ] |
| Rarely | [ ] | Never | [ ] |

7. **Average time spent in the library**

| | | | |
|---|---|---|---|
| Less than 1hr. | [ ] | Between 1 to 3hrs. | [ ] |
| Between 3to 5hrs. | [ ] | More than 5 hrs. | [ ] |

8. **Indicate the level of your satisfaction with the ICT (computer and networking) facilities in your library**
   Fully satisfied [ ] Partially satisfied [ ] Least satisfied [ ]

## III. USE OF ELECTRONIC RESOURCES

**9. Do you use the following electronic resources in your library? (Please tick (√)). Also indicate your level of satisfaction with these items.**

| Item | Use | | | | Satisfaction | | |
|---|---|---|---|---|---|---|---|
| | Yes | No | | | | | |
| | | *Because my library doesn't provide it* | *Because I am unaware of it* | *Because I am not interested in it* | *Fully satisfied* | *Partially satisfied* | *Least satisfied* |
| E-books | | | | | | | |
| E-journals | | | | | | | |
| Online catalogue | | | | | | | |
| E-question papers | | | | | | | |
| Digital Library/ Institutional Repository | | | | | | | |
| E-Project reports/ E-dissertations | | | | | | | |
| CD-ROM databases | | | | | | | |

10. **Which is your preferred place to use e-resources? (Please tick (√)).**

| | | |
|---|---|---|
| 1 | College library | |
| 2 | Home PC/laptop | |
| 3 | Internet Café | |
| 4 | Computer Lab/computer center | |
| 5 | Your Office PC | |
| 6 | Others(specify) | |

11. **Of the following please indicate the purposes for which you use e-resources (Please (√) all relevant items)**

| | | |
|---|---|---|
| 1 | Study & Research | |
| 2 | Aiding project/dissertation work | |
| 3 | Writing & Presenting articles/papers | |
| 4 | Updating subject knowledge | |
| 5 | Preparing lecture notes/aiding teaching | |

12. **Please mention the frequency of using the following electronic resources**

| Sl. No. | Item | Very Frequently | Frequ-ently | Occas-ionally | Rarely | Never |
|---|---|---|---|---|---|---|
| 1 | e-books | | | | | |
| 2 | e-journals | | | | | |
| 3 | Online catalogue of your library | | | | | |
| 4 | CD-ROMs | | | | | |
| 5 | NPTEL/ Other e-learning platforms | | | | | |
| 6 | E-resources of other libraries | | | | | |
| 7 | Wikis | | | | | |
| 8 | E-question paper | | | | | |
| 9 | Electronic theses / dissertations/ project reports | | | | | |

13. **Which format of the following information sources would you like to prefer? (Please tick (√)).**

| Sl.No. | Item | Print format | Electronic format | Both |
|---|---|---|---|---|
| 1 | Books | | | |
| 2 | Journals | | | |
| 3 | Library Catalogues | | | |
| 4 | Question Papers(previous) | | | |
| 5 | Project reports/ dissertations/ theses | | | |
| 6 | Reference Books(eg: dictionary) | | | |

14. **What are the reasons for preferring e-resources? (Please tick (√) whatever applicable)**

| | | |
|---|---|---|
| 1 | Provides faster access | |
| 2 | Easy to find relevant information | |
| 3 | Provide up-to-date information | |
| 4 | Hyperlinks help to access related information | |
| 5 | Others (specify) | |

## IV. RESOURCE SHARING

15. **Do you think that the resources (print and electronic) in your library are adequate to serve its users?**

| Type | Adequate | Not Adequate |
|---|---|---|
| Print resources | | |
| Electronic resources | | |

16. **Do you think that your library needs to cooperate and share the resources with other libraries?**
Yes [ ] No [ ]

17. **Would you like to have access to a single platform (a Virtual Resource Sharing Center) that shares the e-resources of other Engineering colleges and that provide access to e-books, e-journals, e-databases, etc (subscribed and freely available)?**
Yes [ ] No [ ]

18. **The following are some of the features of the proposed Virtual Resource Sharing Center. Please tick (√) the items you wanted to be included in the center.**

| | | |
|---|---|---|
| 1 | Subscribed/Purchased e-books | |
| 2 | Subscribed e-journals | |
| 3 | Online dictionaries/encyclopedia | |
| 4 | Links to free e-resources on the internet | |
| 5 | E-project reports/dissertations | |
| 6 | Access to digital libraries/institutional repositories of other Engineering colleges | |
| 7 | Virtual Reference Service | |
| 8 | E-Learning platform /Online lectures (audio/video/written) | |
| 9 | Communicate with experts | |
| 10 | Previous Question papers | |
| 11 | Syllabus of different courses | |
| | Others (specify) | |

19. **Following are some statements regarding the proposed Virtual Resource Sharing Centre (VRSC). Please indicate (√) your opinion/perception towards the VRSC**

| Sl. No. | Statement | Strongly Agree | Agree | Not Sure | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| 1 | VRSC will help to satisfy my information needs | | | | | |
| 2 | VRSC will help the students to improve their studies and achieve better results in exams. | | | | | |
| 3 | VRSC will reduce the divide between "facility" rich and poor colleges | | | | | |
| 4 | All the Engineering colleges must actively participate in the VRSC | | | | | |
| 5 | VRSC will support the career development of faculties. | | | | | |
| 6 | VRSC will help to improve the scientific productivity of faculties | | | | | |

20. **Are you willing to contribute learning objects (audios, videos, etc) to the E-learning module of the proposed VRSC ?**

Willing to contribute [ ] Try to contribute [ ]

Not willing to contribute [ ] No comments [ ]

21. **Please give some suggestion for the proposed VRSC.**

.....

.....

.....

.....

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# Appendix-IV

## Questionnaire

(To Librarians of the Colleges that maintain a Digital Library)

1. **Do you have a DL or IR?**
   DL [ ] IR [ ]

2. **Name the DL software(s)**

3. **If proprietary, cost and AMC**

4. **Of the following please tick the contents of your DL**

| | |
|---|---|
| E-books | |
| Digitized back issues of journals | |
| E-question papers | |
| Publications of faculty members | |
| E-thesis/dissertations | |
| E-project reports | |
| Seminar presentations/papers | |
| E-learning content (videos/demos) | |

5. **How do you add content in the DL**

| | |
|---|---|
| Uploading centrally from library | |
| Any registered user can upload | |
| Only faculties can upload | |
| Any other method (please mention) | |

6. **How often do you add content?**
   Regularly [ ] As and when generated [ ]

7. **Is your digital library open (to others)?**
   Y [ ] N [ ]

8. **If open do you allow metadata harvesting by others?**
   Y [ ] N [ ]

**9. Do you have any type of co-operation with any institution in sharing the metadata or content of your DL?**
   Y [ ] N [ ]

**10. If yes, give details**

**11. Have you incorporated web 2.0 in your DL? Plz. mention**

**12. The following are some of the problems associated with DLs. Please mark the problems relevant to you.**

| **Problems** | **Indicate your opinion** |
|---|---|
| Incapable to rectify the problems with the system | |
| Lack of an agency to provide technical support | |
| Lack of confidence to move further | |
| Lack of familiarity and technical skills | |
| Lack of proper training | |
| Lack of sufficient hardware for digitizing | |
| Lack of support from management for taking external assistance | |
| Lack of technical support from the institution | |
| Problems with updating to newer versions | |

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