

COMPUTERISATION OF UNIVERSITY LIBRARIES IN KERALA

Thesis Submitted to the University of Calicut in partial fulfillment
of the requirements of Ph.D. in Library and Information Science

by

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Under the supervision of
Prof. M BAVAKUTTY

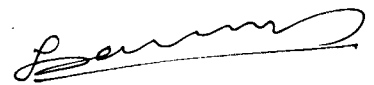
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DECEMBER 2004**

DECLARATION

I, Muhammed Salih T.K. hereby declare that this thesis has not previously formed the basis for the award of any Degree, Diploma, Associateship, Fellowship or other similar title or recognition.

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*I certify that this thesis entitled "**COMPUTERISATION OF UNIVERSITY LIBRARIES IN KERALA**" is a record of research work done by Sri. MUHAMMED SALIH T.K. during 1997-2004, for the award of the degree of Doctor of Philosophy in Library and Information Science, under my supervision.*



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List of Abbreviations and Acronyms Used

AACR	Anglo American Cataloguing Rules
ADA	Americans with Disabilities Act
AIRC	American Information Resource Center
AMC	Annual Maintenance Contract
ATM	Automatic Teller Machine
B.A.	Bachelor of Arts
BONET	Bombay Library Network
BSNL	Bharat Sanchar Nigam Limited
BTech.	Bachelor of Technology
BTIS	Biotechnology Information System
CALIBER	Convention on Automation of Libraries in Education and Research
CALIBNET	Calcutta Library Network
CAS	Current Awareness Service
CC	Colon Classification
CCC	Classified Catalogue Code
CCF	Common Communication Format
CD	Compact Disc
C-DAC	Centre for Development of Advanced Computing, Pune
CDROM	Compact Disc Read Only Memory
CDS/ISIS	Computerised Documentation System/Integrated Sets for Information Systems
CHMKL	C.H. Mohammed Koya Library, University of Calicut
COPSAT	Contents of Periodicals in Science and Technology
CPU	Central Processing Unit
CUL	Calicut University Library (C.H. Mohammed Koya Library)
CUSAT	Cochin University of Science and Technology, Kochi
CUSATL	Cochin University of Science and Technology Library, Kochi
DCA	Diploma in Computer Applications
DDC	Dewey Decimal Classification
DDS	Document Delivery Service
DELNET	Delhi Library Network
DLF	Digital Library Federation
DOS	Disc Operating System
DOT	Department of Telecommunication
DRDO	Defense Research Organisation
DRTC	Documentation Research and Training Centre, Bangalore
DTP	Desktop Publishing
DVD	Digital Video Disc Digital Versatile Disc
EAS	Electronic Article Surveillance
E-Contents	Electronic Contents
EIS	Electronic Information Sources
E-Journal	Electronic Journal

E-Mail	Electronic Mail
EPABX	Electronic Private Automatic Branch eXchange
E-Resources	Electronic Resources
ERNET	Education and Research Network
et. al.	and other people
ETD	Electronic Theses and Dissertations
FDD	Floppy Disc Drive
FTP	File Transfer Protocol
GB	Gigabyte
GJU	Guru Jambeshwar University
GNDU	Gurunanak Dev University
GPSS	Gateway Packet Switching System
HAU	Haryana Agriculture University
HDD	Hard Disc Drive
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
IASLIC	Indian Association of Special Libraries and Information Centres
ICT	Information and Communication Technology
IDC	Information Dissemination Centre, Osmania University, Hyderabad
i.e.	that is
IGM Library	Indira Gandhi Memorial Library
IIT	Indian Institute of Technology
ILA	Indian Library Association
ILL	Inter Library Loan
ILMS	Integrated Library Management System
ILS	Integrated Library Systems
INFLIBNET	Information and Library Network, Ahmedabad
IP	Internet Protocol
IRS	Information Retrieval Systems
IRTPLA	INFLIBNET Regional Training Program on Library Automation
ISBN	International Standard Book Number
ISC	Internet Systems Consortium, Inc.
ISDN	Integrated Services Digital Network
ISO	International Standard Organisation
IT	Information Technology
IUCCA	Inter University Centre for Astronomy and Astrophysics
Kbps	Kilobytes per second
KU	Kurukshetra University
KUL	Kerala University Library, Thiruvananthapuram
LAN	Local Area Network
LAS	Library Automated Systems
LC	Library of Congress
LCD	Liquid Crystal Display
LIC	Library and Information Centre
LIS	Library and Information Services

M Tech.	Master of Technology
MA	Master of Arts
MALIBNET	Madras Library Network
MAN	Metropolitan Area Network
MARC	Machine Readable Catalogue
MB	Mega Byte
Mbps	Megabytes per second
MCA	Master of Computer Applications
MDU	Maharshi Dayanand University
MGUL	Mahathma Gandhi University Library, Kottayam
MHO	The Joint Financing Programme for Co-operation in Higher Education, Netherlands
MHz	Megahertz
MLib. Sc.	Master of Library Science
MLISc.	Master of Library and Information Science
MSDOS	Microsoft Disk Operating System
MTL	Margaret Thatcher Library, Moi University, Kenya
MUL	Manipur University Library
MYLIBNET	Mysore Library Network
NCSI	National Centre for Science Information
NCSU	North Carolina State University
NDRI	National Dairy Research Institute
NICNET	National Informatics Network
NISSAT	National Information System in Science and Technology
OCR	Optical Character Recognition
OPAC	Online Public Access Catalogue
OS	Operating System
PC	Personal Computer
pdf	Portable Document Format
PERL	Practical Extraction and Report Language
PGDCA	Post Graduate Diploma in Computer Applications
PGDLAN	Post Graduate Diploma in Library Automation and Networking
PHP	Hypertext Preprocessor
PSTN	Public Switched Telephone Network
PU	Punjab University
PUNENET	Pune Library Network
R&D	Research & Development
RABMN	Remote Area Business Message Network
RAID	Redundant Array of Independent Disks
RAM	Random Access Memory
RFID	Radio Frequency Identification
Rs.	Rupees
SCPC	Single Channel Per Carrier
SDI	Selective Dissemination of Information
SGML	Standard Generalized Markup Language
SIRNET	Scientific and Industrial Research Network

SLIS	Schools of Library and Information Science
SNDT	Shreemati Nathibai Damodar Thackersey Womens University, Bombay
SOUL	Software for University Libraries
TCP/IP	Transmission Control Protocol/Internet Protocol
TIETL	Thapar Institute of Engineering and Technology Library
TIFACLINE	Technology Information System
TQM	Total Quality Management
UBL	University of Botswana Library
UDC	Universal Decimal Classification
UGC	University Grants Commission
UK	United Kingdom
ULS	University Library System
Unesco	United Nation's Educational, Scientific and Cultural Organisation
UPS	Uninterrupted Power Supply
URL	Uniform Resource Locator
USA	United States of America
VNIT	Visvesvaraya National Institute of Technology
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminal
VSNL	Videsh Sanchar Nigam Limited
WAIS	Wide Area Information Server
WAN	Wide Area Network
WWW	World Wide Web

* trade names of products in abbreviated forms are not included

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CHAPTER 1

INTRODUCTION

- ❖ Need and Importance of University Library Computerisation
- ❖ Areas of Library Computerisation
- ❖ Computerised Services to Users
- ❖ Digitization
- ❖ Networking and Resource Sharing
- ❖ Internet and its' impact on Library Information Services
- ❖ Open Source software for Libraries
- ❖ System Librarianship
- ❖ New dimensions in Library Automation
- ❖ Role of INFLIBNET in Computerisation of University Libraries
- ❖ Problem, Terminology and Definition of Key Terms
- ❖ Structure of the Thesis

This chapter throws light on the subject under study, 'Computerisation of University Libraries' that encompasses various facets. All related aspects including the necessity for computerisation of University Libraries, areas of computer applications in libraries, various services provided under a computerised environment, the potential of open sources in libraries, System Librarianship, latest trends in computerisation etc. are covered. It is with the establishment of the Information and Library Network (INFLIBNET) Ahmedabad; the momentum of computerisation of University Libraries in the country started and its role in this endeavor is undisputable. So the contribution of INFLIBNET is also dealt with in detail.

Indian Universities constitute one of the largest higher education systems in the world, with 294 university level institutions which includes 52 Deemed Universities, 40 Agricultural Universities, 33 Technical, 18 Medical, 3 Information Technology, 1 Journalism, 6 Law and 10 Open Universities, 13150 affiliated colleges, 88.21 Lakh students and 4.27 Lakh teachers¹. The government of independent India realized the need for studying in detail the national education set up and appointed several committees and commissions. All these committees while evaluating the status of higher education in the country and making solid recommendations for their restructuring have also examined the role of libraries in the academic institutions and made several recommendations for the proper development of the University Library System.

1.1 Role of University Library in Higher Education

Universities have certain objectives and the role of its libraries in attaining the set objectives is undisputable. The important role that the University Library could play in a university setup began to be duly recognized in India during the second quarter of the 20th century only. However, the real boost and momentum in the growth and development of university libraries took place only after the

country attaining independence in 1947. University Library is the hub of all academic activities in a university and is supposed to meet all the information requirements of its academic community by providing every possible information sources to the clientele. Radhakrishnan Commission (1948- 49) has rightly pointed out the importance of the University Library in a University setup, as "Teaching is a co-operative enterprise. Teachers must have the necessary tools for teaching purposes in the shape of libraries and laboratories and also the right type of students. The library is the heart of all the university's work, directly so as regards its research work, and indirectly as regards its educational work. Scientific research needs a library as well as its laboratories while for humanistic research, the library is both the library and laboratory in one"². It has been rightly reported "Education, especially at higher levels, has been described more as a process of learning than of teaching, signifying the self-efforts to be put in by the students. According to this concept, students in higher education are to be provided with the facilities necessary for mastering the subject matter, techniques, skills, habits of thought and methods of work in their chosen field. Classroom instruction alone will not provide all the opportunities needed for attaining all these complex educational objectives. It is here the libraries come to help the students"³.

1.2. Need and Importance of University Library Computerisation

All human activities are controlled by knowledge derived from information. Information is the essential input for study and research activities and it becomes valuable only when it reaches its target users. Till recently, the University Libraries have been manually providing traditional library and information services mainly contained in print media such as books, journals etc. Information has become catalyst in the socio-economic, scientific, technological and cultural development of the society. Hence easy availability of required information to the academic community is imperative. Any study and research

activity need quick access to right information and its efficient and rapid processing. So the need for quick information retrieval forces libraries to depend on some means that makes information processing and retrieval efficient and rapid. One of the basic jobs done by computer is information processing and retrieval in a very rapid manner; hence it has become an aid in information management. Library computerisation is to provide a better service with added benefits and is involved in acquiring, processing and providing information services from machine-readable databases.

The objectives of library computerisation has been described as⁴:

- To improve access to collection;
- To improve the quality of existing services;
- To reduce the routine and time consuming clerical works;
- To improve the speed of cataloguing, technical processing and putting items on shelves faster;
- To offer improved range of services;
- To improve co-operation and resource sharing among libraries;
- To easily participate and utilize national and international computer networks; and
- To provide more current and comprehensive reporting of library information to managers.

The objectives of the use of computers in libraries have been viewed from a slightly different perspective as⁵:

- To maintain bibliographic records for all materials;
- To provide bibliographical details through a single enumerative access point of all type of materials;
- To reduce repetition (drudgery) in the technical process of library work;
- To provide accurate information at a fast rate;

- To share the resources in the networking project;
- To improve precision and scope of research activity;
- To innovate new IT processes to provide high quality information

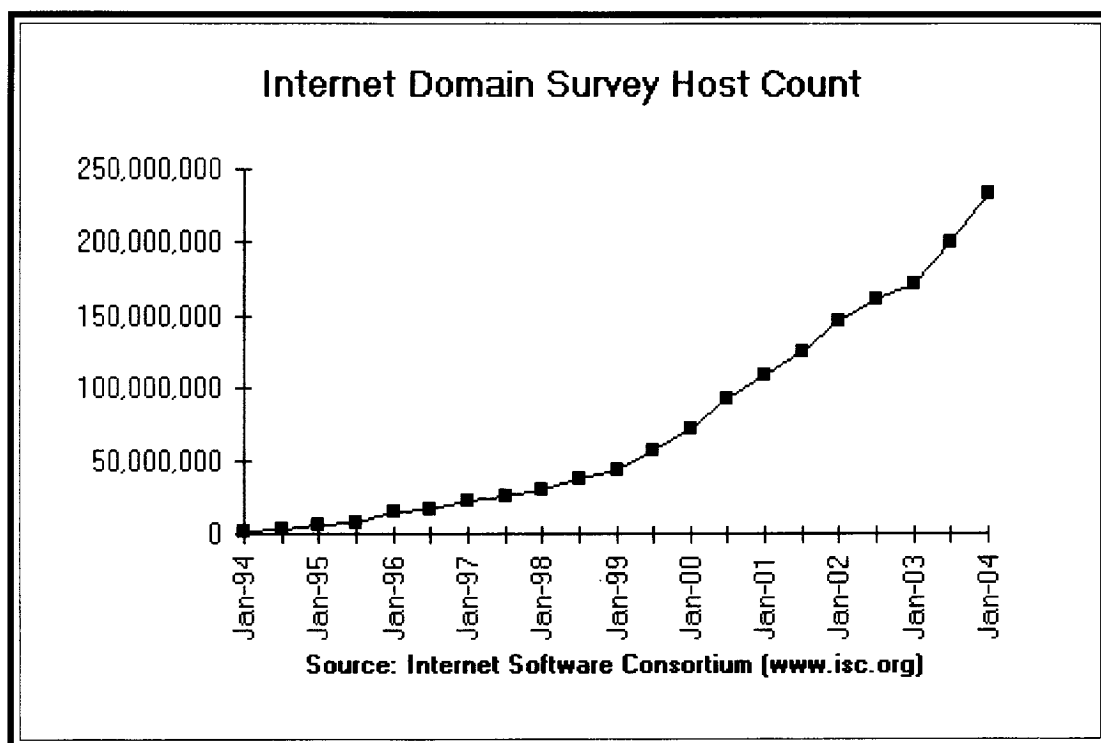
The major reasons that necessitate dependence on computers in University Libraries can be summed up to the following headings.

1.2.1 Information Explosion

There has been a tremendous increase in the generation of information in all fields of knowledge due to intensive researches taking place in almost all fields of knowledge. This further widens the horizon of knowledge and causes multiplication of knowledge often termed by information scientists as 'information explosion'. "Information overload is not a new phenomenon: the potential for overload has existed ever since information became an important input to any human activity. For example, once the scientific disciplines began to clearly emerge in the 17th to 19th centuries, it gradually became impossible for anyone to keep abreast of all the work in what had been called 'natural philosophy'. In some fields, the degree of specialisation is so high that, even within the same discipline, people are unable to keep abreast of all sub-areas and, in fact, may be completely unable to understand some of them. Throughout the 20th century, the explosion of information outputs in the form of journal papers, patents, books, 'grey' literature, and so forth continued and that explosion gained even more force in the period immediately following the Second World War."⁶ According to Kamath⁷ in the field of Science and Technology alone about three million documents are published each year which include articles, conference papers, books, technical reports and theses. He maintains that the rate doubles every eight to 10 years. The Faxton Company USA, statistics reveals that the number of fulfilable journal titles rose from 38079 in 1974 to 1,04,714 in 1989 – an increase of 66,635 or 175 percent.

In addition to the large quantity of print materials, the volume of information available electronically is also increasing exponentially. Today Internet has become the biggest source of information and the findings at the University of California that printed documents of all kinds comprise only 0.003% of the total information generation is an indicator of the dominance of digital information in our knowledge sources. The number of Internet hosts has increased many folds in recent years. With interdisciplinary and multidisciplinary initiatives and with the emergence of new disciplines, it is likely that the volume of information will continue to increase. The latest ISC (Internet Systems Consortium, Inc.) Internet Domain Survey released its report in January 2004. The survey attempted to discover every host on the Internet by doing a complete search of the Domain Name System and discovered a fast growth in the number of domains during the last 10 years and the growth is well evident in the figure⁸ below.

Figure 1.1 Growth of Internet Domain Hosts during the last decade



It has become difficult to track and disseminate up-to-date information needed for Research and Development. Hence modern libraries in recent decades have experienced new challenges of adapting to the new environment of information technology.

1.2.2 Shrinking Budget and Price hike of Documents

The cost of books and other information sources are escalating year by year. But the fund allocation to University Libraries in our country is not increasing in proportion with this increase. There has been a continuous devaluation of currency also. Hence no library is able to procure all the resources needed by its users. The Faxton Company's (USA) statistics revealed that the average price per serial title paid by college and university libraries in 1979 was \$ 50.11; by 1989 it had risen to \$125.87, Scientific and Technological libraries pay an average of \$234 per serial title a year. "The average price of foreign titles has risen from \$41.34 per title in 1976 to \$143.09 in 1989"⁹. So this situation also adds to the reasons for libraries turning to computerisation as a computerised library can co-operate with other libraries for effective resource sharing through networks, overcoming the barriers of limited resources in terms of finance and library collections.

1.2.3 Shift in the Medium of Publications

The shift in the medium of publication from print to digital is another important factor that necessitated computer applications in libraries. A study conducted by faculty and students at the School of Information Management and Systems at the University of California at Berkeley to measure the quantity of information produced in the world each year revealed that the world produces between 1 and 2 exabytes of unique information per year, which is roughly 250 megabytes for every man, woman, and child on earth. An exabyte is a billion gigabytes, or 10^{18} bytes. Printed documents of all kinds comprise only 0.003% of

the total. Magnetic storage is by far the largest medium for storing information and is the most rapidly growing, with shipped hard drive capacity doubling every year. Magnetic storage is rapidly becoming the universal medium for information storage¹⁰. So the shift in the volume of sources of information and its format in recent years have made the traditional libraries not capable of meeting the present day library and information requirements of the academic community.

1.2.4 Lack of Adequate Space

Every year the size of the library collection increases reducing the area of available free space in libraries. "The size of the recorded information is ever growing whereas space available at the disposal of each library is limited. No library can think of getting additional space every year, although collection will grow continuously. Weeding of books is a small solution but books cannot be weeded out as speedily as these are acquired. Computer application can solve this problem, as computer is capable of storing huge bulk of information on tiny storage mediums"¹¹. Lack of required space in libraries is one of the reasons that coerce libraries to turn to tiny storage mediums for storing information.

1.2.5. Impact of Information Technology

Information Technology is an amalgam of wonderful inventions of the 20th century in Electronics and Communication. During a very short span of time it has acquired an important place in almost all walks of human life and particularly in the field of education with a greater impact on the universities and its libraries. Over the last couple of decades, there has been a significant change in higher education occasioned by Information Technology.

The recent developments in ICT, which comprises computer and communication technology, have effected revolutionary changes in the way in which information is collected, stored and disseminated and literally the rapid developments in the field of computers and communication have virtually shrunk the size of the earth. The availability of a number of specialized databases, online and offline information services (over Internet and in CDs and DVDs), resource-sharing networks, availability of e-contents etc. further necessitates computerisation of libraries.

In order to achieve progress in any field whether it is academic or non-academic, authentic data is an indispensable requirement. The age-old methods of organizing data are no more applicable in a dynamic and ever growing society. Due to a high need for quick retrieval and dissemination of information and better services for its users, use of computers in library housekeeping operations has become indispensable. In a nutshell following are the main factors which necessitates computerisation of libraries¹².

- Explosion of knowledge resulting in numerous specialization and flow of almost non-stop information;
- In-ability of users to explore unlimited literature and information of interest;
- Wastage of lot of precious time in handling routine and repetitive library operations; and
- Impossibility of a single library to acquire and make available the entire published materials.

It has been reported that "the world's total production of information amounts to about 250 megabytes for each man, woman, and child on earth. It is clear that we are all drowning in a sea of information. The challenge is to learn to swim in that sea, rather than drown in it. Better understanding and better tools

are desperately needed if we are to take full advantage of the ever-increasing supply of information"¹³.

Thus University Libraries are found now-a-days struggling in many ways in their routine affairs like inability to manage the ever growing huge collection of books and other reading materials, price hike of information sources coupled with shrinking fund allocations, shift in the medium of publications in the form of availability of some of the sources of knowledge only in digital form like CDROM, DVD and websites, reduction in the size of available space in libraries, the overall impact of IT on society and consequent ever increasing demand from users, lack of adequate staff to perform different tasks that are mainly repetitive in nature etc. Similarly no library can be self sufficient in this era and there is a need for obtaining resources from other libraries, publishers and information providers located in far away places through computer networks. Computer is an electronic device capable of storing large amount of data, processing it accurately and speedily and retrieving the same within the shortest possible time. Speed, storage, accuracy, versatility, compactness, reliability, repetitiveness, diligence etc. are the common features of computers. With rapid strides in technological revolution, computer hardware cost has declined considerably from year to year and at the same time the number of circuits per millimeter on a computer chip doubles every year increasing the speed and capacity of computers. More over computer and communication technology has made acquiring of information from far away places very easy. Hence if we match the requirements of a modern University Library and the capabilities of computers, we will find that computer application is unavoidable for University Libraries to achieve its objectives. In brief, computers are needed in libraries to manage the huge collections which has become almost humanly unmanageable, to avoid jobs of a repetitive nature, to provide better access to collection

including access from and to remote sources and to exploit the increasing potential of the technology for better services and operations.

1.3. Areas of Library Computerisation

The impact of computers has permeated all sectors of librarianship. Housekeeping applications of computers in libraries include Acquisition control, Serials control, Circulation control, Technical processing comprising Cataloguing and Classification, and Stock verification. Computerisation helps achieving greater standardization, efficiency, cooperation and improved services in libraries.

Computerised information retrieval systems offer more convenient, more flexible and more comprehensive retrieval than manual systems and there are large numbers of internationally accessible Information Retrieval Systems (IRS). It is possible to provide various services using the data collected and processed in housekeeping operations. Such information retrieval activities include OPACs, generation of various types of bibliographies, Current Awareness Services, SDI services, Abstracting work, compilation of union catalogues/lists, indexing services etc. OPAC is the most prominent IRS used in libraries by all types and categories of members. Computerised system is also needed for providing management statistics etc. for an effective Management Information System.

Library housekeeping operations are particularly suited for computerisation because of its' repetitive nature. Many of the sections in the library use the same data for their operations and services. It is because of this nature of the library, computers were made use of in libraries first rather than in many other organizations. Computers are capable of handling many of the mundane repetitive tasks that are necessary but are time consuming. Effective

computerisation will drastically reduce the amount of work needed to organise, maintain and retrieve information. There needs a provision for Nodes from different sections to access the data made available from a central Server.

Computers are widely made use of in library housekeeping operations by keeping the record of the stock of the library as to its whereabouts and status. Computer permits the reduction of the number of repetitive jobs performed in the library by keying in the data once and manipulating it several times as and when required. All library housekeeping routines are directed towards controlling the stock of the library and such routines may include selection, ordering, procurement, invoice processing, accessioning etc. of the documents that come under the Acquisition procedures; labeling cataloguing, assigning keywords, subject descriptors and class numbers etc. that come under the Technical Processing or Cataloguing procedures; Circulation procedures such as issue/return, recall, fine collection, addition/modification/deletion of membership details etc; Serials control module including procurement procedures related with serial publications and many other routine as well as occasional tasks performed in the library.

1.3.1 Acquisition Procedures

The routine acquisition procedure in libraries is very much suited for computerisation as it involves repetitive clerical tasks. The procurement of items made in this section are mostly monographs of once-and-for-all purchases. The following basic functions of the Acquisition module have been identified¹⁴.

- a) To receive records of items to be acquired;
- b) To establish whether items requested are already in stock or on order;
- c) To print orders or otherwise order items;
- d) To check when orders are overdue and follow up overdue orders;

- e) To maintain a file of records of items on order;
- f) To note the arrival of ordered items and prepare for payment;
- g) To maintain book-fund statistics and accounts.

Apart from these functions, report generation at various stages of procurement for managerial purposes as well as for staff and users of the library is also needed in this module. The module should be capable of accepting standard data from different sources like other online and offline databases also. It should manage databases like vendors, financial sources, currencies and its corresponding local rates etc.

1.3.2 Technical Processing of Documents

The jobs involved in technical processing of documents have been minimized due to the use of computers. Catalogue has always been regarded as an important tool and the primary record of the stock of the library for the users. Several physical forms exist with regard to the catalogue and different cataloguing rules are in prevalence. Computers permit to produce catalogues according to desired rules using the predefined instructions and the data acquired from acquisition. Further data can be accepted from external and remote sites according to various standards. More over the use of computer helps to retrieve data through all the entry elements that have been fed in to the computer.

Use of subject descriptors to provide subject approach to the resources has become very easy in a computerised environment. By using an authority list the system itself is able to display the possible subject descriptors and the technical staff need to make an appropriate selection only. Similarly assigning class numbers for shelf arrangement as well as information retrieval has also become a

relatively light job now days. Internet can also be used as an aid in the technical processing by obtaining class numbers and catalogue formats from other sources.

The functions of the computerised cataloguing system are as follows¹⁵:

- Inputting complete details of new documents that is bibliographic and indexing elements;
- Maintaining the database of master file of bibliographic records and index files. Carry out functions like add, delete and modify;
- Generating various lists like author, subjects and other bibliographies, list of additions and indexes etc.
- Providing for search of the database by various access points;
- Generating selected records in book form or card form;
- Generating out put in various catalogue formats like ISSD (M), AACR etc.
- Integrate with other subsystems like circulation, acquisition and reference systems.

1.3.3 Circulation Procedures

Circulation control in libraries impinge upon one of the primary functions of the library i.e. document delivery to its clientele for use outside the library. It is more concerned with controlling stock within one library or library system. While stating the principles of circulation control Rowley¹⁶ noted that in order to achieve maximum availability of material, all libraries must control circulation, by keeping, at the very least, record to specify:

- What material is in the library stock or readily accessible through other channels;
- Which material is on loan, and from whom or where it can be retrieved;
- When material on loan next be available in the library for other customers.

In addition to controlling the movement of documents such as check-in/check-out, follow-up, overdue collection etc. the circulation module need to generate various information and report to support the general queries from the users as well as to provide management information for the library management.

Though relatively an old technology bar coding is a very important one used in libraries. Barcodes are self-contained messages with information encoded in a series of black bars of varying breadths and white spaces between every two of them. Libraries use this technology for charging and discharging of documents and also for stock verification for the reasons - operational efficiency, speed and accuracy. The main objectives¹⁷ of using bar code in libraries are to improve operational efficiency; to achieve accuracy; to make stock verification an easy process and to reduce overall cost. In a bar-coded system, the accession number and member identity code which are scanned at the time of charging/discharging will ensure the accuracy. On the other hand in a manual or semi automated system, the typographical error may result in charging/discharging a wrong document to a wrong member. In future the RFID technology may take up the functions of barcodes, yet this is the most economical and feasible technology available and used at present.

1.3.4 Stock Verification

The library resources that are being issued to its members are prone to loss. An inventory control system is needed to collect information on such losses. A computerised system reduces the labour involved in such a task. Usage of barcodes for feeding data of available book is highly recognized. After taking stock of all the collections, it is to be compared with the library database and a list of missing items generated.

1.3.5 Online Catalogues and Web OPACs

OPAC entertains queries with regard to the availability and status of the library resources through different access points. It has become the primary key for the clientele to the collection of the libraries replacing the traditional card catalogues in our universities. It can be made available over the LAN, Intranet as well as Internet providing access without any geographical barriers. Thus web OPACs are very common these days. It serves the clientele in a much more convenient manner than the traditional catalogues by providing the current status of the item and several other features like options to request for new titles of all kinds of resources, facility for document reservation etc.

1.3.6 Serials Control and Articles Database Management

Serials module in an automated library system is supposed to look after the procurement and other activities related to serial publications. From the programmers point of view this module poses much problems due to the changing nature of serial publications like frequently occurring changes in title, frequency, publisher etc. Serials control is one of the most complex procedures in libraries. The complexities of the procedure of procurement, claiming and entering of issues, follow-ups to be taken in case of missing issues - it occurs very frequently in case of journals, Article indexing, Routing, Selective Dissemination of Information etc. makes it a much complex activity compared to other routine works in the library.

The functions of the Serials control system are as follows¹⁸:

- Inputting serials data;
- Ordering new serials;
- Renewing presently subscribed serials;

- Accessioning of individual issues as and when the issues are received;
- Sending reminders;
- Selective follow up of missing issues;
- Preparation of various lists like lists of: periodicals received, journals subscribed, journals exchanged, journal received as gift and list of holdings with their status on shelf, binding, circulation etc. by subject, title etc.
- Keeping track of the amount spent on subscriptions, bindings etc.
- Estimation of the budget for the next academic/financial year, and
- Binding control.

Article indexing facilities provides more convenient and exhaustive search facilities to the users and helps the library to provide effective and innovative services in the libraries like Selective Dissemination of Information and Current Awareness Services.

1.3.7 Management Information Systems

Apart from making provisions for various automated operations and services in libraries, the library management system has to generate necessary information required for the top-level management to make plans and take decisions. This could be about the need for procurement of a particular title or type of document or about extending or reducing the working hours of the library or increasing or reducing the number of staff. Bailey¹⁹ noted that “the need for statistical and analytical information to be able to justify their decisions and provide accountability. Intelligence can take the form of:

- Report showing how much is spent with particular supplier
- Reports showing percentage increases in prices
- Ability to accurately predict annual budgets

- Savings made from cancellations
- Breakdown of expenditure by budget codes
- Breakdown of expenditure by budget different formats
- Copyright licensing audit figures
- Statistics on the use of resources
- Statistics on time and costs for research activities

Compiling such information can be a time-consuming and costly exercise in itself, and thus managers are demanding the ability to produce reports and statistics from their systems with ease and speed". Provision of required information will enable the management to take suitable decision at the right time.

1.4. Computerised Services to Users

User service refers to what a library does to facilitate retrieval of information and access to information for patrons. There are a wide variety of services that can be rendered to its users by a computerised library system. These may include Current Awareness Service, Selective Dissemination of Information, Reference Service, Circulation of Accession List, Content page Service, Online database services, Online bibliographic services, Online Full Text E - Journals, CD ROM and DVD based services including multimedia, Internet services, computer aided User Education programmes etc.

1.4.1 Current Awareness Service (CAS)

CAS helps the user keep him/herself up to date about the developments within a wider subject field. An automated CAS system reviews the information source immediately upon its receipt. The information or the description about the source is then routed to the person with whose interest the information is related. Title announcements, contents list etc. forms parts of CAS. A

computerised system can easily provide such a service with the matching of the content of the document and the user's subject area. This can be routed through the email id of the patrons for quick service.

1.4.2. Selective Dissemination Of Information (SDI)

SDI service helps to route all the information in a particular area of interest to a user by matching the subject profile of the person with the subject of the information. This enables the user to get all the information arriving at the library that falls within his area of study. An effective SDI service can be developed by storing a user profile and marking the subject area of the document. The efficiency of the system depends on the profile construction of the user as well as the information source. Under this service the users' subject profile is collected and stored in the system and periodically matched with the profiles of new entries in the database and matching references are routed to the user either through email or through a printed copy.

1.4.3. Reference Service

Computerised reference service is requested and provided over a network or the Internet, usually via e-mail, instant messaging ("chat"), or Web-based submission forms, and are usually answered by librarians in the reference department of the library. Sometimes the participants in a collaborative reference system serving more than one institution may answer it like "Ask a librarian..." <http://www.loc.gov/rr/askalib/> from the Library of Congress. Synonymous terms used for this service includes chat reference, e-reference, online reference, and virtual reference.

1.4.4. Circulation of Accession List

An automated library system can very easily generate the new additions list on a periodic basis and make it available to the users through different

channels so as to make them aware about the latest additions to the library. This service is intended to increase the use of the newly added documents. Here the user is kept up to date regarding the holdings of the library and can select the document according to his/her interest.

1.4.5. Content Page Service

Content page service is provided to the users to make them aware about the contents of the latest journals so that they needn't go through the whole journal to make a selection of the required article. Mostly the content pages are scanned and stored to some format like 'pdf' and then routed to the users either through email or through print copies. If the reader is interested in any of the article he/she can request the source journal and get the article. If the copy is a digital one, it can be served through the network even.

1.4.6. Online Database Services

At present several online databases are available such as STN, BIOSIS, SciFinder INSPEC, COMPENDEX PLUS etc. Access to those databases is mostly limited to subscribed users only. Individuals cannot afford to subscribe such highly charged databases and libraries can only come to their rescue. Many databases are now available in CDs and DVDs and fast access to such databases can be provided within the library through the library LAN.

1.4.7. Online Bibliographic Services

A bibliographic service does not provide always the required information rather it makes available the information about the source of information. An online bibliographic service system is a computer file consisting of electronic entries, each containing a uniform description of a specific document or bibliographic item, usually retrievable by author, title, subject heading or keywords. An increasing number of such databases now provide the full-text of

at least a portion of the sources indexed. Most electronic bibliographic databases are proprietary, available by licensing agreement from vendors, or directly from the abstracting and indexing services that create them. Libraries as part of their user services do providing access to such databases.

1.4.8. Online Full Text Services

Online Full Text is an electronic resource that provides the entire text of a single work or of articles published in one or more journals, magazines, and/or newspapers. Such a bibliographic database provides the complete text of a significant proportion of the works indexed, in addition to the bibliographic citation and (in many cases) an abstract of the content. Many journal publishers have made their publications available in the digital format. Science Direct, Emerald, JSTOR, Cambridge University Press etc are examples for this service. These are made accessible over Internet and in some cases are also available on CDROM and DVD. In some cases full text of articles is available free of cost and in most of the cases it is priced. Subscribers of the journal get the privilege of accessing the electronic version of the same article through Internet. Full text of article is now made available mainly through library consortia and is either IP number based access or by verification of user id and password. This service enables the user to access the article immediately on its publication and effective search of articles is very much possible. More over in case of electronic copy of articles, there is no question of tear because of constant use of the article. Libraries make available the article either on the basis of individual subscription or through participating in consortia.

1.4.9. CD ROM And DVD Based Services

Many valuable databases are available in the form of CDs and DVDs. Biological Abstracts, Chemical Abstracts etc. are best examples for this. A good number of books, journals, reference sources, theses, dissertations etc. are

available in these formats and making it available over a network through a CD/DVD server provides users with much easiness of accessing these valuable sources. These sources may include multimedia resources also and serving it over a network makes multiple accesses to the resources. It provides users with speed of access, capability to search using various search strategies etc. and there is no fear of the source getting mutilated because of constant use.

1.4.10. Internet Services

The number of information resources that are available on the Internet is enormous and growing rapidly, and because of their number and their variability in subject, treatment, complexity, language, etc., they provide something of potential value to all members of the higher education community.

“By the mid 1990s, most academic librarians recognized that the Internet could be used to satisfy a wide variety of information needs and that members of the higher education community needed assistance in using it as an information source. Over the last decade, academic libraries have facilitated the use of the Internet by their clients in several ways”²⁰. There is a critical need to provide University Library clients more efficient and effective access to Internet information resources that have value for higher education.

1.4.11. User Education Programmes

A good user education programme helps the user to understand the facilities and services of a library for its better exploitation. Applications of computers, incorporating text, graphics; animation, sound and video, in imparting user education programmes have made it more effective and meaningful. Availability of different presentation packages like Microsoft Power Point, Harvard Graphics etc. have reduced the task of libraries in preparing the user education programmes. Users can make use of the programme even

without the direct intervention of the library staff and such provision will really help the users in making best use of the library. The computer as a multimedia workstation has created a major shift from traditional modes of teaching and learning to a multitude of new and exciting options for instructors and users. The increased potential of multimedia capabilities for computing with new devices such as DVD-ROMs and increased network bandwidth provide exciting opportunities for the delivery of audio, video, and graphics. Utilizing multimedia for teaching is really just another tool that provides a new type of learning environment. Libraries are now able to host their multimedia supported user education programmes in their websites.

1.5 Digitization

Digitization is a process by which a character or text, chart, picture, sound, video etc. is converted to digital format. The ultimate goal of a digital library is to provide ways of organizing and efficiently managing large data collections. Digitization changes the material in to digital form that is easier to store and retrieve. Digital information can be created using OCR technology, digital cameras or directly keying the information. Digitized information has many advantages like universal availability, minimum cost, easy use, does not get mutilated by use or time and doesn't perish after a long time. It can easily be put on a network to make multiple accesses. Digitization provides access to multi media documents including full text, sound and motion films. Digitization of some documents has become very important to protect such valuable information sources that are prone to total loss or disappearance due to its oldness.

Setting up a digital collection or library has become a relatively easy task using the current database technology as most of the components and tools for doing it are open sources and easily available. Libraries have always striven to

collect process and disseminate information and information exists in many forms. Digital libraries break the barrier of physical boundaries and strive to give access to varied domains and communities.

1.5.1 Electronic Theses and Dissertations (ETD)

An ETD is an electronic document that contains the research work of a scholar. The ETD is similar to its paper predecessor. It has all the features of an ordinary thesis or dissertation with the additional benefits of being electronic in physical form. There has been a move from paper theses and dissertations to electronic format with much acceptance among universities in the international community. It provides a technologically advanced medium for expressing ideas. The benefits of providing electronic resources has been listed by the Virginia Polytechnic Institute and State University website²¹ as:

- More access to research
 - research is available on campus
 - research is accessible worldwide
- Less expense to authors and libraries
 - no paper costs
 - no physical shelf space
 - lower cataloging costs
- Better presentation of research (not available in paper format)
 - addition of multimedia files
 - more dynamic presentation of data
 - hyperlinks
 - programs and code

Our universities play a major role in generation and dissemination of knowledge by conducting research works and producing theses and

dissertations as a unique genre of information sources. These theses are unique sources that contain very valuable findings. Many of such works are not published and not available elsewhere. There is no clear-cut policy in our universities for making available the theses and dissertations to other researchers and academics. Usually a copy is sent to the University Library. Even if it is not made available to the library, the same is not being traced and acquired by the libraries. Digital libraries of Electronic Theses and Dissertations offer an alternative to this waste of valuable scholarship.

The practice of submission of theses in electronic format only has not begun in our country, yet initiatives have begun to convert the existing theses to digital format by projects like Vidyanidhi at Mysore University. Further the huge collection of theses and dissertations in our universities are getting deteriorated and losing readability day by day due to several reasons like typewritten text and poor quality papers etc. Hence these need to be digitized for better preservation and accessibility and concrete initiatives need to be taken in this direction. The copyright of such resources lies with the concerned universities and what is needed is an attitude to share the unique source of information. Each individual library has to take measures to digitize the existing collection and insist the researchers to submit a copy of their work in a standard digital format. Since all theses are produced in electronic format the researchers can easily do this. INFLIBNET can take a central initiative and insist all the universities to make available the theses to a central database.

1.6 Networking and Resource Sharing

Resource sharing has been in existence in our libraries in different forms like inter library loan, sharing of cataloguing data, sharing manual expertise and skills etc. for many decades. But with the advent of computer networks its potential increased many folds. The most obvious benefit of computer network

is that it can retrieve virtually any kind of data including textual, audio and even video. It enables to combine the skills of different people and the power of different equipment, regardless of the physical locations of the people or equipment.

There are several factors that compel one Library to depend on other Libraries and Information Centres like reduction in budgetary provision, increasing prices of documents, lack of infra structure and expertise etc. Rao²² has traced the expenditure analysis on procuring library resources. India is spending more than Rs 5,000 million a year on procuring new library resources, and of that around Rs 2,000 million is spent on the acquisition of overseas journals. The annual increase in price of these resources means that even financially sound organizations experience difficulties in meeting their cost. Also, the increase in information generation at an estimated rate of 13 per cent per annum has made the task of collection, organization and retrieval of information very difficult. These two main factors have influenced libraries and information centres to automate their services and share resources through networking. The Faxon company, USA, which maintains statistics from 1974 on, reveals that the number of journal titles rose from 38,079 in 1974 to 104,714 in 1989, and that the average price per serial title paid by university libraries in 1979 was US\$50.11; by 1989 it had risen to US\$125.87. Also, the science and technology libraries pay an average of US\$234 per serial title a year.

The growth of Indian library networks may be traced to the efforts made during the last four decades. The 1958 Scientific Policy resolution enabled the appointment of different committees and commissions that looked into specific issues and produced recommendations in the form of Sinha Committee's Report (1959), the Ranganathan Report to the University Grants Commission (1965), the Peter Lazar Report and the Kamath Report (1972). In 1984 the Working Group of

the Planning Commission recommended to the Government the need for modernization of library services and informatics during the Seventh Five Year Plan (1985-1990). The Ninth Five Year Plan (1997-2002) Working Group on libraries and informatics highlighted the challenges to be faced by the Indian libraries of the twenty-first century due to unprecedented developments in IT, networking and the Internet.

Telecommunication networks form an integral part of accessing, communicating and transmitting information. In India, the Department of Telecommunications (DOT), Bharat Sanchar Nigam Limited (BSNL), and the Government of India are responsible for providing and maintaining national and international telecommunication facilities. Now private investments in this field have been made by companies like Reliance, Indicom, Asianet etc. and are making provisions for effective data transmission across the country. Several library and information networks have been developed in different parts of the country since 1988 prominent include INFLIBNET and DELNET.

“In the 1950s and 60s United States and Europe felt a pressure for increased cooperation and effective dissemination of information. The factors responsible were:

1. Enormous growth of published records;
2. Need for effective control of library resources for retrieval purposes;
3. Inability of library staff to handle enormous data;
4. Complexity of user demands;
5. Limitation of library space and finance;
6. Spurt in research activity due to sufficient grants available for research institutions and research scholars;
7. Interaction between major disciplines which resulted in the creation of new disciplines like geophysics, biophysics, physical chemistry etc.;

8. Advances in computer science in terms of hardware and software capabilities to effectively handle bibliographic storage and retrieval;
9. Advances in library networking; and
10. Availability of funds for automation, networking and retrospective conversion"²³.

Networking of LICs for achieving their stated objectives should involve the increased application of IT, the most dynamic technology in so far as breakthroughs are concerned. According to Moore's Law, the number crunching capacity of the computer doubles and the price halves every 18 months. Hence, the future of library networking is in this dynamic technology. Just as electronic books are replacing physical books, the conventional LICs are undergoing transformation in size, location, operations and in shape as they become digital LICs.

Rao²⁴ has further observed "developing countries like India being late entrants into the field of IT have an advantage over developed countries in that they skip intermediate technological stages. This means India can build its national LIN better and cheaper than those in developed countries. Several initiatives have taken place at different levels since 1988, such as INFLIBNET, DELNET, BTIS, CALIBNET, MALIBNET, BONET, and in the next few years all these networks in India will have to be linked to the NII, and access extended to all educational institutions". This is applicable to the networking scenario in Kerala where it is nonexistent. A network that brings the resources in the university libraries of Kerala under one umbrella is the need of the hour. Interlinking of the four major university libraries in Kerala through Asianet leased line for UGC Infonet connectivity has widened the scope for resource sharing among these universities. It can now operate a Virtual Private Network

(VPN) for an effective communication and networking. The modalities and financial resources need to be explored for such a venture.

There are certain security issues related with the networks. Protection of networks is a vital issue to be considered against external attacks to the databases. A common method of protection is the use of firewalls. These are systems comprising hardware and/or software. They are usually placed in between an institution's network and the Internet, though they can also be used internally. A firewall could be placed between a university's administrative system and the student side of its network. Firewalls employ one or more of four techniques: packet filter, application gateway, circuit-level gateway, and proxy server. "In a perfect world, network security wouldn't exist. It's a barrier and, generally speaking, has an inverse relationship with functionality. Librarians and other users of information systems usually find network security to be a nuisance. But just as we understand we should lock our cars when we leave them in parking lots, so we know that we must secure our networks"²⁵. Libraries are now making available their databases over networks including Internet and adequate steps need to be taken to protect their valuable resources from any possible damage.

1.6.1 Consortia Initiatives

Although resource sharing and cooperation among libraries have been an international tradition for many decades, the phenomenal growth of consortia over the past decade clearly has been fueled by the rapid transformation made possible through technology. Today, many libraries, especially academic and research libraries are already a part of one or more consortia, and those that are not are rapidly taking steps to develop these strategic partnerships with other libraries. In developed countries, although the consortium movement initially was most pronounced in academic libraries, today public, school and even

corporate libraries are exploring new ways to provide shared services and to reduce their costs through consortia purchase of resources.

Consortia approach has got certain advantages from the point of view of publishers as well as library and information centers. Hurtt²⁶ discussed the advantages of consortia from the publishers' point of view. The first advantage for publishers working with consortia is that they can help to simplify the sales process in some of the same ways that working with wholesalers can. In developing a multi-consortium or national consortia approach, a publisher usually needs to have one contact for marketing, selling, negotiating a price and licensing. This works most efficiently when a publisher can work with consortia that have strong centralized administration. Those consortia that can sign license agreements on behalf of their members, and those that accept and pay from one invoice certainly cut down on the time and paperwork needed when dealing with each library.

The second advantage, according to him is that consortia can help publishers increase their market penetration and communication with more libraries, and to do so more quickly than the publisher can do on its own. Consortia, with their Web sites, newsletters (distributed via both mail and e-mail), regular meetings, and listservs are often able to communicate publisher information quickly to their membership about new products, trials and price offers quickly and efficiently.

These first two advantages contribute to the third advantage to the publisher: faster sales. Working through consortia can help publishers achieve a faster rate of adoption or sales, especially when the offer requires that the libraries subscribe to the product by a set deadline date. It is possible to sell an online product to an entire state or to a substantial percentage of the membership of consortia within three months when conditions are right and everything in the

process runs smoothly. By contrast, traditional mechanisms - such as direct mail, telemarketing or visits from field sales representatives - could require one-to-three years to achieve similar results.

The biggest advantage libraries can take from consortia is that they will get more resources for less amount than what they get if they purchase as a single client. Vijaya Kumar and Sreekumar²⁷ listed the benefits that libraries can reap from consortia as:

- Sharing of information with improved resource sharing;
- Joint pricing negotiations, which gives ability to control expenses and reduce overall costs including information costs;
- Contracts covering multiple countries and strategic alliance with institutions that have common interests for building a larger political coalition and critical mass.

They further listed the benefits of purchasing e-journals through consortia as:

- A single interface and access point;
- A wider range of electronic journals available;
- E-journals organized by subject;
- Links to and from indexing and abstracting services;
- Enhanced search facilities; and
- Customizable institution interface.

The UGC Infonet has provided University Libraries in the country an opportunity to reap the benefits of consortia and there needs to be more initiatives in this direction according to the typical information needs of universities. There are problems with regard to funding management etc, nevertheless such an approach will enable each individual library participating

in the consortia to have resources that were not attainable earlier. "To succeed as a collective activity, almost every group has had to overcome political hurdles, funding challenges and the egos of individuals and institutions. Library consortia are having an important impact around the world"²⁸.

1.7 Internet and its' Impact on Library Information Services

Advent of Internet to the provision of information has a tremendous impact on libraries. "Libraries have always been concerned with public service and access to collections. Traditionally, service and access have been provided on an as-needed basis to those people who actually enter the library building - it has been that presence in the library that has been the characteristic for distinguishing library patrons. This approach allowed librarians to help those who had a specific and defined need for information and defined the library as the place to go for help"²⁹. With the advent of automated library systems, library collections became more accessible within the library. Libraries made the transition from the card catalog to the online catalog, allowing electronic access to the information and making keyword searching a real possibility, a real boon to novice library users. Telnet and gopher access to libraries were the first popular manifestations of information-sharing and communication technologies, allowing remote access to collections and predicting the global information networks available today. Now the access provided to information by the libraries are not confined within the walls of the library rather it is extended universally through Internet to reach the users far away. More over libraries provides Internet services to its clientele enabling them to trace the information available elsewhere as well as to provide them communication facilities. Here the libraries have to play the dual role of providing information to remote clientele and enabling its local members to get information from remote sites.

One of the main objectives of the university libraries is to support research and university libraries worldwide started to recognize that research habits significantly changed with the availability of research information on the Internet. Individuals, publishers and other research organizations provide more and more research publications online. This makes the often time-consuming process of obtaining a printed copy through the local library faster and more convenient. It necessitates provision of Internet services in university libraries to retain its role as the main provider of information in higher education.

1.8 Open Source Software for Libraries

Libraries looking for alternatives to restrictive software licenses and expensive software can go for open source software. In recent years, there have been a number of developments in library-related open source software about which many of the library professionals are not aware. Libraries in India have made use of CDS/ISIS and winisis packages for database creation. It is freely available from Unesco site and further developments are possible in ISIS using Pascal programming interface.

Bretthauer³⁰ throws light on the availability of open source software for library related operations. Open source software is supplied with the source code, the underlying programming that is used to create any software package. In the case of proprietary software, the end user cannot legally view or change the source code rather he gets an executable form of the program. Contrary to this, open source software users are encouraged to look at the source code and offer improvements wherever possible, using a process which is similar to peer review. Over the past decade, open source software proponents have created some stunning successes: Linux, FreeBSD, OpenBSD, Apache, MySQL, PostgreSQL, PHP, PERL, and Python are all open source products

Opensource.org also has a certification process for licenses intended to protect the use of the term “open source”.

One notable example in open source is the OpenBook integrated library system, for which source code was not available until after the product’s first public demonstration. Current projects adopting this model are Infomine and the Internet Scout Portal Toolkit. These use open source packages such as Apache and MySQL to create sophisticated software. MyLibrary (<http://hegel.lib.ncsu.edu/development/mylibrary/>) has been used in production user portals by several libraries beyond NCSU, where it was initially developed and is still maintained, both in the USA and elsewhere.

Libproxy is a rewriting pass-through proxy system, which is intended to permit authenticated users to access library resources from outside a library’s IP range. Patrons of libraries which use this software to provide access to IP-authenticated electronic resources from outside the library’s IP range are not required to modify their Web browsers. The current version has been implemented in production use.

Citation Manager (<http://stalefish.lib.sfu.ca/CitationManager/>) is an open source online citation database for end users. It provides an easy way for institutions to give all patrons equal access to simple bibliographic organization tools both on-site and at home. It’s author, Todd Holbrook (2001) of Simon Fraser University Library, describes the package as “still at an alpha stage as I add features, but it’s stable so far and usable, if limited”. This package may be of interest to libraries which support commercial citation management packages. Work also continues on several open source integrated library systems. Generally open source ILSs are probably best considered as up-and-coming but not quite ready for production use. Koha (<http://www.koha.org/>) has been in production use in its home library, the Horowhenua Library Trust, Levin, New

Zealand since the beginning of 2000, and development continues. OpenBook suffered a slight setback when its sponsoring organization, the Technology Resource Foundation, lost its funding. OpenBook is MARC21-compliant, has a Web interface, support for multiple languages, includes a Z39.50 server and client, and is geared toward collections of up to 25,000 items. Avanti (<http://www.avantibrarysystems.com/>) also continues development, and is being tested.

A most significant development in open source software for libraries was a meeting sponsored by the Digital Library Federation in October 2001. Organized by Aaron Trehub, Eric Lease Morgan, and Martin Halbert, and facilitated by Dan Greenstein of the DLF, the meeting's focus was on mainstreaming open source software in libraries. Many but not all of the attendees represent ARL libraries. There were two major outcomes of the meeting. First is an effort to develop a portal approach to exhibiting library-related open source software, including the ability to sort or find products used by type of library and by type of project. The goal of such a project would be to help libraries determine what packages would be suitable for use. The intent was to build on the strengths and accomplishments of Dan Chudnov's www.oss4lib.org, rather than compete with this successful site, which has functioned for several years with minimal support. That idea has been prototyped by Eric Lease Morgan and Notre Dame Libraries' Digital Access and Information Architecture Department, with the intent of pursuing grant funding opportunities and building awareness of open source within some library circles. The second outcome was to sponsor, or help sponsor, a research project which would test a number of hypotheses about open source software. The report of this meeting can be found at <http://www.diglib.org/architectures/ossrep.htm> Koha (<http://www.koha.org/>) is an effective open source suited for libraries. Greenstone has excellent provisions for managing a digital library collection.

The popularity of Linux, the open source operating system has grown visibly over recent years. It attracts attention of many because of different reasons such as free availability, reputation for stability, reliability, user-friendliness etc. Many libraries are opting for this powerful operating system and there are many reasons for its popularity. It provides a range of choices that few other Operating Systems can match. These choices include a healthy selection of Linux distributions, an extensive array of supported hardware, a growing number of application programs and an assortment of organizations that are willing to provide technical support for Linux systems. Now Linux has become a viable alternative to any other Operating Systems including DOS, Windows, Unix, NetWare and so on.

Open source software specific to meeting different library needs are evolving and is beginning to fulfill its potential for replacing increasingly restrictive software licenses and software subscriptions with a useful, viable alternative. Libraries in under developed and developing countries that find it difficult to raise source for obtaining highly charged commercial software should think of opting for open sources.

1.9 System Librarianship

Due to the impact of technology on libraries, the roles of librarians have undergone considerable change. The use of the technology as the basis of information service has highlighted the need for library personnel with special skills to help information seekers. The skills needed in the latest information technology has caused professionals from other fields especially from computer field enter the area of information provision. Ramakrishnan³¹ has rightly pointed out "As is evident from the use of Internet and other IT devices by information seekers, a large number of non-library professionals are in the field. In fact, the term 'Information Professional' can be used as a broader term to include the term

'Library professional' as well. It is for the traditional library professionals to equip themselves with IT skills so as to function effectively in this IT age i.e. the twenty first century". Availability of the right kind of manpower in terms of necessary quality and quantity at various levels in the hierarchy of library is a pre requisite for the success of automated systems.

Now a new 'breed' of professionals with skills in library science as well as in computer applications known as 'system librarians' have come up in developed countries. System librarianship in India is a profession of recent origin. System librarians are computer professionals and librarians simultaneously. Jordan³² has defined systems-librarian as "a librarian who is responsible for managing the information technology used in a library". Among librarians, those dealing with systems represent a subspecies whose place within the hierarchy has been shifting. Systems librarians handle all things dealing with computers in libraries. It is an ecological niche that requires skills that are not taught in most library and information science schools today, and certainly were not taught at the time when most senior practicing librarians studied library science. Qualified librarians, in both library and computer science, to take on the challenge of making a library's automated system and electronic resources work are also so few that demand remains high. Seadle³³ has identified the role of systems librarians as "Systems librarians represent a service profession for a service profession. They are the plumbers who get called in an emergency, the carpenters who make additions to the house, the roofers whose work is supposed to last for a decade but sometimes leaks. They are absolutely necessary to accomplish what we do in libraries today".

Wilson³⁴ articulates in detail what systems librarians commonly do on the job. He identifies the following to be the typical responsibilities of systems librarians:

- Integrated library system management;
- Network design and management;
- Server and host administration;
- Desktop computing;
- Training, documentation, and support;
- Application development;
- Planning and budget;
- Specification and purchasing;
- Technology exploration and evaluation;
- Miscellaneous technology support;
- Technical risk management; and
- Communication and coordination.

Above listed of responsibilities and skills illustrates how comprehensive the job description of a systems librarian can be and how important his role in the organization. Yet, the exact combination of these items will depend on the size and functions and services of library or organization, the skills and responsibilities of others working with the systems librarian, and several other factors. White³⁵ has given the following as the primary responsibilities of a system librarian:

- Developing original applications;
- Troubleshooting;
- Software evaluation;
- Hardware/software monitoring, maintenance, and upgrading,
- Data protection;
- Staff training;
- System documentation; and
- Negotiation and communication.

While library schools have taken interest in recent years in instilling knowledge about the latest digital technologies, few if any schools currently offer courses in introductory systems librarianship. If we go through the syllabi of library schools we can find that the focus tends to be mostly on human-computer interaction, application packages like word processors or minor database applications rather than the basics of operating system administration, network administration, database design, or languages like Java, Perl, or C++. This fits with a trend in library schools to provide a broader and more intellectual education, rather than train students to step immediately into a specific library job like cataloging or reference.

Seadle³⁶ has further emphasized, "a good systems librarian is in fact more like an expert bibliographer than like a technician. Both should bring scholarly expertise, plus substantial language or methodological training, to the job. Their status is not equal. But in the end, what makes libraries work is the balance of skills. The real professional's professional in the library world can be anyone who provides a set of skills that others need. Systems librarians are certainly among them". Information technology applications are changing always and the systems librarian's mission is to keep him/herself up to date and to work with constantly changing technology. Both library staff and library users have rapidly changing information needs and technology skills; systems librarians need to seek and help design systems to serve such a diverse population.

System administration is a very important task to be performed by the system people like system librarians or computer professionals. It involves maintaining the databases, providing access to the system according to privileges, creating/deleting users, protecting databases and taking back up to avoid data loss etc.

In order to protect the database backup of the data is to be taken regularly and system administrators generally adopt automatic methods of backup like mirroring of disk drives, RAID facility, using certain software like cloning software etc. Cloning software is now becoming quite popular in all types of libraries. Pricing is such that even many libraries can afford it. It takes an image of an entire hard drive and stores it on some kind of media such as zip disks, compact disks, or a server's hard drive. It can be used to roll out a group of new computers or as a backup system. It can be especially helpful to libraries that have limited staffing resources to devote to troubleshooting computer software problems. If a software problem occurs on a computer, it can basically be restored in a matter of minutes to the state it was in at the time the image was created. It is well worth the cost when purchasing computers in bulk for a new building or replacing a batch of old computers.

1.10 New Dimensions in Library Automation

Computer technology always found to be fast growing is bringing out new applications. Due to intensive research taking place in computer applications many new technologies are coming up. Automated library systems are now moving to a totally automated one where the user of the library need not interact with any staff member for obtaining assistance and is able to get the services with the help of computers. This provides users with greater easiness. Facilities like Radio frequency controlled document security systems, automated check-in/check-out systems, use of smart cards for user identification and microchips for document identification etc. are implemented in India also and it is expected that these highly sophisticated technologies will be affordable for our university libraries also when the present high cost comes down. It is a fact that in a country like India where a big number of graduates and post-graduates in

librarianship are in want of jobs, introduction of these sorts of facilities in libraries may cause resistance from the library staff in fear of loosing the job.

1.10.1 RFID Technology

Radio Frequency Identification (RFID) technology has changed the concept of security all over the world by giving Smart Cards for individuals' identification. The use of RFID has now been extended to libraries so as to keep them efficient and competitive in an ever-changing environment. The technology is applied to a variety of activities in libraries now a days like totally automated check in/check out (without the intervention of the library staff), theft detection, stock verification etc. and comprises many components including RFID Tags/Labels, Library Staff Station, Security Gate, Self Service Units, Shelf Management etc. and it can be extended to many more areas in future. Being a new technology its potential is to be elaborated a little.

RFID tags are flexible paper-thin with an electronic chip. When placed in to books or other media, theses tags/labels can be read and written to using radio frequency, that operate without contact and line of sight. It has an in-built EAS function to detect thefts and is designed to last for lifetime of the item they identify. The Library Staff Station facilitates handling of materials having RFID tags. Through a modern graphical user interface, many functions can be run on this station.

Once the label is placed in the document, its identification such as Accession Number/shelf location is registered in the chip of the label. This information is either to be taken from the library database or it is directly taken from the book by scanning the barcode on the book. Thus this ID tags are used for check in/check out purposes.

After establishing the validity of the member through the Smart Card, the documents to be checked out are placed on the deck of the station. Library database is updated automatically by putting the book in the borrower's account and theft detection system of the label is deactivated. When the document is to be returned, the borrower has to place it on the deck and it gets checked in and the theft detection mechanism is activated. Fine, if any, would be calculated and a slip may be printed at this time. If the document is to be renewed, it is to be placed on the deck and can be renewed after checking the validity of renewal and new due date is to be confirmed.

Sorting the document for re shelving can also be done by this technology. When it is placed on the deck, it is capable of displaying the collection and shelf number of the document. Security Gates are two or more Theft Detection Pedestals that are independent of each other and may have overlapping protection zones providing additional security. Any item that has not been checked-out by staff station or self-checkout station, will be detected as it passes through these pedestal zones.

Self Service Units are stations where the books are checked out of the library independently by the borrower without any intervention of library staff. It is an interactive station with touch screen that prompts the member to enter his/her identity card. The system checks the validity of the member card, and if found satisfactory further prompts to place the books on the deck of the borrowing station one by one. The status of each item is changed as checked out and the theft detection mechanism is deactivated so as to make a smooth passage through the security gate. Another system facilitates the self-check-in process. Here the documents to be returned are to be placed in the equipment for this purpose. System updates the database by changing the status of the document and account of the borrower appropriately and deactivates the theft detection

mechanism. Just like the ATM facility in banks this automatic check-in facility can be made available 24 hours even if the library is closed.

RFID technology can very well be applied in stock verification function also. Special hand held terminals will help to check the availability of the item in the shelves without the document being taken out of the shelf.

1.10.2 Wireless Applications in Libraries

Wireless access within the library is provided in many advanced countries to enable the clientele to access the resources with ease. There are different standards used in wireless technology such as 802.11a, 802.11b, Bluetooth, HomeRF etc. and adoption of standards may differ from library to library. Graham³⁷ noted the reasons for use of Wireless technology in library networks and found it divided in US along two lines relevant to the type of libraries. Public libraries use wireless technology as a cost effective way to extend networking in buildings, where the addition or expansion of traditional network cabling was costly and difficult due to structural issues. Application of wireless technology in College and University libraries addresses specific needs, in particular providing access for community members' laptops. Laptops are not common in our universities today, but the reason specified by Graham in the case of public libraries may be applicable to our university libraries as well.

1.11 Role of INFLIBNET in Computerisation of University Libraries

Information and Library Network (INFLIBNET), Ahmedabad is an autonomous inter university center of the UGC, established in 1991 and located at Gujrat University campus, Ahmedabad. It is directed towards modernization of libraries and information centers for information transfer and access, to support scholarship, learning and academic pursuits by establishing a national network of libraries and information centers in universities, institutions of higher

learning and R&D institutions in India. It is basically a co-operative endeavor in resource development, sharing and its utilization at national level. In May 1996 it attained the status of an autonomous Inter-University Centre under UGC. INFLIBNET is set out to be a major player in promoting scholarly communication among academicians and researchers in India. It is with the coming up of INFLIBNET that the trend of computer application in university libraries in the country started and the role of INFLIBNET in this momentum is very great.

Major objectives³⁸ of the INFLIBNET are:

- To promote and establish communication facilities to improve capability in information transfer and access, that provide support to scholarship, learning, research and academic pursuits through cooperation and involvement of agencies concerned
- To establish Information and Library Network (INFLIBNET) - a computer communication network for linking libraries and information centers in universities, deemed to be universities, colleges, UGC information centers, institutions of national importance and R&D institutions etc. avoiding duplication of efforts in acquiring resources.

1.11.1 Functions of INFLIBNET

In order to fulfill the broad objectives, INFLIBNET has undertaken the following activities³⁹:

- Promote and implement computerisation of operations and services in the libraries and information centres of the country, following a uniform standard.

- Evolve standards and uniform guidelines in techniques, methods, procedures, computer hardware and software, services and promote their adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchange of information towards optimal use of resources and facilities.
- Evolve a national network interconnecting various libraries and information centres in the country and to improve capability in information handling and service.
- Provide reliable access to document collection of libraries by creating on-line union catalogue of serials, theses/dissertations, books, monographs and non-book materials (manuscripts, audio-visuals, computer data, multimedia, etc.) in various libraries in India.
- Provide access to bibliographic information sources with citations, abstracts etc. through indigenously created databases of the Sectoral Information Centres of NISSAT, UGC Information Centres, City Networks and such others and by establishing gateways for on-line accessing of national and international databases held by national and international information networks and centres respectively.
- Develop new methods and techniques for archival of valuable information available as manuscripts and information documents in different Indian Languages, in the form of digital images using high-density storage media.
- Optimise information resource utilization through shared cataloguing, inter-library loan service, catalogue production, collection development and thus avoiding duplication in acquisition to the extent possible.
- Enable the users dispersed all over the country, irrespective of location and distance, to have access to information regarding serials, theses/dissertations, books, monographs and non-book materials by

locating the sources wherefrom available and to obtain it through the facilities of INFLIBNET and union catalogue of documents.

- Create databases of projects, institutions, specialists, etc. for providing on-line information service.
- Encourage co-operation among libraries, documentation centres and information centres in the country, so that the resources can be pooled for the benefit of helping the weaker resource centres by stronger ones.
- Train and develop human resources in the field of computerised library operations and networking to establish, manage and sustain INFLIBNET.
- Facilitate academic communication amongst scientists, engineers, social scientists, academics, faculties, researchers and students through electronic mail, file transfer, computer/audio/video conferencing, etc.
- Undertake system design and studies in the field of communications, computer networking, information handling and data management.
- Establish appropriate control and monitoring system for the communication network and organise maintenance.
- Collaborate with institutions, libraries, information centres and other organisations in India and abroad in the field relevant to the objectives of the Centre.
- Create and promote R&D and other facilities and technical positions for realising the objectives of the Centre.
- Generate revenue by providing consultancies and information services.
- Do all other such things as may be necessary, incidental or conducive to the attainment of all or any of the above objectives

“The automation of university libraries is a pre-requisite for networking and resource sharing. INFLIBNET Centre, through UGC, has been providing the

required support to universities in phases. Till 1999-2000, 123 universities have been given initial grant of Rs. 6.5 lakhs each to develop infrastructure for automation. INFLIBNET Centre also desires that each university should establish a LAN in its campus linking all the departments including library. This LAN in turn will be connected to the WAN⁴⁰.

1.11.2 Achievements of INFLIBNET

The major achievements of INFLIBNET include financial assistance for automation of university libraries, development of SOUL, a library management software, library and information science human resource development and consultancy, development of Union Database, bibliographic standards and latest being UGC Infonet.

1.11.2.1 Financial Assistance for Automation of University Libraries

INFLIBNET, through UGC provided both initial and recurring grants to the 142 universities identified under the programme. Non-recurring grants enabled the universities to procure hardware, software (OS), modem, telephone, air-conditioners etc. Universities were also provided with recurring grant for the first five years after the installation of the systems to help them maintain the same and retro-conversion of bibliographical data. This has definitely helped to create an IT conscious environment in university libraries in India. Further, to manage the automation activities in university libraries the post of Information Scientist in the scale of pay of Lecturer was sanctioned with financial support for the first five years.

1.11.2.2 Development of SOUL Software

INFLIBNET has developed SOUL software to facilitate automation of libraries. It works in Client/Server mode in Windows environment using MS-

SQL server as back end tool. It is web compatible and supports barcode technology to generate labels and is developed in conformity with international standards like MARC21, CCF, AACR II, ISO 2709 etc. Certain utility software developed at the Centre are available to the universities on request such as software for searching the data from union databases (OPAC), Catalogue card generation, Duplicate checking of records, Customised software for Books, Theses, Serials, Data Conversion from Dbase, FoxPro and text file to ISO-2709 format.

1.11.2.3 Human Resource Development and Consultancy

To enhance the skills of University Library staff for implementation of INFLIBNET Programme, the following training courses are conducted. 20 training courses of four-week duration for operational staff working in the university libraries were prominent. This is mainly meant for operational staff of libraries. They are given exhaustive training on application of computers to library and information services and 7 workshops of one-week duration for senior library staff such as University Librarian and Deputy Librarian, focusing on managing automation and networking. IRTPLA, a new series of training programs are conducted at different locations in collaboration with universities across the country to train college librarians at regional level. More than 800 professionals have been trained under a total of more than 35 programs. Special workshops on Network Management for Libraries have also been conducted. Ten Librarians from different universities spent a week at INFLIBNET to solve their problems in using ILMS software. SOUL was installed at 304 Libraries and onsite training of one-week duration to the library staff was provided at each site. Apart from these, an annual convention called CALIBER is conducted at various places. It helps the library as well as IT professionals to interact with each other and discuss issues for mutual benefit.

1.11.2.4 Development of Union Database

Development of Union Database is one of the most important activities of INFLIBNET Centre. Its Book database consists of 60 Lakh records received from 89 universities and has around 12 Lakh unique records. Theses database consists of more than 1.4 Lakh records of doctoral theses submitted to various Indian universities. Serial holdings database has more than 13750 unique serial titles having over 47,000 holdings of various universities in the country. Experts database provides useful data related to the names of experts in different disciplines and it consists of more than 13000 records and is growing steadily. Research projects database has more than 9000 records. Apart from these the NISSAT-Project Database has more than 20000 experts profiles in the area of Science and Technology and is provided access on the URL <http://nissat.inflibnet.ac.in>.

1.11.2.5 Bibliographic Standards

To maintain consistency and quality in databases created by the participating libraries, each participating library has to follow the standards adopted by INFLIBNET. The document “INFLIBNET Standards and Guidelines for Data Capturing” is made available to all university libraries. INFLIBNET also recommends the standard, Anglo American Cataloguing Rules – Rev. 2 and Library of Congress Subject Headings to assign subject headings. Libraries following INFLIBNET standards will find it easy to convert their records in to MARC 21 format. INFLIBNET also brings out several publications and provides information services like Document Delivery Service (DDS).

1.11.2.6 UGC INFONET

UGC under the auspices of INFLIBNET launched an ambitious programme to bring about a qualitative change in the academic infrastructure,

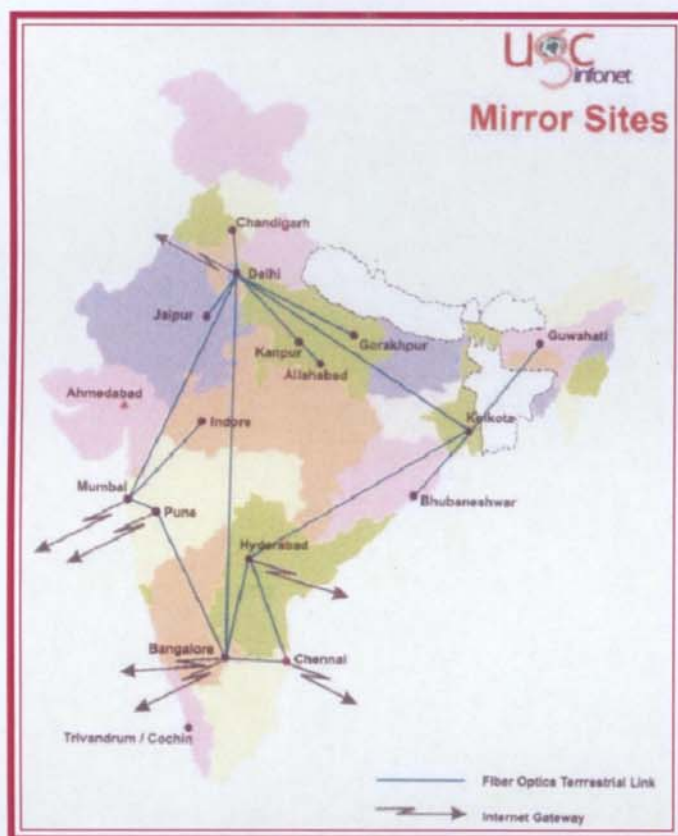
especially for higher education. Under this initiative UGC plans to modernize the university campuses with state-of-the-art campus wide networks and setting up its own nationwide communication network named UGC-Infonet. It uses ICT and Internet to transform learning environment from a mono-dimensional to multi-dimensional one.

Infonet provides access to highly precious databases like Chemical Abstract and Biological Abstract and E-journals covering all fields of learning of relevance to various universities including Arts, Humanities, Social Sciences, Physical and Chemical Sciences, Life Sciences, Computer Science, Mathematics and Statistics. The literature made available includes full text access to journals covering research articles, reviews and abstracting databases. Access is provided to current as well as archival literature. Its future programs include developing modules on E-Learning, Education and Tele Conferencing, collaboration with national documentation centers and other resourceful libraries. UGC-Infonet will be a boon to the higher education systems in several ways:

- UGC-Infonet will become a vehicle for distance learning to facilitate spread of quality education all over the country.
- UGC-Infonet will be a tool to distribute education material and journals to the remotest of areas.
- UGC-Infonet will be a resource for researchers and scholars for tapping the most up-to-date information.
- UGC-Infonet will form a medium for collaboration among teachers and students, not only within the country but also all over the world.
- UGC-Infonet will be an Intranet for University Automation.
- UGC-Infonet will encompass entire University Systems for most efficient utilization of precious network resources.

UGC-Infonet is aimed at establishing a channel for Globalisation of Education and to facilitate the universities in marketing their services and developments. Infonet proposes mirror sites for content hosting in major cities of the country as shown in Figure 1.2.

Figure 1.2 UGC Infonet Mirror Sites in the Country



Courtesy: <http://web.inflibnet.ac.in>

1.11.2.6.1 Network Architecture

UGC Infonet is based on open IP platform, employing state-of-the-art technologies like IP, enabling on-line response to queries. Open system architecture will ensure support for current and future applications. Users from educational Institutions would enjoy high data rates while accessing Intranet and Internet resources.

1.11.2.6.2 Main Features of the UGC-INFONET are:

- Scalable Architecture to grow from Universities to affiliated Colleges
- Nation-wide Terrestrial Backbone using Fiber Optic links
- Integrated Satellite WAN supporting broadband and SCPC VSAT technology
- Comprehensive Network Management Systems for overall monitoring of the network, down to each and every device.
- Linkage with other Academic and Research Networks all over the world.
- Data security and virus protection using firewalls and Intrusion Detection Systems
- Dedicated Data Center for Web hosting, e-Journals and Mail Boxes.
- Mirror sites spread all over the country for content hosting.
- Broadband Multimedia and Video Channels for Distance Learning

1.11.2.6.3 Intranet for Universities

Availability of Reliable and Stable network infrastructure will facilitate increased usage of computers in the University Campuses. Campus Management will be more efficient and student friendly. Interlinking of the universities will expand the reach of students and faculty to other universities providing them with better avenues for wider horizontal growth. UGC-Infonet is aimed at establishing a seamless link between the UGC and the universities. This will help to provide a more accurate and up-to-date picture of the Universities, while at the same time it will enable universities to have timely information about the various schemes of the UGC. Consequently, this is expected to bring a qualitative change in the UGC-Universities interaction. The huge and multifaceted Indian Education Systems would achieve greatest efficiency through e-governance of UGC.

1.11.2.6.4 Implementation of INFONET

The UGC-Infonet is overlaid on ERNET Infrastructure in a manner so as to provide assured quality of service and optimal utilization of bandwidth resources. The network is run and managed by ERNET India. The project is funded by UGC with 100% capital investment and up to 90% of recurring costs. A joint technical and tariff committee, consisting of leading experts in the country is setup to guide and monitor the design, implementation and operations of UGC-Infonet. INFLIBNET is the nodal agency for coordination of the UGC-Infonet and facilitate linkage between ERNET and the Universities. In the long run, each University will become a hub for the colleges affiliated to it. ERNET entrusted Asianet Satellite Communications, the responsibility of providing connectivity to the universities in Kerala. Leased line connectivity with one Mbps bandwidth has been provided to the four universities viz. Kerala, Calicut, Mahathma Gandhi and CUSAT.

1.11.2.6.5 Campus LANs at Universities

Infrastructure at the University campus is also critical to take full advantage of the UGC-Infonet. Campus LAN technology is evolving rapidly and many universities may not have the expertise to setup the most modern and cost effective LANs. ERNET India has participated with many institutions in the planning and implementation of their campus computing facilities. The expertise generated thus will be extended to the Universities so that every university can have a state of the art infrastructure.

To conclude, a decade ago library automation, at least in our country, was regarded as an addition to the facilities in a library rather than a necessity. Today the situation has changed and automation has become the dire need of libraries to discharge its duties to build up and process its collection, to facilitate operations, to provide services to its clientele and to support the management

decision-making. No library, especially in higher education, can survive in the present era without the application of computers.

It is in this context, that a detailed study of the computerisation of university libraries in Kerala is proposed to be conducted covering a wide spectrum of facets such as its areas of applications, different hardware available and software in use, features and use of OPACs, INFLIBNET support received, various standards in use, utilization of open source software, financial resources available, services provided and operations performed using computers, digitization initiatives, network facilities available, Internet services provided to the members as well as services provided through the library website to remote users, the human resources available for computerization activities, response of users with regard to the computerised circulation system, OPAC and Internet services, responses of the person in charge of the computerised activities regarding the duties and responsibilities, facilities available, difficulties faced in the process of computerisation of the university libraries under study and to identify the solutions to the problems etc. This study will help to understand the status of computerisation of the university libraries and to identify the lacunas in the system and will further be able to put forward suggestions for its improvement.

1.12 Problem, Terminology and Definition of Key Terms

The study is entitled "**Computerisation of University Libraries in Kerala**". It surveys the present status of application of computers in the operations and services of the major University Libraries in the state of Kerala. The views of the academic community on the automated services in the University Libraries under study are also analysed. The definitions of the key terms in the title are as follows.

1.12.1 *Computerisation*

The web edition of English-Russian Glossary on Information Society⁴¹ defines computerisation as “Process of development and implementation of computers providing automation of information processes in different spheres of human activity”.

Computerisation is also defined as “The act of implementing a computer based system to enhance business efficiency”⁴².

The New International Webster’s Pocket Computer Dictionary of the English Language⁴³ defines the term ‘computer’ as “a programmable machine that stores and retrieves data, and performs high-speed logical and mathematical operations”, and the term ‘computerize’ as “to adapt to use or control by a computer”.

The term “computerisation” refers to the application of computer(s) to some specific job or service or equip with computer(s) so as to facilitate or automate procedures. In other words it refers to conversion of an existing system to another system or form that is controlled, stored, or processed using general or special purpose computers or both. Here the study covers the state of the art of computerisation.

1.12.2 *University Library*

ODLIS⁴⁴ (Online Dictionary for Library and Information Science by Joan M. Reitz) defines University Library as “A library or library system established, administered, and funded by a university to meet the information, research, and curriculum needs of its students, faculty and staff”.

The collective term "University Libraries" refers to the main library attached to the Universities that look after the information needs of the university academic community mainly students, research scholars and faculty members and to which access is provided to the whole university community not to any particular department or group.

1.12.3. Kerala

The term "Kerala" refers to the geographical area of purview of the study, which is the extreme south-west State of India.

So, the present study is an attempt made to assess the present scenario of computerisation of university libraries in Kerala.

1.13. Structure of the Thesis

The thesis is divided into 5 chapters as mentioned below.

Chapter 1 gives the Introduction to the subject covering the need and importance of the University Library computerisation, areas of library computerisation, services to users, system librarianship, new dimensions in library automation, the role of INFLIBNET in computerisation of University Libraries. This chapter also includes the problem under study, terminology used and definition of key terms.

Chapter 2 is confined to the Review of Related Literature on various aspects of the subject such as planning library computerisation, database creation, automated services, evaluation of computerisation, digitization, networking, resource sharing and user studies.

Chapter 3 gives the Methodology of the work covering the need and significance of the study, objectives, hypotheses formulated, limitations of the study, various data sources, selection of sample and data collection and the method of analysis adopted.

Chapter 4 confined to the Analysis and Interpretation of the Data contain analysis on library collections, financial assistances, manpower and infra structure available, various services and INFLIBNET support and participation. It also includes the analysis of the websites of the University Libraries.

Chapter 5 entitled 'Summary of Findings and Suggestions' gives the major findings of the study, tests the hypotheses and makes conclusions on the basis of the results of the analysis. It also puts forward certain suggestions for the improvement of the computerisation process of the libraries studied also make suggestions for further research on the subject.

Having explained the various aspects of the subject under study and the details of the problem to be studied and the structure of the report, the next chapter covers the literature review made by the investigator to get him acquainted with the problems under investigation.

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CHAPTER 2

Review of Related Literature

- ❖ Planning for library computerisation
- ❖ Library computerisation - experiences and case studies
- ❖ Database creation, Retro-conversion
- ❖ Automated services
- ❖ Evaluation of computerisation
- ❖ Digitization and digital collection
- ❖ Networking, Resource sharing and Consortia initiatives
- ❖ Internet
- ❖ User studies

Best and Kahn (1989)¹ rightly noted that “familiarity with the literature in any problem area helps the students to discover what is already known, what others have attempted to find out, what methods of attacks have been promising or disappointing and what problems remain to solve”. A review of related literature is essential before the conduct any research in order to avoid unnecessary duplication. It further enables the researcher to formulate correct research methodology, to adopt appropriate tools for the research work and to collect relevant data.

The investigator has made an exhaustive study of the related literature to the maximum possible extent that helped him to acquaint himself with the subject under investigation. The subject “Computerisation of University Libraries” encompasses various facets and the whole sets of activities forms a life cycle. It starts right with the planning of the computerisation process or in a more refined wording it starts with a system analysis and finally it reaches the end user, that is, the users of the computerised library. Once it completes the circle it is to be assessed or revised thoroughly and new actions should be planned for the improvement of the existing system as well as for introducing new and innovative activities and services. Different aspects of the subject under study are covered here. The studies reviewed are arranged under the following headings:

- Planning for Library Computerisation
- Library Computerisation -Experiences and Case Studies
- Database Creation, Retro-Conversion
- Housekeeping Operations
- Automated Services
- Evaluation
- Digitization
- Resource Sharing, Networking and Consortia
- Internet
- User Studies

2.1 Planning Library Computerisation

Conducting a system analysis is a pre requisite to the implementation of any new system. Saha (1997)², based on her experiences in library automation at the Indian Institute of Technology Library, Delhi, discussed the vital decisions to be taken before initiating library automation that include computerisation of library functions; building up CDROM databases/electronic journal subscriptions and online access. Decision to computerize the library was taken by a sub committee for library computerisation appointed by a workshop on "Modernisation of library for undergraduate education" in March 1986. Being a new venture separate fund of Rs. 8 Lakhs was granted and utilized for procuring the systems. In 1992 Ministry of Human Resources Development granted Rs. 10 Lakhs for the purchase of PCs and CDROM drives. The hardware procured first was a 486 based Meter III from HCL-HP. The Department of Computer Science developed the software that looks after circulation module and have provisions for issue and return. The OPAC connected to computer network is found to be in high use. The Library has a CD database also which subscribes to seven databases. The problems faced in subscribing CDROMs/Electronic Journals such as higher subscription rates, variation in fee for multi user access etc. are explained. The author is of the view that with the changing technology a new breed of users who are interested in access to information rather than the traditional access to the holdings are coming up. A change is needed in the mental attitude of the library staff and thinking processes have to be transformed considerably to cope up with the challenges from technology, environment and users.

Heaton and Marks (2002)³ made a study on the planning of the library at the University of Nevada, Las Vegas. The Lied Library was planned and constructed over a ten-year period. During this process, the library staff tried to plan for new technology (IT) by making the building as flexible as possible. Although the staff had very little technological or planning experience in the

early years, they were able to successfully plan a technologically advanced building. Much of the success of this venture came by researching technology, and constant revision of plans to incorporate changes. Through careful infrastructure planning, no major changes were needed to accommodate technological upgrades. Several committees were formed to execute the project. The lessons learned were many, and below are some that deal directly with planning:

- Involve a reasonable number of people on the planning committees. Use other mechanisms to keep the staff informed.
- Committees can outlive their purpose. Do not hesitate to close them down.
- Form new committees when there is a legitimate need, but make certain they have a clear assignment.
- Plans are just that - conditions will change, requiring modifying plans without the opportunity for committee involvement.
- Do not assume that things discussed with architects many times have been incorporated into the design. We must check and double check to make sure they are
- Keep planning as flexible as possible for as long as possible

Considering the length of the project and the number of changes in key personnel involved along the way, the planning process for Lied Library was amazingly successful and were able to accommodate the new IT infrastructure.

Vaughan (2002)⁴ made a study focusing on the planning, implementation and some of the subsequent issues that arose related to information technology within Lied Library, University of Nevada, Las Vegas. There are numerous considerations when constructing a state-of-the-art twenty-first century library. Major tasks include detailed network planning, system specifications, and equipment procurement. Collaborative teamwork and

constant monitoring of the construction process are essential to ensure a successful outcome. Hardware and software that promote efficient management of various library systems will help ease the tremendous task of managing and troubleshooting the "beast" that has been created. Regardless of the amount of planning and vigilance, challenges and problems will occur during various phases of building construction and subsequent occupancy. Technology planning and implementation for any modern library is a lengthy, detailed process involving the efforts of many individuals, within and without the library. A vision of what the library will offer and important goals to be achieved should be planned prior to groundbreaking. It is vital to keep an up-to-date budget regarding the huge amount of investment that will be spent to bring technology to the library. Similarly, it is important to understand that everything will not flow perfectly. The larger the project, and the more technology-intensive the project, the more opportunity there will be for unanticipated problems to occur. Nevertheless, after the initial implementation and troubleshooting has occurred, one cannot help but be proud of accomplishing goals set out years earlier.

2.2 Library Computerisation - Experiences and Case Studies

Reddy et. al. (1990)⁵ made a case study of computerization of IGM Library, University of Hyderabad. The study explains how the work of computerization was started. Firstly an analysis was made to draw priorities to automate the library, and these priorities were established keeping in view different aspects like reduction in manpower needs; improvement in the efficiency of the system; involvement of all the concerned; not to disturb the practices and conventions followed earlier; easy to automate and quickly show the results to the management and to sell the idea of total automation at a future date. The analysis showed that priority should be given to automate the library catalogue eliminating the duplication of work done in cataloguing for generating various catalogue entries. So a cataloguing system was designed and a database was created using dbase-III Plus and it helped in

reducing the job of Technical Section. Secondly a periodicals database was created to solve the problem of generating some periodicals list in a variety of formats. With the success of the above two databases a union list of 5642 periodical titles representing 30 significant libraries of Hyderabad was created to facilitate library cooperation and the list was distributed to all libraries and it resulted in avoiding duplication of titles. As the next phase a database of the library staff was created to support the decision making regarding personnel policy framing. In the information retrieval area the library coordinates the SDI services of NCSI, Bangalore and SNTD University Bombay. Searching of CDROM databases for medicine, NITIS and CAB is coordinated in the library. The reasons to procure Libsys, integrated library management software, are discussed. It is advocated that the library professionals in India should be in a position to study the modern facilities provided in the libraries in developed countries and introduce automation to suit our needs with our limited infrastructure like hardware and software, which would answer to our type of problems. The library staff should be trained to gain confidence to handle new technology.

Pradeep and Reddy (1996)⁶ discussed their experience of hardware and software selection at IGM Library, University of Hyderabad. Hardware requirements should be considered according to their capability to upgrade according to future needs and it should support all the software available and also the software used in the library. Harmony should be the major selection criteria. A fast CPU backed up by good RAM is always advisable and disk space should be more than what is required. System should be with good RAM and cache memory. For graphic monitors more the size better will be the resolution, for local networks and Internet access high speed UART 16550 serial port is always advisable. Before going for automation some points are to be considered like physical site preparation, hardware related consideration, training library professionals, data conversion costs and recurring expenditure. Discusses the points to be considered while selecting

the software for libraries. Out of the options, buying readymade package, develop in house or assigning a software agency to develop one, buying a tried and tested readymade package with enough documentation is advised. Barcode technology used in the library is also discussed. Library found overwhelming reaction from the user side and faculty always provide constructive suggestion for improvement. OPAC is found always engaged and it has totally taken up the job of the old catalogue cards.

Chandran and Reddy (1997)⁷ in a case study discussed the automation process at Sri Venkateswara University Library Tirupati. The initial difficulties the authors experienced while they started the work are mentioned. An initial amount of Rs. 6.5 Lakhs was received from UGC in 1995. A detailed proposal for procuring necessary hardware for an Email facility at the library was prepared in consultation with a teacher in computer department. By July 1996 the system was procured after completing all official formalities. As soon as the systems were installed five library professionals were trained in using MS-DOS, Wordstar and CDS/ISIS. A database of theses consisting of 2100 records and serials consisting of 1900 records were created first. For book data entry slips were prepared by physically verifying each document. Future plans for development are discussed and the authors from their experiences have felt the need for an integrated library management software and guidance for procuring necessary computer systems so that unnecessary delay in different universities for making decisions on configurations can be avoided.

Sharma (1997)⁸ made a case study on the automation activities at Nagpur University Library. The library decided for automating all manual procedures, and computers were procured for this purpose. Two LANs, one for main library and another for campus library were installed. One CD net server, barcode software and scanners, system software like MSDOS, Unix, Windows and application software like Libsys (housekeeping operations), MS

Office, communication software like I Link, Procomm and a few other software were procured. Skilled people from outside as well as a few staff members did data conversion. Library has two Pentium servers (SG Unix based) one for main library with 9 terminals connected by means of Ethernet card.

The software includes SCO UNIX on both servers and DOS on terminals, Windows on 4 terminals with TCP/IP on the Unix and ILink on the terminals. The infrastructure created, training of staff, data conversion and bar-coding for circulation are all discussed in detail. A Local Area Network has been established in the campus and different departments are able to access OPAC and CDROM databases in the library over this network. The whole network activity has been divided in to three segments that are all on the thick Ethernet and an Optical fibre cabling has been laid from the library to Zoology department. Steps have been taken for CD-Publishing, subscription of CDROM databases and upgrading communication facilities.

Konnur and Rajendra (1997)⁹ made a case study on the automation of Jayakar Library of the University of Pune. Computerisation activities started in the year 1987 with the purchase of a PC-XT and a discless PC. Later more powerful machines were procured and software like dbase III Plus, FoxPro and CDS/ISIS were used. For the housekeeping operations Libsys software on Unix platform was procured. Later it was found that the hardware was not enough to support the large database and Unix operating system a new DEC Alpha was procured. A grant of Rs. 6.5 Lakhs received from UGC under INFLIBNET programme and the regular grant of the university helped to procure more systems such as more powerful DEC Alpha 2000 computer with 1.2 GB HDD, 1.2 GB SCSI, 64 MB RAM, 2.8 MB FDD, 525 MB CTD and 150 MHz speed were procured. The library has established a LAN, which is supported by OSF/1 and library has access to Internet via ERNET. Persons involved in Computerisation activity are regular staff members and technical

library personnel. It is observed that library has not made the full utilization of the Libsys software.

Bavakutty and Muhammed Salih (1999)¹⁰ made a study on the automation aspects of libraries based on their experience in automating the CHMK Library, University of Calicut. The study discussed the hardware and software to be considered while initiating the automation process of libraries. Based on their experience, certain checkpoints to be reckoned with before we opt for hardware as well as software are given. They are: compatibility of computers for the proposed information system; earlier experience of vendors in the field; reputation of the manufacturer and the product; after sale supports provided; cost factor; documentation on the products; payment terms; warranty and Annual Maintenance conditions etc. The database creation of the Library was done using the existing catalogue main cards. Then the created database was sorted using the accession numbers and a list of missing accession numbers were generated. The details of the documents for the missing accession numbers were fed using the accession register. For the creation of member data dbase III plus was used. With the use of Libsys software the circulation procedures were made easy and time saving. The other modules such as Serials Control, Acquisition etc. provides for better services.

Dabas and Singh (1999)¹¹ made a comparative study of IT applications in 9 University Libraries in Haryana, Punjab and Chandigarh to measure the level of IT application with an ulterior objective to establish some co-relationship between quality in libraries and level of IT applications. Briefly outlines the meaning, scope, importance and possible application of IT in different library and information environment. Enumerates the causes for low level of IT application in Indian university libraries in comparison with their counterparts in the developed countries of the world. A mixture of Questionnaire, Observation and Interview method was adopted. Survey

includes types and forms of collection, hardware and software facilities, application of computers in housekeeping operations, level and size of the in house databases, services of the libraries and access to national and international databases. The study found that the technological level of the University Libraries is far below the satisfactory level. No university library has yet computerized its housekeeping operations. Only Punjab University Library and GNDU Library have provided computerised access to in-house databases. CD ROM facility is available in all libraries and Email and Internet facility are available in many libraries. The survey also reveals that the print culture is still dominating in university libraries of this region.

Okemwa (1999)¹² examined the major problems associated with managing a library automation project in a developing country. The Moi University experience is representative of the type of problems that a library project manager in a developing country is likely to face. Poor infrastructure, shortage of local technical expertise, lack of information technology and shortage of qualified managers are some of the managerial hurdles that they should be able to cope with. It is observed that training local personnel and equipping the training institutions may partly solve some of the problems. Management and information technology skills should be emphasised in whatever training programmes may be initiated in a bid to overcome the shortages.

Rao et. al. (1999)¹³ conducted a study to measure the impact of IT applications on Library and Information Services (LIS) in 45 academic libraries in and around the Chennai city. The libraries belonged to Govt. Aided/Autonomous Colleges, Govt. Professional Colleges, Polytechnics, Self Financed Engineering Colleges, Universities and IIT. The objectives of the study were to analyze the nature, extent and type of applications of IT based services, the area of IT applications, collection development policy, manpower development and attitudes of staff towards IT applications.

The findings of the study showed that the awareness of IT and its application processes were started between the years 1980-85. None of these academic libraries and information centers possessed the IT application based information handling services before 1980 and followed the traditional approach to information management. It is only after 1995, 85% of these libraries started possessing IT application based services and 15% of these libraries are lacking IT application products and services due to lack of adequate financial support and trained staff. The study has also revealed that FoxPro, Dbase and indigenous software packages are in popular use for IT application services. 50% of libraries are using the CDROM databases for information retrieval purpose. 75% of the libraries and information centers collection developments have been affected by IT and 90% management supports are in the personnel management development policy. Authors are of the view that there is no alternative way except the IT application based information handling services in libraries whether it is academic or special.

Mattoo and Rufai (2000)¹⁴ made a study on the automation and networking activities at the Kashmir University Library right from its beginning. The initial hardware configurations, database creation activities including retro conversion and the Internet facilities etc. are dealt with in this study. Some of the problems encountered in connection with finance, hardware, software, training and Internet connectivity are listed. Certain suggestions were made to overcome the financial problems such as charging a library fee from the scholars and students enrolled for registration in the library; providing web based services and charging a fee from foreigners for use of Kashmiri literature. The other suggestions include repairing the damaged hardware; procurement of suitable software for library automation; manpower training; paying incentives to staff for participation in automation and provision of VSAT connectivity for Internet.

Mutshewa and Rao (2000)¹⁵ made a study on how the University of Botswana Library has taken advantage of the new technologies to enhance its service to its patrons. The university local network is used to bring library electronic resources to the desktops of the patrons in their offices. Discusses the Information and Communication Technology infra structure of the university, the university library's automated systems environment, CDS/ISIS and CD ROM databases, Internet, OPAC etc. The University of Botswana Library uses the available information technology resources to enhance its service. A team of subject librarians provides training for staff on the use of resources. Training is also given to individuals or groups in their departments at mutually agreeable time. Staff offices, faculty computer laboratories, and library training rooms are all used to conduct training. In order to provide wide access to the previous question papers of the university, the library has engaged in a major digitisation project to make the papers available to the university community through the Web. The project entails collecting the examination papers from the examination unit. The papers are then scanned and converted to an electronic format, and finally converted to HTML format. An NT server is used to store the digitised question papers. The library provides access to E-Journals through Internet. The library professional staff members are in search of new ways to improve the service and Information Technology has been put at the forefront in the library's quest to provide quality service.

Mutula (2000)¹⁶ made a study on the Information Technology developments in the university environment in Eastern and Southern Africa, and illustrated what university libraries can do to meet user expectations and remain relevant. Libraries in the university environment in Eastern and Southern Africa are making efforts to join and participate effectively in the information revolution. However, these efforts continue to be hampered by many problems both internal and external. The current scene in the region is assessed and analysed through selected literature reviews, the author's

personal experience working in the region, visits to some universities, other key institutions such as the Telkom telecommunications and Eskom electricity companies of South Africa, and discussions with professional colleagues in national seminars and regional conferences.

Cogan and Bullard (2000)¹⁷ based on their experience made a study on the automated retrieval collection at Bruce T. Halle Library at Eastern Michigan University. The authors have been intimately involved in linking the storage system to the integrated library system. A relatively unique feature of the Bruce T. Halle Library is the Automated Retrieval Collection (ARC) that allows for the storage of up to 800,000 items in an on-site storage area, and gives clients the ability to request and receive items from this collection in less than ten minutes. It contains materials published prior to 1990 and had not been circulated since 1994. This storage system is incredibly efficient because almost all items are stored randomly, and it has been well received by the campus community and the staff.

O'Farrell (2000)¹⁸ brought out the findings of a research carried out in Liverpool John Moores University, UK. The study investigated the capability of three Library Automated Systems (LAS), the Talis, Dynix Classic and Innopac, to generate some of the datasets necessary to form the ISO 11620 standard on performance measurement within libraries. The objective of the research was to determine the feasibility of implementing the ISO 11620 standard into the sample libraries, taking into account current performance measurement practice, the capability of the automated systems to generate the datasets, and the librarians' perceptions of the benefits to be obtained. After an extensive literature search, interviews were conducted with the chief librarian of each university to determine current performance measurement practice in each of the libraries; detailed discussions then took place with the system librarians of each institution in order to determine the exact capability of the LAS to generate the relevant datasets. Only the datasets which could

possibly be obtained from a LAS are discussed in this study and those, which require totally manual data collection methods are not included. The study gives the details of how the Talis, Dynix Classic and Innopac systems can generate the datasets. Where ever applicable the three automated systems were investigated to determine if they could generate the details necessary to form the following indicators: Number of active borrowers/number of members in target population; Number of documents in stock; Number of documents in lending category; Number of un-issued documents; Number of library visits; Number of loans; Number of documents currently on loan; Number of documents used in-house; Number of remote uses; Staff time spent on cataloguing/staff time spent on amending records; Number of titles catalogued; Number of titles in stock; Number of available titles; Publication date of document; Date of ordering document/date of receiving document; Date of cataloguing document/date of bindery preparation of document/date of binding of document/date of document is dispatched; and Date of document requested for ILL/date of document ordered for ILL/date of document received for ILL/date of user notified for ILL.

There are two main types of datasets generated by the automated library systems examined in this research: those that are a snapshot dataset, and those that represent figures over a period of time. The Dynix Classic system is the oldest LAS of the three, but neither of the two newer systems is any stronger in providing management information. The BLCMP Talis is a client-server system, but of the three this system appears to be the weakest in providing the datasets necessary to form the ISO indicators. It is noted that, although the systems can generate some of the datasets (for example, the date of ordering and receiving documents) the systems cannot calculate the necessary indicator. The data has to be extracted into another software package or calculated manually. The information above presents quite a promising outlook, since the majority of the datasets seem to be generated by the automated systems. It is found that none of the LASs examined can

generate all the datasets to form the "speed of processing documents" indicator, and the alternative to the automated system is to use a manual sampling method which loses the benefit of retrospective data gathering, and is also labour intensive.

O'Farrell is of the view that there is a clear need for closer liaison between librarians and LAS designers. Regardless of whether or not a library follows the ISO standard, the librarians still need to obtain useful management data from the LASs. The ISO standard is one of the most recent attempts to generate interest and implementation of performance measurement within libraries, but the datasets forming the indicators would be useful to librarians even if the standard is not followed. Unless the data collection becomes less time consuming, the widespread adoption of the ISO standard is likely to be limited. Study found that the systems are weak in generating the necessary management data.

Mittal and Agarwal (2001)¹⁹ made a study on various aspects of computerization of the library of Central Building Research Institute, Roorkey, a premier national institute in India. A proposal for library automation was moved in 1996 and got materialized in 1997. A LAN was set up and the Libsys software was installed in Windows NT Platform. Libsys Corporation conducted on-site staff training. Authors found that automation has relieved the library staff from many routine and time consuming functions giving time to initiate more useful services for the users. These include: Easy duplicate checking at the time of data entry, availability of the status of the document, document history and member history. Various problems encountered in automation include high expenditure, communication gap between library and computer professionals, disruption of shelving due to direct retro-conversion from documents, shortage of trained manpower, lack of necessary air conditioners and power fluctuations.

Non-availability of authority files in Libsys is listed as a shortcoming that affects the correction work in data entry.

Mutula (2001)²⁰ made a case study on the status of information technology development in Kenya and assessed how the public universities along with their libraries in the country should respond in order to compete effectively in the new technological dispensation and become part of the global information society. The topics covered under the study includes: IT environment in Kenya, Internet connectivity, Telecommunication services in Kenya, National IT and network infrastructure, IT opportunities for public universities in Kenya and IT status in university libraries in Kenya. Concludes that libraries in Kenya should pay greater attention to emerging information technologies such as the Internet, virtual libraries, full-text journals, and electronic services. Progress towards library automation must be accelerated, and strategies towards this goal redefined. Efforts should be made by the libraries to enhance the IT skills of their existing personnel, or to recruit people with such skills, in order to embrace and manage such technologies.

Bharat Kumar (2003)²¹ made a study on the status of automation activities at five university libraries of Haryana state with the objectives: Which hardware and software packages are used; Which library functions and services have been or are being automated; and What are the impediments to and impact of automation. Five universities in the state were selected for the study. Questionnaire and observation techniques were adopted for data collection and the data have been presented and compared using tables. The aspects covered in the study are the library collection; History of automation efforts in the university libraries of Haryana, Retrospective conversion, Considerations for automation; Hardware and software used in these libraries; various housekeeping operations; financial management, services rendered; CDROM infrastructure available; networking; impediments to library automation and impact of automation.

The study revealed that Kurukshetra University (KU) has the maximum number of computers while other libraries studied also have adequate number of computers. All the libraries initially used CDS/ISIS for database development and later opted for commercial software mainly Libsys. None of the libraries except Guru Jambheshwar University has automated all the acquisition procedures. Haryana Agriculture University (HAU) and KU and National Dairy Research Institute (NDRI) libraries are using computers for cataloguing but none of the library is using it for classification. NDRI is the only one that has automated the whole circulation procedures but none uses barcodes for circulation activities. HAU has automated all the serials management functions. Maharshi Dayanand University (MDU) has not automated the serials management. HAU library is the only one using computers for financial management. HAU did not feel any impediment to automate the library while GJU library expressed that it disturbed the routine work due to the lack of staff members. Improvement in quality of services and library facilities, saving in time and introduction of new services are the major impacts felt by all the libraries. Reduction in workload is the impact felt only by KU library.

Suggested for interaction between the staff among the libraries to speed up the automation activities as well as for consistency in their jobs and for provision of more infra structure to strengthen and improve the services.

Dabas et. al. (2003)²² made a study on the status of library automation in nine university libraries in Punjab, Haryana and Chandigarh in the background of yesteryears and expected future. The main objective of the study was to measure the level and status of library automation in University libraries of Punjab, Haryana and Chandigarh. It is a sort of audit and investigation of the existing scenario of library automation. Another objective was to find reasons for lower level of automation than the desired level and suggest corrective measures. Questionnaires and observation techniques

were used for data collection from nine libraries. It throws light on the availability of hardware and software in respective libraries and examines types and forms of library collection. Gives a brief overview of library automation in historical perspectives in the selected libraries and focuses on house keeping operations, i.e., acquisition, technical processing circulation, serials management, financial management, services, library administration, CD-ROM and networking infrastructure. Also raises vital issues of concern and impediments in the way of library automation and tries to provide solutions. The paper has tried to identify the impact of automation on the libraries under study and concludes that all the nine libraries are heading at a fast pace towards automated systems. Since the sample of nine university libraries is a representative one in all respect for all the 273 Indian university libraries, the inferences drawn from this study can be considered for all the university libraries.

Study showed that Kurukshetra University Library, Kurukshetra (KULK) has the largest number of computers while Guru Jambheshwar University Library (GJUL) has got the lowest. All the libraries are using Libsys software but face the problem of creating regional language databases. Only Gurunanak Dev University Library (GDUL) and Punjab University Library (PUL) are providing computerised documentation service. Except PUL and Thapar Institute of Engineering and Technology Library (TIETL), no other library could switch over to complete automated systems.

Certain corrective measures such as mutual cooperation among these libraries and more effective teamwork, charging of nominal fee for the services rendered and extension of services to corporate sector and dynamic management approach such as TQM, reengineering, organizational learning and benchmarking are pointed out. Paper concludes that networking of university libraries will logically be extended to digitization of printed material in future.

Chandraiah (2003)²³ made a study on the status of automation in three university libraries situated at Tirupati that comes under INFLIBNET purview such as Sri Venkateswara University Library, Sri Padmavathi Mahila Viswavidhyalam Library and Rastriya Sanskrit Vidyapeeth Library. It was a questionnaire-based survey. A structured questionnaire with multiple choices and open-ended questions, designed according to the objectives was distributed to the University libraries. Hardware, software, manpower, collection, network facilities, grants received from INFLIBNET and subscription of E-journals were studied. The study also extended to understand specific problems of the university libraries in automation.

Study revealed the poor state of the library that there is recession in the progress, budget cuts, reduction in staff size and delay in resource allocation are very common features and the manpower situation is bad and both the hardware as well as software facilities are quite inadequate in these libraries. No library has any collection policy towards E-resources. Study suggested for more infra structural facilities; better training for manpower development; providing software for housekeeping operations to all the libraries.

Julich et. al. (2003)²⁴ made a study on the University of Iowa's process of system migration from selection and data conversion to implementation and presentation of the new system to staff, faculty, students, and the public. The university ran a NOTIS system from 1986 until 2000. The system was robust and fully functional for the needs of the times. Eventually the campus began to realize that the system did not meet its current needs and there were serious concerns about the expense of maintaining this extensive, mainframe system written largely in Assembler. Local computer center support costs for system support for the mainframe system had become prohibitive. In 1996, the university made the decision to migrate to a new system. In August 2000 that migration was complete. The article describes the four-year process undertaken at the University of Iowa. Following a three-year selection effort,

Ex Libris' Aleph500 was chosen as the new system. Staff effort during the selection process and implementation is analyzed and quantified. A comprehensive review of implementation efforts is described including system and client configuration, functional testing and problem reporting, training, and local programming.

Mutula and Makondo (2003)²⁵ in a case study discussed the collection development practices at the University of Botswana Library (UBL) in an environment of increasing electronic resources of information. The UBL is fully automated. All the library procedures, namely cataloguing, serials management, acquisitions, circulation, online public access and examination papers are automated. The library was first automated using the TINLIB integrated library system in 1992, but due to teething problems, the system was replaced in the year 2000 by the INNOPAC (online public access catalogue) millennium system. INNOPAC is an integrated library system, which supports the cataloguing, acquisitions, online public access, serials management and circulation modules. The library catalogue called *Medupe* is accessible over the Web. The system has the capacity to handle 60 simultaneous users. The use of CD-ROM databases was introduced in the library during 1992/1993 when a CD-ROM server was installed and became operational in 1995. The CD-ROM server can be accessed over the university's intranet. The university's examination questions are provided online and the library has full Internet connection with access to various other online databases worldwide. The management of the library automation system is vested in the systems librarian who heads the automation section of the library which is basically responsible for the maintenance of all the IT related equipments and services.

Though most materials selected are in print form, there is an increasing amount of other media such as films, computer programs, videodiscs, and cross-media materials. Selection of materials is done online using online

catalogues of book publishers. When selecting a journal, the subject librarian will first circulate it to the members of the academic staff for their input. If the journal is accepted, the librarian then does a content analysis of the journal, whose findings he/she presents to the Library Selections Committee for approval. The materials selected by subject librarians are forwarded to the Technical Services Department for ordering, purchase, and processing. Ordering is done online by e-mailing the suppliers using the INNOPAC acquisitions module. Raising orders via the acquisition module started in 1993 with two terminals using TINLIB. In 1994, a decision was made to acquire only materials with bibliographic records in machine-readable format in order to speed up cataloguing. Since then, major book suppliers provide materials along with their respective machine-readable records. The requisitions for payment are made and forwarded to the bursar's department for payment before the materials can be received.

Venkata Ramana and Rao (2003)²⁶ conducted a study on the use of Information Technology in 14 Central University Libraries of India that are at various stages of advancement in the use of IT. Questionnaire method was adopted for collecting data from these universities. Study revealed that the main objectives of the automation programme in these libraries were the improvement of access to the collection; improvement in quality of existing services, reducing routine and time consuming clerical works, improving the speed of cataloguing, technical processing and putting items on shelves faster; offering improved range of services and improving co-operation and resource sharing among libraries. The chief person involved in the automation planning was the University Librarian supported by Deputy Librarians, Assistant librarians and computer specialists. Several steps were taken for library automation and the highly rated steps are: sending staff for training courses, visits to automated libraries and consultation with other librarians. The first three ranked factors that influenced software selection were the

easiest for library staff and users; supports the cataloguing record format most used in the country and the comprehensiveness of the software.

The main constraints faced in automation implementation as pointed out by the libraries were inadequate financial resources; lack of well-accepted standard software package and non-availability of IT trained personnel. Regarding the hardware side it was found that most of the libraries are using personal computers while only the University of Hyderabad uses mini computer. Regarding the software, it found that different software are in use in these libraries. The application of computers in library operations and services also found to be varying in great degree. Regarding the standard used in databases it is found that majority are following CCF tags. Five libraries have access to INFLIBNET, four ERNET, three NICNET, DELNET and INET each and regarding participation in networks, seven libraries participate in LAN while five in MAN. The survey confirmed that IT has deeply embedded in the management of information in these university libraries and it has become a powerful tool in the management of routine library operations and services.

Vyas (2003)²⁷ conducted a survey 12 state universities as well as deemed university institutions of Rajasthan to study the status of library automation. IIT Delhi Library was also sent a questionnaire to act as a role model to Rajasthan university libraries. The survey attempts to find out the following aspect of library automation: availability of reading material, financial support to library automation, hardware configuration in libraries, use of application software, initiation of library automation, status of house database preparation, user services, housekeeping operations, networking accessibility of libraries, problems in computerization and networking, assessment of computer applications and networking, and measurement of satisfaction regarding automation of information system. It concludes that the university libraries are interested in library automation and are ready to

participate in resource sharing at state and national level. But INFLIBNET should speed up to attend to the grievances of SOUL users. INFLIBNET should also provide multilingual script to SOUL software to speed up database preparation.

Sinha (2004)²⁸ made an evaluative study on the automation and networking status of libraries in North Eastern (NE) region of India. The main objectives of the study were: to find out the present status of computerisation in Universities/Institutional Libraries/LICs located in the region; to evaluate the source of fund available for library automation and networking or computerisation; to examine the status of IT infra structure (hardware and library application software) available in university libraries/institutions; to find out the computerized services being offered in these libraries; to examine the status of library networking, membership of data networks; to evaluate the use of Fax, Telex, Email/Internet services by the university community; to find out the use of multimedia/CD ROM databases and online databases services; to find out the status of the creation of in-house bibliographic library databases of books, serials, theses and experts taken under the initiative of INFLIBNET; to evaluate the role of INFLIBNET and other library networking agencies for rendering financial and other support for automation and networking activities; to evaluate the need of manpower training for implementation of library automation and networking programme; to find out the role of various agencies for organizing computer training programmes for library and information professionals; and to identify the role of university authority and senior library professionals for deputing the library professionals for IT training. Questionnaire was used to collect data from the institutions. Also made visit to various libraries, direct observation was made and interview of library professionals was also conducted.

Study showed that INFLIBNET is the major funding source for the university libraries of NE region and computerisation was started mainly during 1996-2000. Out of 15 libraries only 26.7% are fully computerised where as 33.3% are partially computerised. 26.7% have opted for Internet connectivity through BSNL while NICNET and ERNET has connected 20% each. PCs with CDROM and multimedia facilities are available in 93.3% while one uses mini computer. Library application software is available in 93.3% libraries, 26.7 have hosted their websites and 60% have OPAC in their libraries. The IT based services provided by these libraries are found to be varying. Data entry operators as well as commercial vendors did database creation in these libraries. 60% have procured CDROM databases and 46.7% have access to online databases. LAN within the library is available only in 33.3% libraries where as campus LAN is available in 26.7% libraries and networking of library computers have not yet started in 40% libraries. 80% of libraries have appointed library staff having working knowledge in of computer handling and 46.7% have appointed Information Scientist. The main problems encountered in the implementation of computerisation programme include lack of adequate infrastructure, trained manpower and hardware as well as software, non-availability of regular power supply, cumbersome procedures in purchases etc. Suggestions put forward for the improvement of the computerisation process includes need for an action plan, procurement of hardware and software as per latest configurations, seeking guidance from experts in the field, visit to computerised libraries by the senior staff, framing of easy procurement procedure, providing regular power supply with the help of UPS, separate financial support for data entry, appointment of information scientist on regular basis, intensive and compulsory training programme to senior professionals, timely release of fund and following of standard given by INFLIBNET for data capture.

2.3 Database Creation, Retro-conversion

Database creation and retrospective conversion of the bibliographical as well as other data in the library are a Herculean task when the collection is too large. Generally the university library collection may run to Lakhs of records and its conversion poses many administrative as well as technical problems to the librarians. It is imperative to have the library database in a standard digital format to provide the information retrieval services or OPACs as well as to begin the housekeeping operations. There are different methods of creation of database and there are many points to be considered while developing a database like choosing data elements, access points, standards to be followed and the method of the database creation etc.

Singh (1990)²⁹ in his description on use of CDS/ISIS package in computerizing the Library and Documentation Division of Indira Gandhi National Open University narrates his own experience of database creation in the library. Till the procurement of CDS/ISIS package in 1989 computers were used for word processing and later it was used for information storage and retrieval. The library has computerised collection development and processing which includes acquisition of books and technical processing. The library uses DDC 20th edition, Cutter's code for book number, LC Subject Heading and AACR II for cataloguing. Two separate databases namely database of Library and Documentation Division ie. for Central Library, Database for Regional and Study Centres collection and database of documentation of distance education were created. The central library database was to provide for an online computer catalogue of the central library collection and to print standard library catalogue using AACR II format. Tag numbers are chosen according to CCF for the databases. Regional and Study Centre database was to support the purposes like to know the study center identified for a particular course and to place orders for books recommended for the course for these centers only, to monitor the receipt of books against particular order, to allot accession number for

particular title supplied to each center, to print the accession lists as well as the catalogue cards and to serve as a union catalogue for total collection of Regional and Study Centre libraries. Database of Documentation of Distance Education consists of records repeating journal articles and analytical entries of books in the field of distance education. This database is created for SDI, CAS and retrospective searching. The author suggests, from the experience of creating different databases, a single comprehensive database with complex database structuring and complex search strategies. If more databases are used the same database structure, i.e. CCF tags must be used so that it can be integrated in future when need arises.

Lakshmi and Rao (1996)³⁰ indicated the importance of a serial database and identified the function of an ideal serial database as ordering and subscription control, check-in, routing, claiming, binding, fund accounting, enquiries and reporting and statistics. As they found neither any existing commercial software nor CDS/ISIS meet these requirements, at DRTC Bangalore, another software was developed in C language. Features of the software are creation of master file, indexing services and printing services and the record format is in conformity with ISO 2709.

Patel and Sharma (1996)³¹ based on their experience at Space Application Centre Library of Indian Space Research Organisation, Ahmedabad discussed the conversion process of the library holdings bibliographical description to machine readable form. A proposal for designing and developing computer based information system was prepared in 1982 and later endorsed by Library Committee. Information storage and retrieval was identified as the first area where computer application is to be made, machine-readable file has been created for books, journals, articles, technical reports etc. This file has been used as database for providing Current Awareness Service, production of catalogue cards, indexing, effective SDI and retrospective search services etc. Database for books, reports etc. was

made in machine-readable form in mid 1987 only as a regular basis using dbase III. AACR II was followed for bibliographical standardisation. Retrospective conversion for data prior to mid 1987 collection was made on prioritization by type of materials. Quotations were invited on large scale from various vendors for doing the work of retro conversion. Conversion of book database was done by vendor, reports partly by vendor and partly by library staff and bound volume by library staff only. The standards used were AACR II, UDC, NASA Thesaurus and ISO standards were followed. Shelf-list cards of books were photocopied for library record and cards were given to vendor for data entry and vendor brought back data on floppy. After print of the records, library staff edited each record with the Shelf-list cards. Vendor completed the task after the final editing of the complete database in machine form. Authors are of the view that in retro conversion, due to shortage of staff, library professionals find it difficult to cope with their normal day-to-day work and therefore can think of database creation only with special efforts in a team spirit. Availability of readymade databases for downloading could alleviate much of the problems.

Reddy and Rao (1996)³² in their study based on their experience at IGM Library, University of Hyderabad discussed database creation, updating and retrospective conversion of earlier data related to books. After acquiring Intel 80286 PC/AT for library automation in 1989 the first step was to design a database using in-house developed dbase III Plus application software. Titles processed for the entire month were entered in to the main database LIBMAST. Printing a monthly list of addition along with catalogue cards and database searching for the required author/title/keywords accession number call number was possible after indexing. In 1991, Libsys package (Xenix based) was acquired and upgraded later in 1993 to Unix based on to Intel 80486 system and transferred to DEC Alpha 2000 Client/Server, DEC OSF based in mid 1995 called Digital Unix to meet the increasing user requirements. Database created using Dbase III Plus was exported to Libsys.

Authors, from their experience, expressed the view that before going in for database creation it is necessary to decide on application of cataloguing codes, classification scheme, hardware, operating system, application software and staff training. AACR II and DDC 18th edition were followed. Data entry was done with care to avoid editing that would be time consuming. For retrospective conversion shelf list cards were used and books purchased from 1989 were already in the Libsys database. Authors are of the view that database creation including retrospective conversion is time consuming and need careful planning. Most libraries are worried about converting the older records because it requires money, manpower and proper decision-making. Libraries should create their databases that will enable them to get in to the network and also provide better and efficient services to their users.

Tyagi (1997)³³ described the experiences of database creation at Defense Research Organisation (DRDO) libraries. Defense Scientific Information and Documentation center was entrusted the job of Computerisation. As databases were to be created at centers in Pune, Hyderabad and Delhi, need for standard structure was felt and CCF was adopted. For capturing data a data input sheet and a manual for guidance in data elements selection was prepared. The software, 'Catalog' was developed for data entry and a training programme in data conversion for professionals at different laboratories was conducted. AACR II with slight local variations was followed for cataloguing rules. It was decided to add recent books to the database first as these are most sought by readers. Some records were already available in non-standard machine-readable form in dbase, FoxPro and CDS/ISIS in different libraries and efforts were made to convert these data with CCF format using different interfaces. Converting this saved 60 percent in terms of cost. Where it was not possible to import the data into 'Catalog' format 'Reword' software has been used.

Reddy et. al. (1997)³⁴, in a case study on database creation and data correction at IGM Library, University of Hyderabad discussed how to manage the correction of books database for the data entered during retrospective conversion operations and regular cataloguing function using a different format other than Libsys. In a database creation process errors may occur at various stages through different ways like through data entry, improper source data, incomplete records, inefficient database design, system failure, mistakes due to unskilled/unwilling staff, duplicate entries, different class numbers etc. Two methods i.e. Print Method and Display Method for correction of database are suggested. Printing accession number wise list with minimum details may be taken up. After taking the print it can be checked with the Accession Register or shelf list or with the document itself. In the display method, records are displayed on the screen and online correction is made. Advantages of data correction are that it results in an error free database for usage by the clientele, easy searching of records, strengthening Boolean search, finding accurate status of the collection, providing efficient service while networking, effective resource sharing and perfect conversion of formats. The notable disadvantages are that it is a time taking process, which may result in the non-cooperation of the staff and the computer systems may not be available for the users while checking is in progress.

Bavakutty and Muhammed Salih (1997)³⁵ in a case study of library automation experience at CHMK Library, University of Calicut discussed different aspects of database creation. Hardware configurations and software used by the library are listed. Authors found data entry by library staff, who are familiar with cataloguing codes, classification schemes etc. more helpful in the long run of data entry. Data entry was done using the main card of catalogue and editing was done to make corrections in the database. For catalogue cards that need detailed checking or correction the catalogue cards were handed over to the Technical Section. After making corrections the

Technical Section returned it to the Computer Section and data entry was completed. The corrected records were added to main database after running certain programs to check the integrity of the data. The data integrity was checked to trace the existence of the '#' character in the database that causes for field break in the database and its presence in the data is a reason for the corruption of CDS/ISIS databases. When an export/import operation is done unnecessary field/record break happens and the database gets corrupted. So it is to be removed using any programme to keep the CDS/ISIS database in tact. The backup of the data was taken after the completion of each day's work.

2.4 Automated Services

In a computerised library a wide variety of services can be provided to the users and the availability of the resources in digital format enables the manipulation of the resources in many desired ways. The prime objective of the computerisation itself is the enhancement of the services and operations in a qualitative manner and usually automated libraries provide many new and innovative services to its users.

Varatha Rajan and Reddy (1996)³⁶ discussed the multimedia services provided at IGM Library, University of Hyderabad. The potential of the media is discussed in detail and the hardware and its configuration required for the service is mentioned. Multimedia facility in the library is provided at the computer division of the library on a first come first serve basis. CD titles highly in use are loaded on the CD-Net to enable the users to access over the campus network also. As part of regular library orientation programme training on use of CD-Net is also included. Multimedia services are provided on stand alone PCs. The specifications of necessary gadgets are given. In the instruction programme to users, one to one instruction, though more time consuming was found more effective. At the opening of academic session group training section is conducted and this is not found as effective as one to

one training. As the retrieval of information from CD ROM/Multimedia is fast the authors are of the view that this media need to be considered for acquisition purpose also. The library should use them to maximum extent by providing information to many users in and outside their university libraries leading to better resource sharing activities among the libraries.

Rao (1997)³⁷ in a case study described a network operated information service by the IIT Bombay Central Library to provide the most current bibliographic data that includes content pages and abstracts of papers from Science and Technology journals. Details, right from the planning of the service, the programme used called DISTRIB, the objectives of the programme and file structure and algorithm for DISTRIB are discussed. Author found the network service of identifying and informing faculty about the information on forthcoming journal articles by Email widely appreciated. The study has shown that the users expected access to resources across the institution through network.

Dugan (2001)³⁸ made a study on the issues concerning the introduction and management of the interdependent laptop computers and wireless networking services provided by the Mildred F. Sawyer Library at Suffolk University in Boston. Suffolk University does not require its students to own laptops; that is not consistent with its long-standing mission. The availability of laptops and the wireless network at the Sawyer Library is a convenience and service for students and they make use of it for accessing Internet as well as for other applications also.

Gregory and Nixon (2003)³⁹ discussed the Instruction Commons information literacy initiative at Iowa State University that provides users with both an information literacy program and a virtual space in which students, librarians, and members of the teaching faculty at Iowa State can explore new ways of integrating electronic resources and library research instruction into teaching and learning. Furthermore, the concept of a

"commons" implies not just a collaborative information space for students, faculty and librarians, but also an area in which an information literacy program can subsist with learning materials that promote IT literacy. The paper described the institutional background of the Instruction Commons, its history, funding, and organization while also providing a description and tour of the Commons. Future directions are also anticipated, including the need for effective program assessment with a view to extracting useful planning and management information. With regard to functionality, the integration of more interactive features, including increased use of learner-controlled paths and quizzes to provide immediate feedback are anticipated.

Lee (2004)⁴⁰ discussed the involvement of the Hong Kong Baptist University Library in continuing the teaching and learning process at the outbreak of SARS. The outbreak of Severe Acute Respiratory Syndrome (SARS) in Hong Kong in 2003 caused massive disruptions in many sectors of the society. Many creative solutions were devised with the aim of continuing the teaching and learning process in educational areas. Among them, the initiative of VITLE classes was probably the only one involving the direct participation of an academic library. Information technology was employed extensively and creatively in these efforts. It was a logical extension for the library to be involved with the "Classes suspended but learning continues" initiative. As an outreach effort to the learning community during the class suspension period, the HKBU Library participated in the pilot program by conducting a 45-minute class titled "Learning to learn: effective information searching" 3 April 2003. In this programme Individual students simply accessed the virtual classroom with the username and password issued by the University after registration at www.ilearn.com.hk The content of the class introduced some basic facts about the Internet, effective searching skills on the Internet, library classification schemes and online public library catalog as the fundamental library tools. The purpose of the session was to promote the

awareness of effective information searching in library and information resources to the general public.

Kolovos et. al. (2004)⁴¹ made a study on the electronic online access showroom, which is used to record and to announce the newly acquired books to the users of the library of the University of Macedonia. The online showroom includes a specially designed digital "exhibition area", which is accessible via the World Wide Web and which is periodically updated with the new book acquisitions of the Library. The users of the library can browse the book catalogue of this exhibition area directly from the Web with an ordinary Internet Browser. The catalogue can be sorted on date, author or title according to the user's preference. Also, instead of browsing the book catalog, the users can execute a search on the stored records, by keyword, title, author, subject, ISBN, or publisher, in order to limit their search to the subset of records that mostly interest them. Furthermore, from the central book catalog, or from their "search-results" list, the users can retrieve more information concerning a specific book, simply by doing a mouse-click on the book title. The returned information includes the table of contents, the cover and the backside of the book, the classification number, the ISBN, the title and subtitle, up to two subject headings relevant to its content, the author name(s), the publisher and the year of publication. Additionally, if they wish, they can make a reservation for one or more books, by filling in a simple form, with their full name, their e-mail address and their user code number (a number which is provided to them on their registration with the library), in order to be notified as soon as the book(s) become available. This electronic browsing system is available in two languages, Greek and English. The user is able to change the language preference from any screen at anytime. In addition, the online showroom comes with a separate online database management environment, which is also accessible via the Web but only by authorized users. This environment allows the management of the book records and of

the authorized user accounts, including the insertion, deletion and editing of the records and users.

Singh et. al. (2004)⁴² conducted a study on the computer based services supported by INFLIBNET Centre at Manipur University Library (MUL). The objectives of the study were: to ascertain the requirements of the users; to assess their attitudes towards INFLIBNET services of MUL; to analyze how far they have benefited from the programme; to check the problems and difficulties they encountered and to seek suggestions from the users to the overall improvement of the programme. Survey was conducted using Questionnaire administered to different user groups. Study revealed the need for improvement in terms of funding, hardware, involvement of more staff in the services, digitization of documents and online access to other libraries and databases.

The suggestions put forwarded by the users include: necessary arrangements for uninterrupted power supply; user education programmes on regular basis about the services provided under INFLIBNET programme of UGC; Provision for more user friendly services; adequate number of computers in the library in proportion with the number of its users; necessary arrangements to improve the speed of the Internet by upgrading V-sat; regular Internet services and provision of full text of the documents to the users.

The major findings of the study are summarized as: the INFLIBNET services of MUL are not fully known to all groups of users and new members of the library especially PG students and non-teaching staff are required to be educated in the services; majority of the users have knowledge of computer/internet access irrespective of their sex criterion except in case of female PG students; the overall awareness of users about INFLIBNET services is encouraging; sending email is the most important purpose for majority of Internet users; the speed of Internet is not sufficient for the users; Users not

seem to be aware about access to OPAC and COPSAT services of INFLIBNET; the general attitude of the users toward the services are varied among different group of users; majority of the users depend on the services to meet their information needs and are partially satisfied with the same and majority of the users encountered different types of problems in the use of the services for which they adopt different ways to overcome.

Choukhande and Dongre (2004)⁴³ conducted an analytical study on electronic sources and services provided to research scholars of Visvesvaraya National Institute of Technology (VNIT) Library, Nagpur. The objectives of the study were: to examine the different factors which facilitate information/sources/services to the user of VNIT library; to correlate the adequacy of the collection vis-à-vis research needs of the users of VNIT library; to identify the various channels of electronic sources through which information is accessed by users of VNIT library; to identify the constraints faced by the research scholars in using/searching information on electronic sources in library. Survey method was adopted and 100 questionnaires were served among the users and out of which 72 users responded. Certain hypotheses were put forwarded they are: VNIT library provides facility of electronic sources and services to the users, and the research scholars are satisfied with adequate collection in the library; the users access information through various channels equally; the users do not face any constraints in using or searching information on electronic sources in the library. Statistical analysis of the study was done by simple percentage and chi-square test. It is concluded that VNIT Library provides all students, researchers, teachers and other users to access the latest scientific literature and enables them to keep pace with the developments taking place in the scientific world and helps to make a positive impact on the quality of research.

Ramesh Babu and Tamzhchelvan (2003)⁴⁴ conducted a study on the subject access in online catalogues in the state of Tamilnadu. The major

objective of the study was to gain an overview of the access features of the OPAC interfaces being used in Tamilnadu. A sample of 50 libraries in Tamilnadu was selected and a structured questionnaire has been administered. The analysis of the data represents the state-of-the-art of the libraries in the winter of 2002. The major findings includes: application of IT is a late nineties phenomena; as many as eleven brands of OPAC interfaces are being used; books and periodicals were covered in the OPACs; eleven access points are provided; subject access is possible through a variety of ways; simple and advanced searches are observed and five types of search methods are noticed but not provided by all the interfaces. Authors are of the view that subject access functionality is yet to reach its full potential in the OPAC environment.

Ramesh Babu and Tamizhchelvan (2003)⁴⁵ described the research survey conducted at the Department of Library and Information Science, University of Madras, Chennai, India. It examines features provided in online public access catalogues (OPACs) in Tamil Nadu. The study had the objectives: to trace the genesis and development of OPACs in Tamil Nadu; to examine the nature of software being used in the design and development of OPACs; to examine the number of access points provided for searching the OPACs; to examine provision for subject access; to study the search strategy and search techniques offered; to study the bibliographic display features in the OPACs; to identify the provision of external links in the OPACs; and to study the physical features of the OPACs. OPACs are recent developments in libraries in Tamil Nadu. A questionnaire was prepared based on the checklist of features and functions of a Web OPAC interface developed by Ramesh Babu and O'Brien (2000). The questionnaire was distributed among 50 libraries in Tamil Nadu, where OPACs are designed, developed and operational. Out of 50 libraries, 36 responded, a response rate of 72 per cent.

A total of 77.8 per cent of libraries use different commercial software and nine types of commercial software are in use by the libraries studied. But nearly one-quarter of the sample developed their own in-house software. While all the libraries in the survey cover books in their OPACs, nearly 75 % have included periodicals. But it is observed that these OPACs are still in the development stage. OPACs under survey have provided as many as 11 access points. While a search facility by author, title and accession number, is provided by all the libraries, class number search is provided by 91.7 per cent, and 83.3 per cent of libraries have provided search by keywords. Although access points such as ISBN, ISSN, classnumber are provided by the OPACs. The most frequent search is by keywords either in title or in any part of the bibliographic record, as is seen in 83.3 per cent of the sample. It is noted that a large number of libraries did not adhere to any standardised vocabulary control tools. On the other hand, in-house developed headings are being used in 18 libraries. The provision of subject access in the libraries surveyed is not comprehensive. Although 91.7 per cent of libraries do offer class number search and Dewey Decimal is the most common classification scheme used. OPACs have other features such as command-driven menus, drop-down menus or pull-down menus, a stop word facility, suggestion boxes or e-mail boxes. While more than three-quarters of the sample (75 per cent) have the provision for drop-down or pull-down menus, about one-third (36.1 per cent) have provision for online mailboxes for user comments and suggestions. Academic libraries are leading the field: with the financial assistance of the UGC and encouragement by the INFLIBNET programme, they are converting their print catalogues into machine-readable catalogues. The coverage of OPACs tends to be limited to book collections as a priority.

2.5 Evaluation of Computerisation

Evaluation of computerised services and operations enables one to look at it with a critical mind and find out the shortcomings, if any, and solve the problems faced by the system as well as to highlight the plus points of the

system. Chopra and Mukherjee (2000)⁴⁶ made an analytical study on the use of Information Technology in the library services at the University of RDVU, Jabalpur. Study is based on the user profile maintained by the university library covering the period from January 1997 to August 1999. The hardware configurations and software available are listed. The services measured are Email service, data search service through Internet and photocopying service. Problems faced in the Internet services are summarized as: non-availability of proper and continuous connectivity; websites of Indian aspects are very meager; data is retrieved very slowly and some time junk characters appear; Boolean operation for advance search does not yield satisfactory results; current data is mostly made available whereas the chances of retrieving retrospective data are very few; data availability in social science and humanities is very little.

Certain suggestions put forward include: services of a trained professional to manage the automated university library system; separate VSAT connection for the library for fast Internet access; making provision for adequate funds for library automation by the UGC and state government as well.

Bii and Wanyama (2001)⁴⁷ presented the details of a study examining the impact of automation on the job satisfaction among library staff of the Margaret Thatcher Library (MTL), Moi University, Kenya. With the exception of the University Librarian, his Deputy and the Systems Librarian who were interviewed face to face, questionnaires were distributed to all other library staff. An 80 percent response rate resulted. It was established that there were myriad problems within the library regarding training and access to automated systems of interest. However, MTL staff members viewed automation as enrichment and a source of satisfaction to their jobs. Concrete plans for consistent structured in-house training; free access to the available

software, additional systems staff, and centralised databases etc. must be implemented to boost the staff members' job satisfaction

2.6 Digitization and Digital Collection

Digital libraries have greater advantage over libraries with print collection in terms of procurement, processing, storage and retrieval of resources. Now-a-days, libraries are digitizing their collection to enhance its use as well as to protect the valuable collection from deterioration. Similarly Electronic Theses and Dissertation (ETD) projects are carried out in many foreign university libraries to enhance the dissemination of precious knowledge contained in unique sources of theses and dissertations. But in India ETD initiatives are in its infancy stage. Reddy and Pradeep (1997)⁴⁸ made a study based on their experience at IGM Library, University of Hyderabad, on Document Image Processing and Management System. Need for document image processing in the context of multiplication of printed documents and space occupied by this media is established. At IGM Library, content pages and newspaper clippings are scanned and kept subject wise in the respective electronic folders for each department. A poor quality document or the way a page is scanned can cause a lot of unrecognized and inaccurately recognized character. If the resolution of the scanner is not set properly it may also cause problems. Once scanned properly and posted in the folder, users can browse the document and if they need the copy they can send a request over the network or directly come to the library. Such storage doesn't have wear and tear due to usage of documents and helps data integrity. Library has controlled the access to different people. Utilization of this technology is useful for quick dissemination of very recent information.

Shaw (2000)⁴⁹, from a case study perspective, discussed the historic Pittsburgh project at the University of Pittsburgh, which is a digital collection that provides an opportunity to explore and research the history of Pittsburgh and the surrounding Western Pennsylvania area on the Internet. It is a joint

project to virtually gather the historic resources of the University of Pittsburgh and the Historical Society of Western Pennsylvania (HSWP). The Web site provides access to full-text collections, archival finding aids, real estate plat maps and the Historical Society's library catalog. The study focused on how the technological and infra-structural environments at the University of Pittsburgh influenced the development of Historic Pittsburgh's full-text collection by the Digital Research Library, a unit within the University Library System. It examined how the staff of the Digital Research Library moved from a small pilot project to full-scale production while offering insight into some of the challenges that were faced. In conclusion the article summarizes some of the lessons learned in the course of the project. In August 1997, the ULS appointed a working group headed by a full-time librarian with an objective to explore options and approaches to develop a digital library project. Members of the working group included librarians, archivists, bibliographers, catalogers, and technical personnel. By the spring of 1998, a realistic assessment of opportunities and constraints emerged after some preliminary experimental work and hours of research into models and standards. As a result, the ULS established the Digital Research Library department and two major content priorities surfaced. The University holds an extensive collection of 19th century schoolbooks that are widely used in a variety of fields of research. The Digital Research Library recognized the important opportunity to study and disseminate this unique collection of materials electronically because rare availability of many titles. In addition, there was strong interest expressed by members of the faculty, librarians, and schoolteachers in a project that would focus on the unique history of the region. Using the Internet to collocate dispersed materials that existed in several different physical locations was particularly appealing to the project planners and a decision was made to concentrate first on what became known as the Historic Pittsburgh project. A project team was subsequently formed. The initial pilot for the Historic Pittsburgh project was funded from reallocated institutional resources with a view towards mobilizing additional

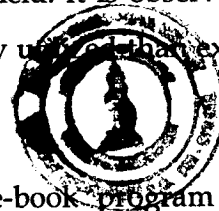
funding after demonstrating a successful project. After considerable research, the Digital Research Library identified several non-content driven considerations that influenced its approach and overall philosophy towards the development of the Pittsburgh project. A history bibliographer at the ULS identified 20 significant books in the public domain. An analysis of the widely varying document structures of the late 19th and early 20th century books was performed, and information about document structure and pagination were captured in a spreadsheet during collation of the books. The pilot images were scanned locally on a flatbed Hewlett Packard scanner at 600 dpi or on a Minolta planetary scanner at 400 dpi. Optical Character Recognition (OCR) was subsequently performed on the resulting images after each image was checked to ensure that it accurately represent the page. Descriptive bibliographic information was extracted from the MARC record and transformed to an SGML-encoded header for the digital edition of the work. The pilot project gave staff an opportunity to identify points in the process that might effectively be automated.

A modest pilot project was ready for demonstration to a the Hillman Foundation. The demonstration garnered enough support and funding to proceed with the first production phase of the project. Moving into a production mode to digitize 500 books over the course of two to three years required that staff identify processes that could be automated or assisted by automation as well as those where human intervention would dramatically increase the quality of the product. Through several iterations the Digital Research Library adapted a workflow that balanced the need for speed, accuracy, automation, and human intervention.

Digitizing over 500 books by the Digital Research Library would have required a heavy investment so the DRL secured a vendor that could handle all aspects of the high-volume imaging process and could better manage imaging costs and production flow. The Digital Research Library staff

examined for accuracy both the facsimile reprints created to replace the originals books and the digital files themselves. Significant improvement in the quality of the OCR could be obtained by using pre-zoning tools on pages that have illustrations. The final stage of the production process involved preparing the raw materials—bibliographic information about the original text, structural metadata, OCR'ed text and images—for online display.

The project team initially decided to collect structural metadata about the books to increase access for users and to make it easy to encode the SGML automatically. The metadata spreadsheet also quickly became a fundamental tool in automating some of the more tedious and time-consuming production steps. The spreadsheet was used to automate aspects of the quality control process, enhance the OCR through pre-zoning, rotate images, and encode the SGML because it contains information about unusual book structure and notes images requiring special attention. Communication among the staff about how the online system should work helped to influence the data capture methods and design of production processes. Moreover, communication about problems with production steps allowed technical staff to develop automated routines to handle the most tedious tasks. The DRL was forced to develop production processes as it went along since it was a relatively early implementer of a local digital library of published texts. The staff of the Digital Research Library sought to follow standards and best practices established by experts in the digital library field. It is observed that the Historic Pittsburgh Web site has been more heavily used than expected by the creators.



Dillon (2001)⁵⁰ conducted a survey on the e-book program of the University of Texas at Austin (UT-Austin) covering the state of the e-book market and e-book technology. Provides e-book usage statistics for three different consortia, and offers guidelines for e-book acquisitions as well as e-book issues to be considered. Relevant specification, standards, and working

groups are explained, as are the future e-book plans of The University of Texas.

The initial reason for the library's interest in e-books was the desire to make scholarly resources of all types available over the WWW. After positive experiences with Web-based e-journals, full-text aggregators, and indexing and abstracting services, e-books were the obvious next step in the attempts to bring a full line-up of Web-based basic library resources to the clientele. After discussing the E-book format, delivery platform and digital right management issues the reasons for choosing web based E-books is elaborated. Collection development staff at UT-Austin have been keeping track of e-book usage from the beginning. The early assumptions were that e-books would receive little usage until there was a critical mass of titles, until the titles were in the OPAC, and until word of mouth built up to a sufficient point that it led to a shift in user behavior and a general acceptance of e-books. However, statistics revealed a surprising amount of usage only a few months into the project. Since then the vendors have altered their statistical packages, which resulted in a change in the way statistics were gathered and reported, but the e-books are still receiving steadily growing usage. A variety of e-book usage statistics are reported in this study. Percentage analysis of the usage of the e-books, comparison of e-book and printed book usage, mostly used e-books etc. are studied further.

Study revealed that e-books in the fields of economics and business, and computer science, are receiving higher use than other subject areas, with medicine and health close behind. Since these subjects all lend themselves to the quick reference-style look-ups that are already part of Web behavior, this may indicate that these subjects are particularly suited to Web-based e-books. The consortia collections available to public libraries, community colleges, and four-year colleges seemed to show a higher use of general history, literature, and sociology texts than do the e-book collections of those libraries

that support advanced degrees. This may be an indication that demand for this type of material among the term paper and report-writing students of these smaller libraries, exceeds the available supply of printed texts.

Based on the experience with e-books, librarians at The University of Texas have adopted the certain principles for acquiring scholarly e-books and these principles have been stated. The librarians from the e-book experience have learned the following points

- e-books in certain subject areas receive heavy usage, and that there is some usage in all subject areas.
- the nature and scope of an e-book collection will condition the use it receives.
- e-book usage appears to have no obvious correlation with whether or not the library owns a print version of the same title. However, once records for e-books and printed books routinely coexist in OPACs for a critical mass of titles, a usage relationship between the two formats may emerge.
- e-books require adjustments to a library's collection development, acquisitions, cataloging, and public service departments in order to integrate them into the routine operations of the library.
- e-book market is in a highly competitive stage where public relations myth making, and competing delivery mechanisms, formats and encryption schemes insure that it will be some time before all of the interested parties understand both the product and the market sufficiently well to move forward with a routinely sustainable and interoperable e-book product based on common standards.
- There is a need to acknowledge the simple concept that not all reading is the same. Just as the attention we give to a movie viewed in a theater is different from the attention we give to whatever is on television; the attention we give to a work of light fiction is different from that we

give to a cookbook or a software manual or a work of personal philosophical or religious significance. Not all content may be suitable for current e-book technology, or our readers' current cognitive habits.

- publishers and technology vendors are still largely focused on the container rather than the content, on protecting copyrights and developing market leadership first, and on meeting consumer needs and developing a digital readership base second. The majority of e-book vendors are focused on retrofitting old models to new circumstances, and searching for an economically sustainable way to do so.
- One thing e-books cause us to acknowledge is that not all textual content needs to be forced to fit into a single conventional size, or single type of presentation, or even to fit the generally agreed-upon intellectual communication model that we have come to know since Gutenberg. To date, however, most publishers are proceeding blithely forward as if they were not handling a new mutant form of information species that could grow up to be quite different from its traditional printed book parents.
- printed book remains a remarkably powerful, effective, efficient, and convenient means of communication.
- e-books are to printed books as television is to radio and movies: another format with its own strengths and weaknesses.
- e-book appears to have a bright future as a means of conveying information of interest to the scholarly community.

Arora (2004)⁵¹ conducted a study on various constituents that contribute to the making of a digital library at the Central Library, IIT Delhi. The increasing commitment for building up network-enabled digitized collections at the Central Library, IIT Delhi coincides with the installation of a fibre optics based campus LAN connected to a 2 MBPS VSNL Radio Link enabling faster access to the Internet for the academic community of the

Institute. The availability of high-speed Internet connection has led to the launching of a number of sponsored and non sponsored projects for building network-enabled digitized collections within the framework of the traditional library and information services at the Central Library, IIT Delhi. The Library has adopted a multi-pronged strategy to embark upon the digital world.

Ubogu (2001)⁵² in a study reviewed the existing African theses and dissertation projects, including the Database of African Theses and Dissertations (DATAD) and the African Universities Dissertations Abstracts (AFUDA) projects, and discussed the status of the Rhodes University project, responses from other institutions in the region and made suggestions for accelerated involvement of tertiary institutions in Africa, especially Southern Africa, in the international network of theses and dissertations. Rhodes University mounted its first digital thesis on the World Wide Web in 1998 and became the first institution in Africa to do so. Since then, the number of available theses and dissertations has steadily increased as more students come to appreciate the importance of submitting digital files of their theses. The university Senate made it mandatory for students to submit digital files of their theses and dissertations. In order to make electronic theses and dissertations (ETD) produced by tertiary institutions in Southern Africa readily available, universities in the Southern African region were invited to join the ETD initiative. This would lead to the building of a digital library of theses and dissertations in the region. A few institutions responded positively and, based on the adoption of the approach, have speedily gained approval of their governing bodies to embark on ETD projects. In addition, the South East Academic Libraries (SEALS), a library consortium of tertiary institutions in the Eastern Province of South Africa, is considering an ETD programme since this would promote collaboration between research programmes at separate universities/ technikons by making research work visible and accessible via a network archive.

Hashler (2003)⁵³ made a study on the effort of the University Library of the Vienna University of Economics and Business Administration to integrate a digital library component for research documents (theses and working papers) authored at the University into the existing library infrastructure. Setting up a digital library has become relatively a easy task using the current database technology and the components and tools freely available. However to integrate such a digital library into the existing library systems and to adapt existing document acquisition work flows in the organization are non-trivial tasks. They use a research framework to identify the key players in this change process and to analyze their incentive structures. Then they describe the light weight integration approach employed by the University and show how it provides incentives to the key players and the same time requires only minimal adaptation of the organization in terms of changing existing work flows. Their experience suggests that this lightweight integration offers cost efficient and low risk intermediate steps towards switching to exclusive digital document acquisition.

2.7 Networking, Resource Sharing and Consortia Initiatives

The concept of resource sharing among libraries is not a new one. But with the advent of computers in to libraries and developments in ICTs resource sharing among libraries attained a greater momentum. Computer networks at local, national and international level enables libraries to make the resources available over the network and reach the users in a more convenient way. Reddy (1997)⁵⁴ in a case study on resource sharing among libraries discussed the concept of resource sharing its need and objectives, budgetary constraints of the libraries in the developing countries and insufficiency of individual resources to meet the needs of the users. The activities of Information Dissemination Centre (IDC) located in the Library building of Osmania University, Hyderabad; its participants; administration and management of the Centre; its sources of finance; resources of IDC; services and functions of IDC; role of participating libraries etc. are discussed.

Author has of the view that with some more inputs by way of upgrading the hardware and other facilities the IDC will become one of the effective information centers in the area of Engineering and Technology.

Rao et. al. (1997)⁵⁵ based on experience at Andhra University Library defined the concept of network. Andhra University toyed with three options before networking the library system and these three are discussed in detail. The first option was to use the existing EPABX lines within the campus, the second option being using a combination of coaxial cable and dial up lines for the network and the third being using a combination of dial up line and VSAT. The University followed the option 1 and is getting the required result. The objective was to enable the Andhra University to have a campus-wide network so that people from various college/department library can have access to the Internet Server which is connected via ERNET through leased line. The Andhra University Library has forged ahead in providing service of database of doctoral dissertation and the floppies are in great demand. So as to make the maximum use of the database and LAN plans are made to make other libraries capable of searching the databases of Andhra University Library by making it available on other networks.

Tyagi and Saleem (2000)⁵⁶ made a study on the LAN installed in the Central Reference Library (CRL) of the Delhi University. Three commonly used network models are the workgroup model, the client-server model and the NT-domain model. Keeping in view the advantages and disadvantages of all these models the Delhi University Library System opted for the domain model. Each library in the Delhi University Library System, which is located in separate building have its own domain. The 12 Port 10/100 Mbps switch connects the OPAC, Arts Library and Under Graduate Library servers. The advantage of using switch instead of hub is that it logically divide whole network into segments. In Central Reference Library the switch has created as many as are the hubs and computers connected to it directly. Each

segment is assigned a unique IP address that identifies it. All the computers have fast Ethernet cards capable of communicating at the speed of 100Mbps. Therefore Unshielded Twisted Pair category 5 cable was used to the hub or switch. The hubs have been used to keep the cost under control.

Patil (2000)⁵⁷ made a case study of the fiber optic network established in the University of Pune with coverage of 400 acres of area jointly by C-DAC, IUCCA and University of Pune. All the university departments, offices and the Library are connected to the network. Objectives of the campus networks are given as to establish the basic network infra-structure which would allow all present and future university departments to have access to university-wide computing resources; to allow for modular, flexible and cost effective growth when required, due to establishment of new departments, schools and national facilities on the campus; to promote interaction in the University campus by giving access to e-mail and other world wide information resources and other facilities to its users; and to be able to withstand changes in technologies by not becoming obsolete for a substantial long time period.

The infrastructure of the network, the financial investment etc. are covered in the study. The University opted for fiber optic cables and its advantages are immunity to electromagnetic and radio frequency noise, very large bandwidth, flexibility to accommodate more equipments in future, ability to carry signals to more distance compared to other mediums and its security features.

The facilities offered by this network includes: access to global databases on Internet and Indian databases on ERNET; Inter-departmental co-operation for educational and research purposes; sharing of central and departmental library databases; email services to the University community; file transfer between remote hosts and local Systems; sharing of network resources and applications; access to wealth of public domain software and

terminal emulation TELNET sessions and RLOGIN facility on other hosts across the globe.

Vatnal and Ramesha (2000)⁵⁸ made a study on the development of library automation programme and the factors that contributed for furthering the campus networking activities. The modest beginning of the computerised information services using COPSAT facility encouraged the large-scale demand for database search by accessing the facilities provided by NCSI and INFLIBNET. Library automation committee played a key role in getting NIC connection for Internet surfing and having connectivity of I-NET helped to make later experiments. The slow access has generated a new wave for going to VSNL connectivity on shared dial up basis. Encouragement of INFLIBNET by providing financial assistance and time-to-time instructions to develop the database of theses and dissertations and back volumes of periodicals and holdings of the University Library resulted in getting the financial and manpower support from the University. Developing the campus network by laying optical fiber cable across the campus gave a new dimension to the networked environment in the campus.

Rao (2001)⁵⁹ made a study identifying the changes that libraries and information centres (LICs) in India need to undergo for networking, and lists the existing communication networks (INDONET, ERNET, NICNET, GPSS, RABMN, INET) and libraries and information networks (INFLIBNET, DELNET, BTIS, SIRNET, TIFACLIN, CALIBNET, MALIBNET, BONET, MYLIBNET, PUNENET, etc.). He mentions the paradigm changes that LICs undergo, challenges to their networking, and also highlights the role of IT in transforming traditional LICs into a digital mode. Discussed the various Governmental policies that led to the development of national information infrastructure, the inadequacies of the infrastructure, the status of IT application in Government, and the challenges in converting library contents into computer readable form. Concludes that, although India has drawn up

ambitious plans, it has not seen the benefits that could come from employing these facilities to improve the socio-economic conditions of its citizens or help it emerge as an economic superpower.

Scigliano (2002)⁶⁰ made a cost-benefit analysis of consortium purchases of electronic resources. The consortia of the Ontario Council of University Libraries (OCUL) comprises of 17 academic libraries as members and two as associate members in the province of Ontario, Canada. They represent the interests of almost 300,000 students and academics in 19 institutions. Although consortia purchases of electronic resources by academic libraries are prevalent, there are few cost-benefit analysis studies of such transactions. This case study fulfills this shortage; through a cost-benefit analysis for an electronic product acquired by an academic library consortium, finding significant savings in patron time.

Ambuja (2003)⁶¹ made a study regarding planning a library consortia in Madras University campuses. The University has four campuses viz. Chepauk, Marina, Guindy and Taramani. This study discusses the plans for Library Consortia among the major Campus Libraries of University of Madras. Major problems that all campus libraries would face while forming a consortium are identified as insufficient funds and lack of trained manpower. The problem of shortage of necessary computers in different campuses should be solved by providing necessary systems required for consortium forming. LAN connectivity in each campus must be extended to all sections of the respective campus library before venturing to consortia. Provision of unique library software for all libraries is a necessity and enough training need to be imparted to the staff.

Martey (2004)⁶² made a study on the major goals and objectives set by Ghanaian academic libraries for the formation of a multipurpose consortium different from the Ghana Interlibrary Lending and Document Delivery Project. It also discussed the challenges that will be faced in achieving the

stated goals and objectives and suggests what librarians can do to make a success out of the proposed consortium. It is agreed that the proposed consortium must aim at resource sharing and some of the specific objectives set are: to acquire common software for use by all the participating institutions; to create a union catalogue of monographs and a list of serials to promote resource sharing; to assist participating libraries to create their own web sites and online public access catalogues; to set up a training committee that will see to the training needs of members of the consortium; to source for funding from places other than the institutions of which the participating libraries are a part; to establish and maintain links with organizations and agencies that can assist the consortium to achieve its objectives; and to negotiate with database providers for reasonable subscription prices for their products.

2.8 Internet

Internet helped the libraries to cross all geographical barriers and to reach the users at remote sites as well as it helped libraries to provide its members with Internet services enabling the members to collect information from far away sources. Reddy and Varatha Rajan (1997)⁶³ in a study on Internet facility at IGM Library, University of Hyderabad, discussed various aspects related with Internet like World WideWeb, Email, Usenet/Newsgroups, Web Browsers, Gopher, Archie, Veronica and WAIS, FTP and telnet, establishing Internet connectivity, hardware and software requirements etc. Internet services in IGM Library are provided through ERNET using VSAT Antenna at the University Computer Centre. Most of the Schools and Departments have access to Internet. The browsers used and frequently accessed sites are mentioned. The search results useful to the Faculty/research Scholars/Students for their academic pursuits are displayed on the notice board. Provisions are made to access electronic journals from Institute of Physics.

Singh (1997)⁶⁴ discussed the technical aspects to be understood for effective usage of Internet facilities and resources. The common facilities provided by Internet are listed and the agencies in India through whom Internet access can be made are mentioned. Four levels of Internet access from level zero to level three like no access, access through Gateway, access through Host and direct access are discussed in detail. Internet protocols are discussed under various headings like Internetworking Protocols, Network Interconnection Layer, Networking or Addressing Layer, Data Transport Layer, Process or Application Layer, Finger Protocol, Network News Protocol, Post Office Protocol and other protocols such as Hyper Text Transfer Protocol, Unix to Unix Copy Protocol and Information Retrieval Service Definition and protocol specification for library application Z39.50. Internet applications like Email, Mailing Lists/Electronic conferences, FTP and Finger as well as advanced applications like Archie, WAIS and Gopher are described. The author also discusses resources available on Internet that can be divided in to two categories i.e. User Assistance Resources and Documentary Resources. Catalogues of thousands of libraries are available online through Internet and the addresses through which these can be accessed re given. Through listing all these the author has indicated the benefits libraries can derive from various Internet facilities and end the paper with a comment that a librarian cannot find a better way to satisfy the information needs of his patrons than an access to the Internet. This indicates that libraries will have to depend on Internet facilities to give effective services in future.

Fazluddin and Chikamalliah (1997)⁶⁵ made a study on the basic functions related to information search on Internet for the library services. After giving an introduction to Internet and its provisions in India, various connectivity options are discussed. The Uniform Resource Locators are discussed in detail. Search Engines, search procedures and different search approaches like simple search, advanced search, more advanced search,

browsing on the net, Newsgroups etc. are discussed. The components, services and facilities of information search on Internet with respect to library services are also discussed. Internet services for Indian libraries future expandability of library services in India, proper management of Indian library support functions and the role of Internet services are also studied. An attempt is made to coordinate the Indian library services and information search on Internet with respect to library services available at the higher educational institutes and the universities around the world. Some theoretical concepts based on information search for the Indian library system are proposed. Expresses the view that Internet based resources and services are very valuable particularly for the developing countries since the printed sources of information are not easily available in time from the developed countries.

Bavakutty and Muhammed Salih (1999)⁶⁶ made a study on the Internet services provided in the CH Mohammed Koya Library, University of Calicut. The library established the VSAT based Internet connection through ERNET in 1998 and it provides Internet facility for the whole University community. A team of the university officials visited other institutions, where the Internet facility is already established, to learn about its installation and functioning. Initially a Sun Server machine and eight nodes were installed. The VSAT equipments for the purpose include A Antenna Reflector, Feed Horn, Router etc. Software for Web browsing and Mail Server were installed. Prior to the formal inauguration of the services, demonstration and orientation programmes for students, research scholars and teachers were conducted to make them aware about the facility. The study covers the initiatives taken from the very beginning of the establishment of the connection; the study made in other institutions where the facility is already established; fund allocation for the purpose; various hardware and software used etc. The study also covers the membership details in the Internet Centre. The members include Faculty, Researcher, Students and Other staff of the

University and are charged a nominal fee for the use of the facility on a yearly basis.

2.9 User Studies

User studies are the most important source that enables to evaluate the services and operations provided by the library. While computerizing the library, the main target of the library authority is the enhancement of the quality of the services provided to its users. User studies that deals with the satisfaction, dissatisfaction, opinion, perception etc. of the clientele about the computerised library setup and services. This will help to evaluate the IT applications in libraries and will lead to the improvement of IT based services. Chandran (2000)⁶⁷ made a study on the use of Internet resources and services in Sree Venkateswara University Tirupati. The objectives of the study were: to ascertain the nature of the respondents who are using the Internet, its resources and services; to assess the knowledge of the respondents about the networks; to identify the sources through which respondents learn about Internet; to identify the means and purposes, tools, communication facilities through which respondents use Internet; to find out the avenues through which the respondents get access to Internet; to ascertain the respondents' feedback about the Internet; and to suggest the ways and means for popularizing and maximizing the utilization of Internet services by the academic community. A questionnaire was administered among the Students, Research Scholars and the Faculty of the University. Findings of the study include: Most of the students are between the age group of 20-25 years and majority of them are B Tech. or MCA student; Most of the users are aware of the networks of VSNL and ERNET and they mostly use Email services and the majority of the users use Internet services at the Computer Centre.

Author has certain suggestions and they include: The Internet facility in the Computer Centre should be extended to all teaching and administrative departments and to the Library also; training should be provided in the use of

Internet resources and the Computer Centre should extend its working hours as well as more computers should be made available to users.

Ren (2000)⁶⁸ conducted a study to examine how performance and behavior will affect self-efficacy. Particularly, how library instruction with hands-on electronic searching experiences will influence college students' self-efficacy in electronic information searching. 85 undergraduate students taking an introductory English composition course on the Newark campus of Rutgers University participated in the study in spring 1999 were taken as sample. The students were surveyed before and after library instruction and it was found that their self-efficacy in electronic information searching increased after the training. That increase was related to attitudes, emotional experiences, search performance, and so on.

Chang and Perng (2001)⁶⁹ investigated the information requirements and search habits of graduate students at Tatung University, a private university in Taipei City, Taiwan. Data were collected by means of questionnaires and follow-up interviews with graduate students from nine departments. Results show that 90% of the subjects conducted information searches using outside sources in addition to the university library. More than half of the respondents said that they depend on the university library and fellow students when conducting information searches. Further revealed that the amount of required effort and speed of access were more important than cost when choosing an Information source.

Schmetzke (2001)⁷⁰ conducted a study on the web accessibility at university libraries and 24 most ranked library schools in USA. The Americans with Disabilities Act (ADA) mandates that library programs and services must be accessible to people with disabilities. In an era in which much information resides in digitalized form on the WWW, the ADA's mandate must be interpreted as applying not only to physical space but also to cyberspace. Just as in the physical world, proper design is a crucial issue.

Only accessibly designed Web pages ensure that all people, including those with print disabilities, have access to Web-based information. Previous studies indicate that a large proportion of campus and university library Web pages are not accessible. This study looks at the universities that, according to *US News & World Report*, have the nation's 24 most highly ranked Schools of Library and Information Science (SLIS).

Up to some extent, the ability to access Web-based information is a question of the proper assistive technology, such as a modified computer keyboard, an enlarged screen display, or a properly configured screen-reading program. But assistive technology alone cannot overcome the barriers that are created at a more basic level: the format in which content is presented. If not properly formatted, or designed, Web pages are not accessible to people with certain disabilities. The objectives of the study were to find out: How accessible are the Web pages of the nation's leading library schools?; Is there a correlation between library schools' rank and their Web site accessibility?; How accessible are the Web pages of the major library Web sites on the same campuses?; Is there a correlation between the Web accessibility of library sites and library school sites?; Which types of accessibility barriers occur most frequently?

For each of the 24 campuses on the *US News & World Report* list of the USA's most highly ranked library schools, Web page accessibility for both the main library Website and the SLIS Web site was determined with the help of Bobby (Bobby is an accessibility validator created by the Center for Applied Special Technology, and it was created to assist people in checking the accessibility of their Web pages). For each site, Bobby was set to check the homepage and the next layer of hyper linked pages (on the same site) for accessibility errors. Only pages without any major ("priority 1") accessibility problems were rated Bobby-approved. The percentage of Bobby-approved pages was then used as an indicator of a site's overall accessibility. With two

sites studied per campus, and with an average of approximately 21 examined pages per site, a total of about 1,013 Web pages were checked by Bobby.

Site accessibility was determined with the downloadable version of Bobby 3.1.1 Bobby provides information pertaining to the type, number, and location of accessibility errors - both minor and major ones for each page checked. Bobby also issues a summary report for each set of Web pages. Web pages that contain any major ("priority 1") error do not receive Bobby's approval. Since the goal of this study is primarily to gauge certain aspects of Web accessibility at the campuses with the most highly ranked library schools (all of which are included in this study), methods of descriptive statistics are employed. Specifically, the following statistical measures are provided: average percentage of Bobby-approved Web pages per data set (library sites, library school sites); range of the percentages in each set; relative frequency of specific accessibility errors; Spearman's rank correlation coefficient for the association between SLIS ranking and SLIS Web site accessibility; and Pearson's product-moment correlation coefficient for the relationship between SLIS Web site accessibility and library Web site accessibility. Percentages and correlation coefficients were calculated with the help of Microsoft Excel 2000 and the respective functions provided therein.

The study revealed that the percentage of Bobby-approved pages per Web site averages 59 per cent for libraries and 23 per cent for schools of library and information science. For both categories, there is much variation among sites: the standard deviation for the library data was 33 and that for the SLIS data was 31. Within both categories, site accessibility (in terms of percentage of Bobby-approved pages) ranges from 0 per cent to 100 per cent. Four of the 24 library Web sites were 100 per cent accessible, while only one SLIS Web site (at Florida State University) received complete Bobby approval. Seven library sites, in contrast to only one SLIS site, had pages of which at least 80 per cent were accessible. On the low end, the difference in accessibility between the

two sets is even more striking: at only one library site were all the pages inaccessible, whereas eight SLIS sites (one third of the studied sites) had 0 per cent accessibility. Four of the library sites, compared to 16 of the SLIS sites, had an accessibility score of 20 per cent or less.

The vast majority of accessibility errors detected by the automated Bobby checker fall into two categories: images without alternative text and image map hotspots without alternative text. Errors in the former category occurred most frequently (close to 78 per cent in the combined set of examined SLIS and library Web pages). About each fifth error detected by Bobby in the combined set fell into the latter category. With a Spearman rank-order correlation coefficient of 0.23, the association between *US News & World Report* SLIS ranks and SLIS Web accessibility is low. There is a mild tendency for the Web pages of the more highly ranked schools of library and information science to be more accessible. With a Pearson product-moment correlation coefficient of -0.07, the relationship between SLIS Web accessibility and library Web accessibility is so low that it can, for all practical purposes, be considered to be non-existent.

Two findings came as a surprise: (1) Average Web site accessibility (in terms of error-free pages per site) at the campus library sites included in this study was relatively high: 59 per cent. (2) By far the biggest surprise was the low accessibility of the 24 SLIS Web sites, a selection that constitutes 43 per cent of all the 56 master's granting institutions in the USA. With an average Bobby-approval rate of only 23 per cent, SLIS Web sites are not paradigms of virtue as far as accessibility is concerned. The study showed that there is no correlation between library and SLIS Web site accessibility. The findings give cause for concern. It is reasonable to assume that low Web page accessibility at the nation's leading library schools reflects a lack of awareness about this issue among the leaders and trainers in the library profession.

Monopoli et. al. (2002)⁷¹ made an evaluative study of the use of electronic journal service of the University of Patras, Greece. The data sought for this study included the number of users; personal characteristics such as age, gender and occupation of users; frequency of use; purpose of use; search methods and services provided; obstacles preventing users accessing a digital library; preferred form of subscription to a journal title - electronic or print and also factors that discourage them from accessing an electronic journals service.

The study found that although the vast majority of respondents were regular Internet users (85.5 percent used the Internet daily and 8.4 percent weekly), "too much networked information" was one of the most frequent problems that both women and men faced when searching Internet - 64 per cent of the respondents indicated this problem. The second most cited problem was the lack of time to search for information - 45 per cent mentioned that they did not have the time required to find information they needed. The users of the digital resources were mainly research and academic staff. The age group of 35 years or lower mostly uses the electronic resources. Easy and direct 24-hour access to a wider source of information from their desktop is the main advantage specified by the end users. 87.8 per cent of the users when asked responded that they would advice friends or colleagues to use the E-journal service. 91.1 per cent of the respondent said that they used the service on a daily, weekly or monthly basis.

Arbib and Shor (2002)⁷² made a case study on the use of Electronic Information Sources (EIS) at Ariel College, one of Israel's largest colleges. The main objective of the study was to determine whether the educational system's efforts to provide electronic equipment are indeed achieving their purpose, the study further investigated the factors that can increase EIS use. Ariel College library provides the students with advanced information technology resources. The study addressed the questions such as: the

frequency of EIS use; student's preference of information resources (the Internet, CD-ROM databases, or Aleph); and basic factors that increase or decrease EIS use; factors refer to prior knowledge in computer use; library instruction; faculty encouragement and field of academic study. The study was conducted during the years 1999-2000 among 10% of the 2,700 students studying for B.A. degree. A questionnaire was distributed randomly to the 270 students, and all of them responded. Eighty-two students (30.4%) were from the natural sciences, and 172 students (63.7%) were from the social sciences. Sixteen students (5.9%) did not indicate their area of study. Study revealed that almost one third of the respondents (31.1%) do not use EIS at all, and a small percentage (14.8) uses EIS several times per week. Twenty percent use EIS once a week, and the rest less frequently. The main EIS used is the Internet (43%), followed by Aleph (17.7%) and CD-ROM databases (14%); only 5.9% of the respondents used all the EIS together. Students make use of EIS for academic purposes (prepare for examinations and research papers) or personal purposes (e.g., e-mail, chat sessions, and computer games).

Talja and Maula (2003)⁷³ made a study with an aim to contribute to the development of a domain analytic approach for explaining the use and non-use of e-journals and databases. The authors identify and define factors to account for disciplinary differences in e-journal use, outline hypotheses to be tested more rigorously in future research, and test them initially on a limited data set. The empirical data for the data was gathered as a part of a wider qualitative study exploring scholars' use of networked resources in four different disciplines; nursing science, literature/cultural studies, history and ecological environmental science. The findings suggests that e-journals and databases are likely to be used most heavily in fields in which directed searching is the dominant search method and topical relevance the primary relevance type, and less in fields in which browsing and chaining are the dominant search method and paradigmatic relevance the primary relevance

type. The findings also support the Bates hypothesis that domain size has an important impact on the search methods used.

Smith (2003)⁷⁴ in a study explored the role electronic journals currently play in faculty's weekly scholarly reading habits. Questionnaire method was used to collect information about the scholarly reading habits of University of Georgia faculty members. A sample of 365 were selected randomly from the total of 800 Science faculty members and the whole of 161 from Social Science faculty. Questionnaire was sent through email.

The findings of the study indicated that 77% Science and 69% Social Science faculty members reported reading electronic sources. The most noticeable disciplinary difference was in personal electronic subscriptions: 35% of science faculty reported reading at least one article from a personal electronic subscription per week, as opposed to only 15% of social science faculty. In addition, slightly more science faculty members reported weekly readings from both library print subscriptions and library electronic subscriptions than did their colleagues in the social sciences. The percentage of faculty who reported weekly readings from personal print subscriptions was the same for both groups (91%). In terms of rank, more assistant professors reported weekly readings from electronic sources (88%) than did associate professors or full professors (69% of both). The most noticeable difference in usage was in library electronic subscriptions, with 84% of assistant professors reporting weekly usage, but only 64% of associate professors and 63% of full professors reporting usage. In addition, 94% of assistant professors reported reading at least one print article per week, as opposed to 100% of full professors who reported this activity. This indicates that 6% of assistant professors at University of Georgia do not read any articles from print sources in a typical week. Disciplinary differences were also evident within rank. More full professors in the sciences (71%) indicated reading at least one electronic article a week than did full professors in the

social sciences (64%). The biggest difference in usage was once again in personal electronic subscriptions: only 8% of social science assistant professors reported weekly readings from this type of source, while 50% of the science assistant professors reported usage.

Ramesha et. al. (2004)⁷⁵ made an evaluative study in terms of user requirements and satisfaction with regard to IT based services in the universities of Karnataka state. Objectives of the study were: to assess current levels of infra structure facilities available to offer various IT services to different categories of user; to examine the state-of-the-art of library automation and networking with special reference to the possibility of participation of libraries for resource sharing with other national and international systems and networks; to diagnose particular problems in providing IT based services; to evaluate the manpower efficiency in providing IT based services on the basis of user requirements and satisfaction; to assess the nature of all types of users, their changing needs of information sources and types of IT based services required to satisfy them; to evaluate and measure the users opinion on IT based services keeping in view user requirements and satisfaction in the networked environment; to highlight the significance of campus networking for enabling the optimum utilization of Internet and other electronic sources and services; to workout the strategy to increase the user awareness or orientation programme with respect to IT based services; to suggest the ways and means of using available facilities to get the adequate financial assistance from different funding agencies. Questionnaire method was used to survey all the 7 university libraries making personal visit to all the libraries. Findings of the study indicates that out of 7 sanctioned posts of University Librarian only 3 have full time librarian and the absence of University Librarian has affected the overall management and administration of the Library; Both traditional and modern infrastructure is available at all university libraries to a large extent and IT and network facilities are satisfactory; most of the libraries have extensively

computerised their operations and this has been developed progressively during last 5 years and 71.42% have rated the facilities as 'good'; the infrastructure includes adequate number of computers with facilities for CD-ROMs, printers, scanner and other peripheral devices; almost all the university libraries are participating in one or the other network system for resource sharing; 95% of the users have rated the computerization as useful and a majority of the users, except from Mangalore University, are not satisfied with the overall IT based information services and notably no user has indicated that he/she is extremely satisfied and 14% are not at all satisfied with the IT based services. The suggestions put forwarded by the authors include filling up of necessary staff positions; conduct of user awareness programmes in libraries; up gradation of IT infrastructure and in-house training programmes for library staff in IT applications.

Ganesan and Pandian (2004)⁷⁶ made a study with the objective of measuring the attitude of users towards web based information services at the IGM Library University of Hyderabad. 35 students were served with questionnaire and some of the students were personally interviewed also. Findings of the study reveals that Internet services at Library is used more by students from Social Sciences (40%) followed by Humanities (28.57%) and students from Science and Management faculties are making less use; students prefer printed materials over digital because of duplication of materials and low downloading speed; 14 out of 35 have use OPAC among the web based services while E-journals and bibliographic services have got second and third preferences; 28 out of 35 are using Internet facility for their academic purposes and 25 out of 35 prefer Google for search and Rediffmail for email purposes.

Certain suggestions are put forwarded for improving the services that include making better awareness among Science students; making

compulsory the Library Orientation Programmes to the students and bringing the web based services to the notice of the users.

Rehman and Ramzy (2004)⁷⁷ made a study mainly to find out whether the health care professionals at Health Sciences Center (HSC) of Kuwait University were not sufficiently aware of the electronic resources available and whether this had a bearing on the under-utilization of these resources. A questionnaire-based survey of health professionals affiliated with three teaching faculties of Kuwait University was conducted to find out the nature and extent of use and the reasons for low use of these resources. Responses were received from 70.9 percent of the faculty members.

The survey revealed Medline as the most heavily used resource followed by electronic journals. Use of online catalog also closely followed the use of e-journals, receiving the mean score of 2.09. Two services of *Current Contents*, which provided current awareness, received low mean scores of 1.49 and 1.30. All other resources received mean scores of 1.07 and lower, indicating that these received marginal, little or virtually no use. The questionnaire listed seven possible obstacles, as perceived by respondents, responsible for the non-use of electronic resources. They were also encouraged to list any additional factors, if they felt so. 37.1 % indicated that they lacked time to use the library. It was followed by the factor of unfamiliarity with computerized searching marked by 22.6 %. 20% were satisfied with the print and a number of them still feel that if they have access to print resources, they might use these resources when they have free time. Four other items, respectively, marked by 14.5, 13.7, 5.6, and 4 percent of the respondents were related to irrelevance to their work, inadequacy of information, unavailability of workstations, and inadequacy of databases. Four respondents mentioned additional factors, which were: access to free databases through the Web, slow search speed, preference for a mediated search, and preoccupation with administrative work. It was found that 63.9 %

noted that self-learning was the most effective mode. It was followed by another 36.1 % who thought that the training provided by librarians was an effective mode. Nearly a quarter of them preferred the mode of learning from colleagues. Only 4.9 % marked that the use of documentation could be an effective mode. Exactly as many perceived attendance at formal meetings to be an effective mode. One respondent added that he or she had learnt the use of electronic resources from the university. The 68.9 % users perceived that newsletters or circulars were the most favored outreach modes most effective for using electronic resources. It was followed by the option of providing orientation to users by 37.7%, 32.8 % perceived e-mail to be an effective outreach mode. 31.1 % marked the mode of library guides for getting necessary information about electronic resources. Quite as many thought that effective use of signage was also an effective means of outreach. 17.2 and 13.9 percent of the users marked other methods of conducting meetings with users and use of monthly reports respectively. Three marked the use of telephone contacts for outreach and 5 users listed training as one of the preferred modes for outreach, using the opportunity for additional comments.

2.10 Conclusion

It is fairly evident from the foregoing studies that attempts have been made at studying various facets of the subject within the country as well as abroad. But it can be seen that no comprehensive study has been made on the subject "Computerisation of University Libraries". More over it is further revealed that studies on the subject with regard to the state of Kerala has not been conducted so far. So a systematic and in-depth study on the subject will definitely help to put forward certain suggestions thereby to improve computerisation of University Libraries in the state of Kerala and help them to perform its functions more effectively and efficiently. More over the study will provide guidance to the newly established university libraries in the state in the process of their automation activities.

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CHAPTER 3

METHODOLOGY

- ❖ Need and Significance of the study
- ❖ Objectives of the study
- ❖ Hypotheses
- ❖ Limitations of the study
- ❖ Data sources
- ❖ Selection of sample and data collection
- ❖ Method of analysis

The purpose of this study was to make a survey of the computerisation scenario of the University Libraries in the state of Kerala for obtaining a clear picture of the level of application of computers in the University Libraries and to assess the extend of its reach to the targeted users of the libraries and to put forward suggestions for the improvement of the existing Systems. The user community is studied on the basis of University Library, Subject Background and their Status. This chapter covers the Objectives of the study, Hypotheses formulated, Sources of data, Selection of samples and methods of analysis of data and its presentation.

The importance of the University Library in the academic society as the prime agency for dissemination of information required to satisfy the information needs of the academics is well established. It is well known that the traditional methods of management of the libraries will not be able to tackle the impact of 'Information Explosion'. Use of computers proved to be an excellent solution to this. Today, computers are doing a yeomen service to libraries with its superb capabilities to do humanly unmanageable works with splendid speed that may act in nanoseconds. Its capabilities such as tremendous speed, huge capacity to store ocean of information on to tiny storage medium like CDs and DVDs, immense capabilities to perform repetitive jobs in libraries without fatigue, the radical power to sort, arrange, retrieve and disseminate information, its capacity to collect information from anywhere in the world through world wide networks overcoming all the geographical barriers etc. has made the computer indispensable in libraries. The use of Internet facilities in the provision of information in libraries has acquired greater significance and utilization of its full potential in the University Libraries is to be made.

3.1 Need and Significance of the Study

The major University Libraries in the state of Kerala started computerisation of their operations and services almost a decade ago. Here

attempt is made to examine whether the libraries have applied computers in all the potential areas of application and whether the computerised services are outreaching and benefiting to the users of these libraries. It is to be ascertained whether the libraries have provisions of adequate finance, hardware, software, manpower and necessary other infrastructure for the smooth furtherance of the task. It is to be further investigated whether these University Libraries are making proper utilization of Open Source software. Such a study will help to find out not only the lacunas in the present system, but the problems faced by the staff and the users of the automated library system also, and to suggest measures for solving the problems that persist.

3.2 Objectives of the Study

The study that is aimed at investigating various aspects of Computerisation of University Libraries in Kerala has the following specific objectives:

1. To identify and compare the application of computers in housekeeping operations in libraries with regard to: (a) Database Management (b) Acquisition procedures (c) Technical Processing (d) Serials Control (e) Document Circulation Operations, and (f) Stock Verification.
2. To identify the availability of hardware and the proprietary as well as open source software along with the operating systems in use;
3. To identify the various sources of available finance for computerisation and to assess the sufficiency of financial resources available;
4. To study the support received from INFLIBNET for library computerisation and the contribution of the University Libraries to the union database of INFLIBNET;

5. To identify the collections available in various types of documents, the standards followed in the technical processing of documents and the satisfaction of the University Libraries over the standards followed;
6. To identify the provisions made in each University Library for accessing the OPAC, options and access points provided, various access points made use by the users, and to ascertain the satisfaction of the users over the library OPAC;
7. To identify the services provided by the University Libraries and the application of computers in various services and operations of the libraries and the opinion of the users about the computerised circulation services;
8. To identify the network infrastructure available in the Libraries and in the Universities for providing computerised services and extending the services of the libraries beyond their premises; and the security measures taken to protect the network;
9. To study the provisions of Internet Services in the University Libraries, to identify the purposes of Internet use of Students, Research Scholars and Teachers and to identify various services used and to assess the speed of the connection and availability of required information and the services provided by the University Libraries;
10. To study and compare the websites of the University Libraries so as to ascertain its role in the provision of information by the University Libraries.
11. To identify the infrastructure available and the efforts taken by the University Libraries for digitization of documents;

12. To identify the total personnel engaged in the computerised activities and their competency for the work in terms of their qualifications;
13. To study the duties, responsibilities and qualifications of the person in charge of the computerised library systems;
14. To identify difficulties faced by the persons in charge of the computerised library systems, the methods through which it is overcome, options available for improving his/her works, the freedom enjoyed in incorporating own ideas to the works and guidance as well as support received from within the library and to study his/her opinion over the facilities available;
15. To assess the utilization of the computerized services by the users and to identify the difficulties faced by them in making benefit of computerisation;

A thorough examination of the professional literature was made to acquire ample knowledge about the subject under study. Mostly journal articles and conference proceedings volumes were consulted for this purpose. Books published on the subject and articles available over Internet as well as websites of some libraries and other organizations were also referred. The examination of the literature particularly the related studies enabled the investigator to arrive at some assumptions that are presented as hypotheses of this study for detailed verification.

3.3. Hypotheses

The following are the specific hypotheses formulated for the study:

1. The University Libraries in Kerala have overlooked the need for development of the E-Resources collections.

2. Computerisation of the University Libraries in Kerala is not being fairly supported in terms of finance.
3. University Libraries in Kerala are not adequately equipped with latest hardware and software to provide modern computerised services to their clientele.
4. University Libraries in Kerala do not have adequate number of qualified and skilled personnel to shoulder the computerisation processes.
5. University Libraries in Kerala are yet to make computerisation in some of the basic and potential areas including services and operations.
6. Lack of proper User Education in the University Libraries in Kerala makes the available computerised services under utilized.
7. The users of the University Libraries in Kerala are making best use of the OPACs utilizing the full provisions made in the OPACs.
8. University Libraries in Kerala lack good computer network infrastructure to extend the services beyond the library premises and the libraries have not utilized Internet to provide modern library and information services.
9. The academic community in the universities of the state considers the 'Internet' as an important source of information but the University Libraries have not reckon with this and are not supporting them properly.
10. University Libraries in Kerala have not begun digitization though there are unique and valuable collections that are prone to deterioration.

3.4 Limitations of the Study

The present study is only at the level of a particular State, i.e. the state of Kerala and a particular type of academic libraries i.e. University Libraries. In Kerala there are Seven Universities namely:

1. University of Kerala, Thiruvananthapuram,
2. Mahathma Gandhi University, Kottayam,
3. Cochin University of Science and Technology (CUSAT), Kochi,
4. Sri Sankaracharya University of Sanskrit, Kaladi,
5. Kerala Agricultural University, Vellanikkara, Thrissur,
6. University of Calicut, Thenhippalam and
7. Kannur University, Kannur

Out of these 7 universities Kerala Agricultural University (KAU) is devoted to a specific discipline, i.e. Agricultural Sciences. Its funding sources, mode of governance etc. are different from the other universities in the state. Hence KAU is not covered under this study. There are two other institutions in the state with the status of Deemed University, they are Sree Chithra Tirunal Institute of Medical Science and Technology, Thiruvananthapuram and National Institute of Technology, Calicut. These institutes are imparting education in two special disciplines, i.e. Medical Science and Engineering respectively. Hence these also do not come under the purview of this study.

Sri Sankaracharya University of Sanskrit and Kannur University are recently established universities and their University Libraries are still in its infancy stage. Sri Sankara Sanskrit University has its campus at Kaladi and presently the University Library is functioning in the Administrative building of the University. There is no permanent staff in the University Library and is presently run by 3 professionals on deputation from Mahathma Gandhi University and a few fresh graduates in Library Science on contract basis. The University is yet to get the UGC recognition. Kannur University attained the

recognition of UGC very recently and is yet to make any considerable move in the direction of computerisation of the University Library. It is too early to study and review the automation status of University Libraries of these two Universities and hence these two Universities are not included in this study.

As such this study covered the University Libraries of four major Universities in the state of Kerala Viz. University of Kerala, Mahathma Gandhi University, Cochin University of Science and Technology and University of Calicut.

3.5 Data Sources

Survey method was used to ascertain information regarding the computerisation of University Libraries in Kerala through means of questionnaires and by personal observations. The investigator resorted to a combination of these two methods to ascertain the problem in its real and correct perspective.

The following are the sources of data used in this study.

1. Questionnaires administered to the persons in charge of the University Libraries in Kerala
2. Questionnaires administered to the persons who are in charge of the computerisation/ computerised activities in respective university libraries.
3. Questionnaires administered to users (Teachers, Research Scholars and Students) for whom the University library is mainly intended.
4. Websites of the university libraries.

3.5.1 Questionnaire Administered to the Person in charge of the Library

This questionnaire consists of two parts. Part I is intended at collecting general information about the library and Part II is to obtain information regarding use of computers in the Libraries. Part I is again divided to 6 Sections numbered from A to F. Section A is meant for collecting general

information regarding the library. There are 9 questions in this to obtain general information about the University as well as the Library. The Section B is intended at collecting the number of different types of documents in the Library. Section C is to obtain category wise data of members and the total figure. Section D deals with the standards followed for technical processing in the Library such as Classification scheme, Cataloguing rules and Standard for assigning Keywords and the satisfaction of the Library over the standards followed. Section E is to ascertain the library and information services provided by the Library. Section F has two sub sections and is regarding the staff strength in professional as well as non-professional categories.

Part II of the questionnaire is intended at collecting specifically with regard to the application of computers in library. There are 13 sections numbered from A to M. Section A contains 16 questions on varied aspects like status of computerisation, duration, application software and Operating systems used, areas of applications, conduct of system analysis, support from INFLIBNET and details of UGC Infonet. Section B is intended at collecting information about library database and there are 16 questions in this Section. This portion covers question such as retrospective conversion, number of records converted, information source used for retro-conversion, nature of database creation, number of persons, method adopted for conversion of details of documents in languages other than English, duration taken, standards followed, frequency of taking backup of database, backup mechanism used and availability of stand by server during emergency. Section C is to collect information regarding the areas of application in Acquisition modules. There are six important areas specifically asked and provision is made to specify any other areas under the Acquisition module. A question is asked whether the library makes use of Internet as an aid in the acquisition of documents. Section D is to obtain information regarding areas of application in the Circulation module. There are seven important areas specified and a question is regarding the use of barcode technology in check-

out/check-in operations. Section E is to collect information regarding areas of application in Serials Control and there are 12 areas asked. A question about the use of Internet as an aid in the procurement of serials is also asked here. Section F deals with the OPAC and there are six questions covering the number of terminals provided to users, the access points provided in OPAC, questions regarding the provision for requesting new titles through OPAC and provision for knowing the current status of the document. Questions in this section also include the availability of OPAC over campus LAN and Internet. Section G is to ascertain information regarding the use of computers in services and operations in the libraries. There are 10 services and 6 operations specified here. Section H deals with the network facility and there are 7 questions in this section covering the availability of network facilities in the library as well as in the campus, medium of transmission, participation of the library in other network services and communication over the network within the library and outside the library. Last two questions are with regard to the Router availability and the security measures taken to protect the library database. Section I specifically deal with the Internet. There are 5 questions in this and the first question is to collect information regarding the Internet Service Provider, mode of connectivity and the bandwidth of the connection. It also contains questions regarding the number of terminals provided, services available, categories of membership and fee collected from members. Section J is regarding the Digitization of documents and there are two main questions; one regarding the identification of potential collection for digitization and the second regarding the number of documents digitized so far. Section K has 4 questions and these are regarding the sources of finance, year and amount received from various agencies for library computerisation, the budget allocation for the last three years for the library and satisfaction of library over the amount allotted. Section L is concerned with the manpower available for computerisation. The last Section in the questionnaire, L is to obtain the number of various computers and other necessary gadgets

available in the library. A specimen of the Questionnaire is provided as Appendix I.

3.5.2 Questionnaire Administered to the Person in charge of the Computerisation

This questionnaire served to the person in charge of the computer section contains 20 questions. The first 6 questions are general in nature and to obtain the name, designation, qualifications, date of joining and scale of pay. Question 7 is regarding the training in computer applications obtained by the person like name of programme, Agency imparted training, duration of the programme and the course content. Question 8 to 12 deals with the guidance and encouragement received from superiors, assistance received from colleagues, communication with counterparts in other Universities and sharing their problems with professionals in the field. The 13th and 14th questions are with regard to attending events like Conferences, Seminars, Workshops, user-group meet etc. It also asks to give details of such events attended and its usefulness to the person is also asked. Question 15 and 16 are to measure the availability of systems and peripherals and manuals and reference sources needed to support the work. Question 17 is with regard to the response received by the person from vendors and contractors. Question 18 is regarding the freedom given to the person to incorporate his own ideas in his works. The physical facility made available to the person and needed further is checked in Question number 19. The last question i.e. 20 is with regard to the responsibilities of the person. 12 responsibilities are specified and it is asked to furnish, if more responsibilities are vested in the person. A specimen of the questionnaire is attached as Appendix II.

3.5.3 Questionnaire Administered to the Users of the Library

This questionnaire is used to collect information from the users of the library such as Students, Research Scholars and Faculty members regarding the use of automated library system. It has three sections numbered A, B and

C. Section A contains 6 questions connected with their personal information and their purpose of library visit and its frequency as well as the approximate time spent on a visit. Section B lists computer based services that are usually supposed to be provided by the libraries. Users are asked to mark their awareness about the service and its availability to them in the library.

The Section C contains a total of 13 questions and first 4 questions are regarding the OPAC in the library. The first question is to check the awareness of the user about the existence of an OPAC in the library and it also lists various access points that are to be marked if made use by the user. The second question is regarding the satisfaction over access points by the user and asked to specify additions needed they feel. The third question is regarding the orientation they received from the library in making use of the OPAC and the method they adopted to learn the use of OPAC. The fourth question is regarding the availability of terminal to the user for accessing the OPAC. The next three questions i.e. 5,6 and 7 are about the computerised circulation services. The fifth question is about the availability of various services in the automated circulation of documents. Sixth is to assess the satisfaction of the user over the saving of time in computer assisted document circulation system and seventh question seeks the users demand for other services in relation with document circulation systems. The remaining questions i.e. 8 to 13 are regarding the Internet services. 8th question is to know whether the user makes use of the Internet services provided by the library and various options regarding Internet service are listed to mark. 9th question tries to know the purpose of the Internet use. The question number 10 is to know whether the user got any training in the use of Internet. The satisfaction of the user regarding the availability of information is checked through the 11th question and 12th is to assess the users satisfaction over the speed of Internet connectivity. And the last question to the user is intended to assess his/her over all satisfaction with regard to the Internet services. A specimen questionnaire is attached as Appendix III.

3.5.4 Study of the Websites of the University Libraries

The available websites of the University Libraries were thoroughly examined to identify the various information and services provided by each library through its website. Information and Services provided by different libraries are listed and a comparison of the sites is made in this study.

3.6 Selection of Sample and Data Collection

The first questionnaire discussed above was administered to the persons in charge of the University Libraries and the second one was administered to the person in charge of the Computer Section/Computerisation of the University Libraries under study for collecting data for the study. The third questionnaire is administered to a representative sample of the users namely Post Graduate Students, Research Scholars and Teachers from Science as well as Social Science subjects. The details of the users taken as sample from each of the University are given below.

Table 3.1 Selection of Sample from the Universities in Kerala

Name of Library	Students				Research Scholars				Teachers			
	Science		Social Sc.		Science		Social Sc.		Science		Social Sc.	
	Served	Responded	Served	Responded	Served	Responded	Served	Responded	Served	Responded	Served	Responded
KUL	100	68	100	84	25	25	25	18	25	13	15	7
CUL	100	85	100	57	25	15	25	15	25	11	15	7
CUSATL	100	92	26	26	25	22	5	5	25	10	4	4
MGUL	100	95	100	58	25	16	15	10	25	17	10	5

In certain cases, especially in Social Science subjects, the sample available was very less in number. Hence in such cases the questionnaires were served to the whole users.

3.7. Methods of Analysis and Presentation of Data

The data obtained were analysed using Microsoft Excel and STATISTICA 6.0, a special data analysis software. Quantitative study and percentage analysis is used and in appropriate cases Chi-square test was done to find out the significance of association between attributes at appropriate instances. The data is interpreted and presented using Tables, Charts and Figures.

3.7.1. Statistical Tools Used

The Chi-square test is mainly used for testing the association between two attributes. (Example: the association between the University Libraries and the use of Internet services). Chi-square is the measure of discrepancy between actual observation and expected value under the hypothesis of no association between attributes. Lower value of Chi-square means lesser the association. In computation, we find the Chi-Square and corresponding P-value. If $P < 0.01$ the association is highly significant. If P is in between 0.01 and 0.05 the association is significant at 5% level and if $P > 0.05$ there is no significant association between the attributes.

Having discussed various data samples and data sources in this chapter, the next chapter is devoted to analysis and interpretation of the data.

CHAPTER 4

COMPUTERISATION OF THE UNIVERSITY LIBRARIES IN KERALA

ANALYSIS OF THE DATA

- ❖ Library collections
- ❖ Financial Assistance for Computerisation
- ❖ Availability of Different Hardware in the University Libraries
- ❖ Software Available for Various Purposes along with the Operating Systems
- ❖ Manpower in the University Libraries
- ❖ Areas of Applications of computers
- ❖ Computerised Services and Operations
- ❖ User Awareness About Different Computerised Services and its Availability to Users
- ❖ Computer applications in various operations and services
- ❖ INFLIBNET support and participation
- ❖ Network Facilities in the University Libraries
- ❖ Internet Services and Facilities in the Libraries
- ❖ Digitization of Documents
- ❖ Services Provided over Internet by the University Libraries

In this chapter the data collected from the University Libraries, the academic community of the universities under study and from the University Library websites have been analysed and interpreted. Using questionnaires, data were collected from the four University Libraries and from the selected sample of users of the University Libraries in the state. The success of any computerised library system greatly depends upon its capability to outreach the target users. Hence the responses of the library users regarding the computerised system have great significance in rating the performance of the system. Responses were collected from sample groups of users consisting Post Graduate Students, Research Scholars and Teachers of the four Universities under study, to ascertain their views about and experiences regarding the services provided by these libraries.

4.1. Library Collections

Table 4.1 shows the number of various collections available in the University Libraries under study as on 31st March 2004.

Table 4.1 Collections of Documents in the University Libraries in Kerala

Type of Document	KUL	MGUL	CUSATL	CUL
Books	286155	33379	55882	89568
Bound Vol. Journals		2881	20798	2105
Theses and Dissertations		428	573	3005
Reports	-	-	-	-
Patents	-	-	1891	
Standards	-	-	-	-
Audio Cassettes	-	-	-	1
Video Cassettes	150	-	-	1
Microfiches	1500	-	-	205
CDs	3000	150	168	140
DVDs	2	-	-	-
Any Other	-	-	-	-

The Library collection is one of the main factors that determine the value of the library. A good, qualitative, properly processed and arranged collection of different types of documents on a varied range of subjects makes the platform for providing effective service to the clientele of a university library.

Kerala University Library (KUL) was not able to provide the exact figures of documents available in each category. The given figure 286155 includes their collections of Books, Bound volumes of Journals, Theses and Dissertations. All these collections are accessioned in a continuous serial order and also fed in to the computer making no distinction on categories. All the other data provided by KUL pertaining to Video Cassettes, Microfiches and Compact Discs are also approximate, as these items are not properly recorded in the library and no exact figures were available. In a computerised environment one has to be able to provide the exact data regarding its collection. But even after making complete retrospective conversion KUL finds it difficult to figure out the numbers in each category. This can be regarded as a handicap of the system the KUL has developed. Mahathma Gandhi University Library (MGUL) has a collection of 33379 books, 2881 bound volumes of journals and 428 Theses. Cochin University of Science And Technology Library (CUSATL) has a collection of 55882 books, 20798 bound volumes of journals, 573 theses and dissertations, 1891 Patents and 168 CDs. The Calicut University Library (CUL) has a collection of 89568 books and 2105 bound volumes of journals, 3005 theses and dissertations, 140 CDs and 205 Microfiches. It was observed that most of the CDs available in libraries were not specifically procured rather they were received free along with the hardcopy of books. It seems that the size of various collections available in the libraries is in proportion with the year of establishment of each library. KUL, the oldest library established in the year 1942 has the highest collection while CUL established in the year 1969 stands second and CUSATL established in 1977 stands third and MGUL established in 1989 is in the fourth position.

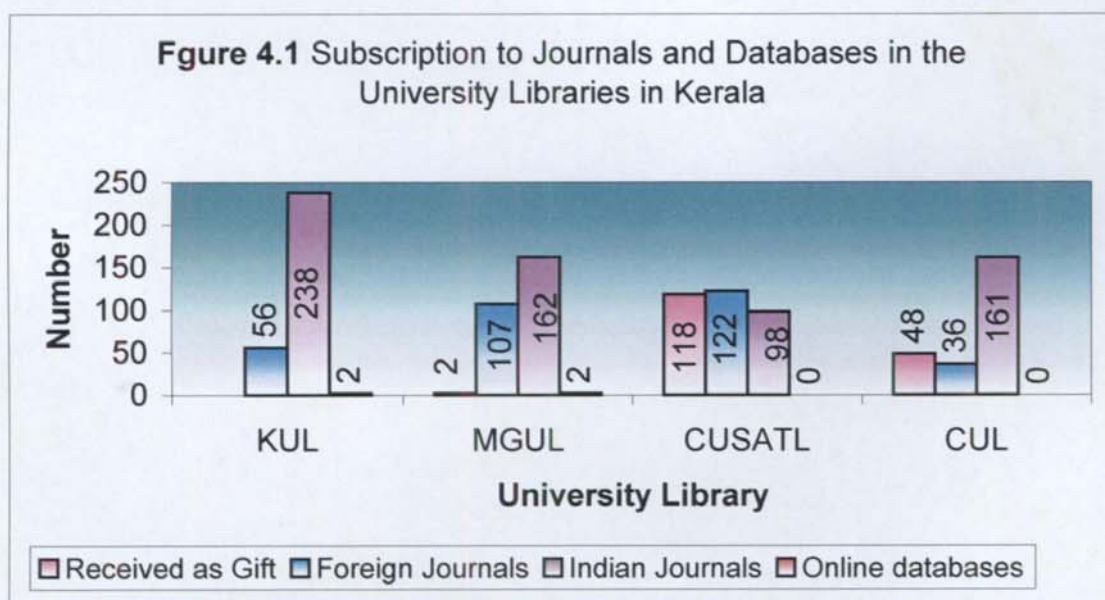
4.1.1. Journals and Online Databases

University libraries are intended to support the higher education that mainly consists research activities. Researchers largely depend on journal articles for obtaining latest information in any field of knowledge. So a good collection of journals with properly processed set up is a necessity in any university library. In a computerised environment, making the articles available along with the abstract to the users over the library as well as the campus LAN will enhance the use of journals. Table 4.2 provides details of subscriptions of journals by the University Libraries.

Table 4.2 Subscription to Journals and Online Databases in the University Libraries in Kerala

Journals	KUL	MGUL	CUSATL	CUL
Total Subscribed	294	269	220	197
Received as Gift	No details	2	118	48
Foreign Journals	56	107	122	36
Indian Journals	238	162	98	161
Online Databases	2	2	Nil	Nil

Figure 4.1 graphically represents the number of journals obtained and databases subscribed by the University Libraries.



The KUL subscribes to the highest number of journals i.e. 294 followed by MGUL 269 and CUSATL 220 and CUL subscribes to the lowest number i.e. 197 titles. CUSATL gets the highest number of 118 journals as gift while CUL gets 48 and MGUL only 2. No information was available from KUL regarding the number of journals received as gift as they are not recorded in the library. Out of the 294 journals subscribed in KUL, 56 are foreign and 238 are Indian journals. In MGUL 107 are foreign journals while 162 are Indian. CUSATL subscribes to more number of foreign journals, out of the 220 journals, 122 are foreign and only 98 are Indian. In CUL out of 197 journals, 36 are foreign and 161 are published within the country. The KUL and MGUL subscribe to 2 online databases each while CUSATL and CUL do not subscribe to any online databases.

MGUL has not computerised their Serial Control while all other libraries are doing the Serial Control through their computerised system. MGUL stands second in the number of journals subscribed with a total of 269 journals. Making a proper article indexing through their Serial Control module will help MGUL to provide better services to its users. CUSATL has computerised the serial control functions, but has not started article indexing. CUSATL has the highest number of foreign journals among the libraries under study. However this library does not index the articles in the journals. Unless journals are not properly indexed, many of the valuable articles may not get the attention of the users. Since the OPAC of CUSATL is accessible over the campus LAN, providing the article index over the campus LAN will definitely enhance the use of the valuable journals in the University Library.

The analysis clearly reveals the poor share of online resources in the University Libraries in Kerala. CUL stands last in the matter of subscription to periodical literature and the reason may be the least allocation of fund. Other libraries subscribe to fairly good number of journals.

4.1.2. Technical Processing of the Library Collections

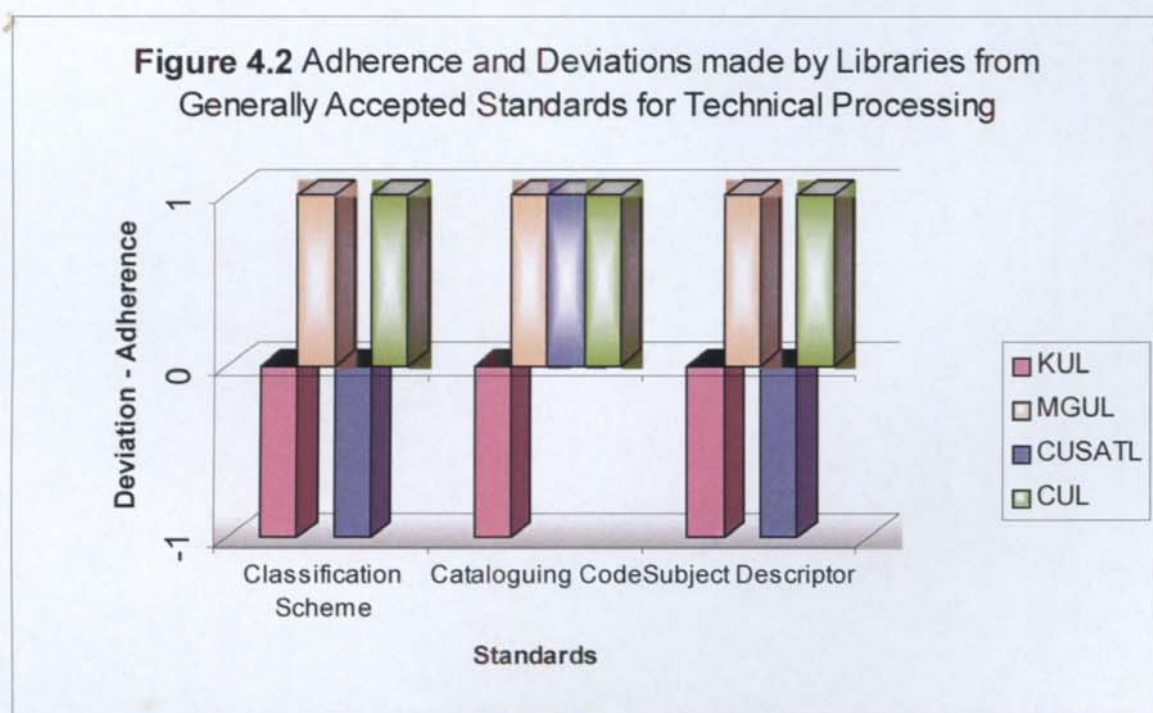
Technical processing comprising classification, cataloguing and assigning of subject descriptors to the documents are done so as to provide better services to users as well as for better management of the information resources within the library. More over adhering to international standards helps the libraries in sharing the information smoothly in a resource-sharing atmosphere in the present networked world. Table 4.3 gives details about the standards followed by the university libraries under study in technical processing of documents.

Table 4.3 Standards used for Technical Processing of Documents in the University Libraries in Kerala

Category	KUL	MGUL	CUSATL	CUE
Classification Scheme	CC	DDC	UDC	DDC
Cataloguing Code	CCC	AACRII	AACRII	AACRII
Subject Descriptor	Chain Procedure	LC Subject Headings	Sears' List	LC Subject Headings

KUL is following the traditional Indian standards for their technical processing of documents. Colon Classification (CC), the classification scheme used by KUL is not much popular these days and is not considered user friendly also. More over CC schedules are not updated and revised regularly. The cataloguing code as well as method of assigning subject descriptors used in KUL are also not widely used and almost absent in the international scenario. So adherence to such standards will pose difficulty while cooperating with other libraries for resource sharing. Similarly the library may find it difficult to process the documents procured in the newly emerging subjects if the standards followed are not revised and updated frequently. Dewey Decimal Scheme of Classification is the most widely accepted classification scheme all over the world. And INFLIBNET which is the prime agency inspiring computerisation activities and hosting a union database of university libraries in the country insists on the Common Communication Format, AACR II and Library of Congress Subject Headings

as the standard tools for all the participating libraries¹. MGUL and CUL are following DDC, AACR II and Library of Congress Subject Headings. CUSATL is following AACR II for cataloguing rules but for classification the library is using UDC, because the collection is mainly confined to Science and Technology subjects for which UDC is considered more appropriate. CUSATL is following Sear's List of Subject Headings for assigning subject descriptors and not found to be satisfied with the use of the same. Regarding the satisfaction over the above standards followed, MGUL and CUL who are following the standards suggested by INFLIBNET as well as widely accepted all over the world, are found to be fully satisfied. KUL expressed their total dissatisfaction over the standards followed in Classification, Cataloguing and assigning Subject Descriptors by them and wanted to change to the standards suggested by INFLIBNET. CUSATL is only partially satisfied and wanted to change the subject descriptor from Sear's List to 'one which incorporate latest developments in subjects'. The adherence and deviation made by the University Libraries from commonly accepted standards is represented in the Figure 4.2 given below.



In the Figure, the standards shown in the upper layer are according to the internationally accepted ones and shown in the lower side does not

confine to the internationally accepted practices. So it is clearly depicted that the standards followed by MGUL and CUL in all three processes are within the suggestions of INFLIBNET and within the international practice while KUL is trailing totally and CUSATL partially in this matter.

4.2. Services Provided by the University Libraries

Library is essentially a service institution and all the collections developed, infrastructure built up and personnel appointed are to serve as a base for providing effective services to its clientele. Data were obtained from libraries to know what are the traditional library and information services provided by them. Table 4.4 lists the services provided by each of the library.

Table 4.4 Services Provided by the University Libraries in Kerala

Services	KUL	MGUL	CUSATI	CUL
Book Lending	Y	Y	Y	Y
Reprographic Services	Y	Y	Y	Y
Selective Dissemination of Information	N	Y	Y	N
Circulation of Accession List	Y	N	N	Y
Content Page Service	N	N	N	N
Compilation of Bibliographies	Y	Y	N	Y
Local Abstracting/Indexing Service	N	N	N	N
Inter Library Loan	Y	Y	Y	N
Reference Service	Y	Y	Y	Y
Current Awareness Service	N	Y	Y	N
Routing of Periodicals	N	N	N	N
User Education	N	Y	Y	N
Translation Services	N	N	N	N
Other Services	-	-	-	-

All the University Libraries are found to be providing Book Lending Service, Reprographic Service and Reference Service. Regarding the provisions of other services the libraries differ. MGUL and CUSATL provide Selective Dissemination of Information while KUL and CUL does not provide

4.3. Library Membership

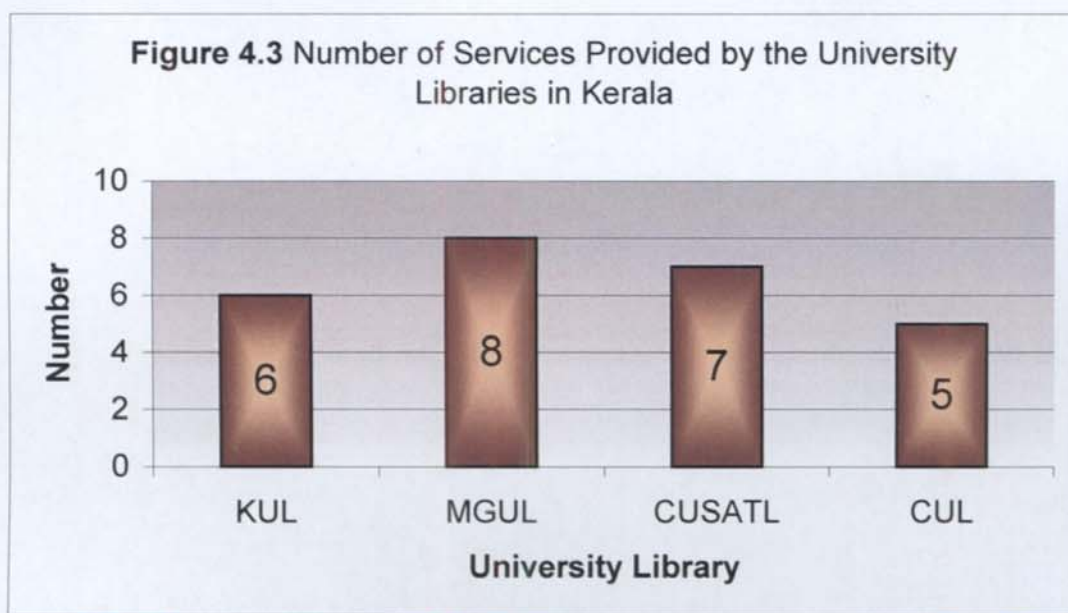
KUL was not able to provide the exact number of members in different categories in the library. The figures provided include even old memberships that are no more valid. The members have been serially numbered from the past without making any distinction among different categories. It is strange that the KUL is not able to provide the statistics of current live membership in different categories. All the other three libraries were able to provide the figures of their membership in various categories. Table 4.5 gives the details of the membership in each library.

**Table 4.5 Membership Details of Different Categories
in the University Libraries in Kerala**

Category	KUL	MGUL	CUSATL	CUL
Under Graduates	18985	-	331	110
Post Graduates		1100	1873	1717
Researchers		280	272	29
Teachers	3192	530	223	20
Non Teaching Staff		504	564	170
Public	20127	-	80	158
Others	-	-	8 (Institutions)	2
Total	42304	2414	3351	2265

In all the cases post graduate students constitute the biggest category of members. They are the students of the Teaching Departments and Schools situated in the university campuses. It is notable that the number of registered researchers in CUL is very low. This is due to the fact that there is a decrease in the number of students registered for research in various departments in the University recently. Similarly live membership in the category of Teachers is also low. The number of Teachers in the MGUL includes teachers from the university Departments and Schools as well as from the Affiliated Colleges. The very objective of the university library is to support the higher education by providing all possible sources of information

this service. KUL and CUL provide Circulation of Accession Lists while other two are not offering the same. Compilation of bibliographies is done by KUL, MGUL and CUL while CUSATL does not make provision for this service. All the University Libraries except CUL provide Inter Library Loan and except KUL and CUL others are providing User Education services. Current Awareness Service is provided by MGUL and CUSATL. None of the libraries under study provide Content Page Service, Local Abstracting/ Indexing Service, Routing of Periodicals and Translation Services. And no library pointed out any other service provided by them. This analysis is a purely quantitative one and does not go to the frequency or quality of the service provided by the libraries. On observation it was found that some of the services provided by the libraries are not regular in nature. However it is graphically represented in the Figure 4.3 given below.



As the Figure 4.3 shows, in terms of the number of services provided KUL and MGUL stands ahead of others followed by CUSATL. CUL stands behind other libraries in this aspect, though as shown in the Table 4.19 the major portion of the library budget is set apart to meet the salary of the staff. Even after making such huge investment on the manpower library lags behind in the matter of providing proper library and information services.

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to the academics consisting of Students, Research Scholars and Faculty members. As mentioned in the previous chapter on methodology, here the user samples were taken among from these categories and attempt was made to ascertain their purpose of library visits, its frequency and the duration of the time they usually spend on a visit. It is hoped that such an analysis will help to understand the dependence of the users on libraries under study in the matter of fulfilling their information needs.

4.3.1. Purpose of Library Visit by Users

The purposes of library visits were obtained from the users through a question with 4 specified options. Users were also given opportunity to mark any other purposes.

Table 4.6 Purpose of Library Visits by the Users - University Library wise

Purpose of Visit	KUL	MGUL	CUSATL	CUL	All Group
Study	148 (68.84%)	120 (59.70%)	109 (68.55%)	114 (60.00%)	491 (64.18%)
Research	38 (17.67%)	27 (13.43%)	14 (8.81%)	25 (13.16%)	104 (13.59%)
Recreational	0 (0.00%)	1 (0.50%)	1 (0.63%)	6 (3.16%)	8 (1.05%)
Other - (News Paper Reading)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (0.53%)	1 (0.13%)
Study and Research	25 (11.63%)	23 (11.44%)	20 (12.58%)	28 (14.74%)	96 (12.55%)
Study and Recreational	1 (0.47%)	22 (10.95%)	10 (6.29%)	15 (7.89%)	48 (6.27%)
Study and Other (News Paper Reading)	0 (0.00%)	3 (1.49%)	0 (0.00%)	0 (0.00%)	3 (0.39%)
Research and Official	0 (0.00%)	1 (0.50%)	0 (0.00%)	0 (0.00%)	1 (0.13%)
Research and Recreational	0 (0.00%)	0 (0.00%)	1 (0.63%)	0 (0.00%)	1 (0.13%)
Study, Research and Official	1 (0.47%)	1 (0.50%)	0 (0.00%)	0 (0.00%)	2 (0.26%)
Study, Research and Recreational	2 (0.93%)	3 (1.49%)	4 (2.52%)	1 (0.53%)	10 (1.31%)

The specified purposes were Study, Research, Official and Recreational and apart from these some of the respondents mentioned the purpose of visit as to read newspapers. Responses were marked by the users under single option as well as under multiple options. University wise analysis of the purpose of visit is shown in the Table 4.6.

Official and Recreational purposes of library visit is recorded here very rarely only. University libraries are supposed to meet the information requirements for the higher education. It is found that Study and Research are the main purposes for which the users of all the University Libraries under study depend their respective libraries. Table 4.7 gives the details of the analysis based on the subject background of the users.

Table 4.7 Purpose of Library Visits by the Users - Subject wise

Purpose of Visit	Social Science	Science	All Groups
Study	191 (64.31%)	300 (64.1%)	491 (64.18%)
Research	50 (16.84%)	54 (11.54%)	104 (13.59%)
Recreational	2 (0.67%)	6 (1.28%)	8 (1.05%)
Other - (News Paper Reading)	0 (0.00%)	1 (0.21%)	1 (0.13%)
Study and Research	34 (11.45%)	62 (13.25%)	96 (12.55%)
Study and Recreational	12 (4.04%)	36 (7.69%)	48 (6.27%)
Study and Other (News Paper Reading)	2 (0.67%)	1 (0.21%)	3 (0.39%)
Research and Official	0 (0.00%)	1 (0.21%)	1 (0.13%)
Research and Recreational	1 (0.34%)	0 (0.00%)	1 (0.13%)
Study, Research and Official	1 (0.34%)	1 (0.21%)	2 (0.26%)
Study, Research and Recreational	4 (1.35%)	6 (1.28%)	10 (1.31%)

In the above table both groups make almost similar response from Social Science as well as Science backgrounds regarding their purpose of library visits. Table 4.8 has the details regarding the purpose of library visit by various categories of users in the University Libraries in Kerala.

Table 4.8 Purpose of Library Visits by the Users - Status wise

Purpose of Visit	Students	Researchers	Teachers	All Groups
Study	459 (81.24%)	20 (15.87%)	12 (16.22%)	491 (64.18%)
Research	18 (3.19%)	72 (57.14%)	14 (18.92%)	104 (13.59%)
Recreational	7 (1.24%)	1 (0.79%)	0 (0.00%)	8 (1.05%)
Other - (News Paper Reading)	1 (0.18%)	0 (0.00%)	0 (0.00%)	1 (0.13%)
Study and Research	24 (4.25%)	29 (23.02%)	43 (58.11%)	96 (12.55%)
Study and Recreational	48 (8.50%)	0 (0.00%)	0 (0.00%)	48 (6.27%)
Study and Other (News Paper Reading)	3 (0.53%)	0 (0.00%)	0 (0.00%)	3 (0.39%)
Research and Official	0 (0.00%)	0 (0.00%)	1 (1.35%)	1 (0.13%)
Research and Recreational	0 (0.00%)	0 (0.00%)	1 (1.35%)	1 (0.13%)
Study, Research and Official	0 (0.00%)	0 (0.00%)	2 (2.70%)	2 (0.26%)
Study, Research and Recreational	5 (0.88%)	5 (3.17%)	1 (1.35%)	10 (1.31%)

The above Table shows that the main purposes mentioned by all the categories include either study or research purpose or both. This shows that irrespective of the status, the users make use of the University Libraries for the purposes for which it is intended.

4.3.2. Frequency of Library Visit by Users

Analysis on the frequency of visits made by the users to the library gives an idea about the use of library made by the clientele as well as how

important the library is to the users. If the library is found very rarely used by its clientele it may be because of the triviality of the library to the user. If the library is so inevitable to the user he may visit it frequently to collect the required information. Analysis on the frequency of visit by users in the university libraries under study showed that overall 60 per cent of the users are daily or alternative days visitors to the library. The perceptions and priorities of such a user population have greater relevance in rating the performance of the libraries. Table 4.9 gives a detailed frequency of visit statistics of the users of various libraries under study.

Table 4.9 Frequency of Library Visits by the Users of University Libraries in Kerala - Library wise

Library	Daily	Alternative Days	Once in 3 days	Once in a week	Rarely	Total
KUL	102 (47.44%)	31 (14.42%)	23 (10.70%)	45 (20.93%)	14 (6.51%)	215
MGUL	98 (48.76%)	48 (23.88%)	23 (11.44%)	28 (13.93%)	4 (1.99%)	201
CUSATL	46 (28.93%)	34 (21.38%)	29 (18.24%)	41 (25.79%)	9 (5.66%)	159
CUL	60 (31.58%)	42 (22.11%)	18 (9.47%)	47 (24.74%)	23 (12.11%)	190
All Libs	306 (40.00%)	155 (20.26%)	93 (12.16%)	161 (21.05%)	50 (6.54%)	765

Overall 40 per cent of the users are daily visitors to the library while 20.26 per cent are making visit on alternative days. 21.05 per cent of the respondents make visit once in a week only while 12.16 per cent are visiting once in three days and the percentage of users who make rare visit to the library are 6.54 per cent only. The rate of daily visitors is highest in MGUL

while the lowest is in the CUSATL. The highest rate of rare visitors is in CUL while MGUL has got the least number of rare visitors.

Table 4.10: Frequency of Library Visits by the Users of University Libraries in Kerala - Subject wise

Subjects	Daily	Alternative Days	Once in 3 days	Once in a week	Rarely	Total
Social Science	159 (53.54%)	48 (16.16%)	25 (8.42%)	45 (15.15%)	20 (6.73%)	297
Science	147 (31.41%)	107 (22.86%)	68 (14.53%)	116 (24.79%)	30 (6.41%)	468
All Groups	306 (40.00%)	155 (20.26%)	93 (12.16%)	161 (21.05%)	50 (6.54%)	765

Subject wise analysis of library visits presented in Table 4.10 shows that Social Science (53.54%) users visit the library daily and are far ahead of their Science (31.41%) counter parts in visiting the library daily. This may be because of the fact that for the users of the Social Science, virtually the library is both the library and the laboratory in one.

Table 4.11 Frequency of Library Visits by the Users of University Libraries in Kerala - Status wise

Status	Daily	Alternative Days	Once in 3 days	Once in a week	Rarely	Total
Students	242 (42.83%)	108 (19.12%)	69 (12.21%)	115 (20.35%)	31 (5.49%)	565
Research Scholars	50 (39.68%)	35 (27.78%)	8 (6.35%)	24 (19.05%)	9 (7.14%)	126
Teachers	14 (18.92%)	12 (16.22%)	16 (21.62%)	22 (29.73%)	10 (13.51%)	74
All Groups	306 (40.00%)	155 (20.26%)	93 (12.16%)	161 (21.05%)	50 (6.54%)	765

Status wise analysis of users in Table 4.11 showed that Students (42.83%) are ahead of Research Scholars (39.68%) and Teachers (18.92%) in making daily visit to the library. Among the Teachers the highest percentage (29.73%) visit the library once in a week only. The highest percentage (13.51%) of rare visitors is also from the teachers and this is more than double of the average (6.54%) of total rare visitors.

The analysis of the data proved that majority of users usually make regular visit to the library daily or on alternative days basis. As such it can be assumed that the users, particularly the students find the library crucial for satisfying their information needs.

4.3.3. Time Spent by Users in the Library

Analysis was made to determine the average time spent by the users in the library on a visit. Table 4.12 provides the details.

Table 4.12 Time Spent by the Users of the University Libraries - Library wise

Library	Less than 1/2 Hour	1/2 to 2 Hours	2 to 5 Hours	More than 5 Hours	Total
KUL	43 (20.00%)	121 (56.28%)	49 (22.79%)	2 (0.93%)	215
MGUL	31 (15.42%)	141 (70.15%)	27 (13.43%)	2 (1.00%)	201
CUSATL	43 (27.04%)	107 (67.30%)	8 (5.03%)	1 (0.63%)	159
CUL	55 (28.95%)	113 (59.47%)	22 (11.58%)	0 (0.00%)	190
All Libs	172 (22.48%)	482 (63.01%)	106 (13.86%)	5 (0.65%)	765

Table shows that majority (63.01%) of the users use to spend in the library 'half an hour to 2 hours' on a visit. In all the libraries under study majority of users belong to this category only. Similarly in all the cases, but KUL, the second highest category belongs to those who spend 'less than 30 minutes' on a visit. In KUL second highest category (22.79%) belongs to those

who spend '2 to 5 hours' on a visit. This may be because of the reason that the KUL is situated away from the main campus and users may prefer to stay for a long time once they make a visit to the library. Library wise analysis of users showed that in KUL 20 per cent spending 'less than half an hour' in the library while 56.28 per cent spending '30 minutes to 2 hours' on a visit to the library. Only one per cent or below are found to be spending 'more than 5 hours' on a visit to the library. In CUL no one has claimed to be spending 'more than 5 hours' on a visit.

The subject wise analysis showed that those who spend more time in the library belong to Social Science subjects. In the categories of users spending 'less than 2 hours' the percentage of Science users are high where as in the categories of those who spend 'more than 2 hours', the percentage of Social Science users are high. Table 4.13 gives the details.

Table 4.13 Time Spent by the Users of University Libraries in Kerala - Subject wise

Subject	Less than ½ Hour	½ to 2 Hours	2 to 5 Hours	More than 5 Hours	Total
Social Science	59 (19.87%)	162 (54.55%)	72 (24.24%)	4 (1.35%)	297
Science	113 (24.15%)	320 (68.38%)	34 (7.26%)	1 (0.21%)	468
All Groups	172 (22.48%)	482 (63.01%)	106 (13.86%)	5 (0.65%)	765

Status wise analysis also proved that the habit of spending time in the library by different categories is not different from the general trend. In all the cases the highest percentage was recorded in the second category of 'half an hour to 2 hours' and the second highest was in the first category of spending 'less than 30 minutes'. Table 4.14 given below has the details.

Table 4.14 Time Spent by the Users of University Libraries in Kerala - Status wise

Status	Less than ½ Hour	½ to 2 Hours	2 to 5 Hours	More than 5 Hours	Total
Students	129 (22.83%)	357 (63.19%)	74 (13.10%)	5 (0.88%)	565
Research Scholars	29 (23.02%)	74 (58.73%)	23 (18.25%)	0 (0.00%)	126
Teachers	14 (18.92%)	51 (68.92%)	9 (12.16%)	0 (0.00%)	74
All Groups	172 (22.48%)	482 (63.01%)	106 (13.86%)	5 (0.65%)	765

It is notable that none from Teachers and Research Scholars are spending 'more than 5 hours' in the library while 0.88 per cent of students claimed that they use to spend 'more than 5 hours' on a visit to the library. The above analysis on the time spent by the users in the library has proved that respondents use to spend a reasonable time in the library on a visit.

It can be concluded from the analysis on Frequency of visit, Purpose of library visit and Time spent on a visit that the academic community under study is serious users of the university libraries and they heavily depend their respective university libraries for meeting their information requirements with regard to their higher education purposes.

4.4. Financial Assistance for Computerisation

Adequate funding is a pre requisite for the successful implementation of any programme. All the libraries under study started their computerisation process in the middle of the last decade or just prior to that. During this period the price of computers and its peripherals were comparatively high and the libraries needed huge amount for implementation of computerisation processes. The financial aid received from INFLIBNET

was crucial in the beginning of the computerisation of these libraries. All the university libraries under study have received grants from INFLIBNET. KUL and CUL received the grant in 1995 while MGUL received it in 1998 and CUSATL in 1999. Being an old university, KUL was fortunate to receive a handsome amount of Rs. 52 Lakhs while all other universities got Rs. 6.5 Lakhs each. The Table 4.15 depicts the details of the grants received from various sources by different university libraries for their computerisation.

Table 4.15 : Financial Assistance Received by University Libraries in Kerala from Various Agencies for Computerisation Purposes

Name of the Agency	KUL		MGUL		CUSATL		CUL	
	Amount in Lakh	Year	Amount in Lakh	Year	Amount in Lakh	Year	Amount in Lakh	Year
INFLIBNET, UGC	52	1995	6.5	1998	6.5	1999	6.5	1995
State Govt.	8	2002	33	1992-2003	-	-	10	1995
Other	-	-	-	-	200 from MHO Project	-	-	-

The assistance received from State Government seemed to be varying in libraries. KUL received an amount of Rs. 8 Lakhs in the year 2002 while MGUL received a total amount of Rs. 33 Lakhs during the period between 1992 and 2003. CUL received Rs. 10 Lakhs from the State Government in the year 1995 while CUSATL has not received any amount so far from the Government. But CUSATL received a very huge amount of around Rs. 2 Crores as part of the aid received by the university from Netherlands. This amount is approximate and no exact figure was available as the amount was allocated and utilized for the university as a whole. The above figures disclose that there is a disparity among libraries in getting the amount for computerisation and the amount received by CUL is too less compared to other universities. Yet CUL was able to automate most of the library procedures. On the other hand it is to be noted that even after receiving a

huge allotment from INFLIBNET, KUL is not yet able to extend their computerisation to all the sections of the library especially to circulation procedures.

4.4.1. Budget Allocation to University Libraries in Kerala

The internal allocation in the university budget is the main source of regular finance for various offices in universities for its functioning. Each university library also gets its share every financial year. Information was obtained from university libraries regarding the allocation of funds for activities related with computerisation, staff salary and procurement of books and journals. It is found that the major allotment in the university budget is devoted for meeting the staff salary in most of the cases. The other important allocation is for the purchase of books and journals. All other purposes get a very skimpy amount and many of the highly essential needs like procurement of necessary hardware and software, online subscriptions, AMC charges, recurring expenses related with computers etc. are seemed to be quite overlooked in the university budgets. University wise allocations of budget are discussed below.

4.4.1.1. Budget Allocation in Kerala University Library

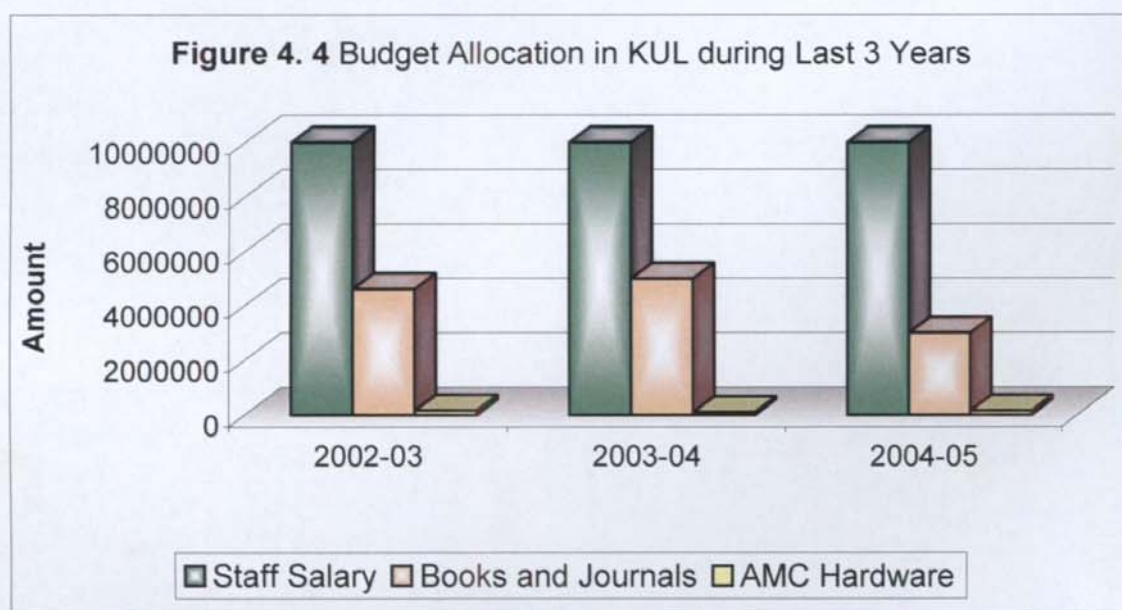
The Table 4.16 shows the budgetary allocation on Salary, Books and Journals and Computerisation related purposes in Kerala University in the last three financial years. As the table reveals allocation of the amount for computer related purposes in KUL is very less during last three years. The university budget has not made any provision for subscription to online databases, procurement of hardware and software, recurring charges related with computers and AMC for software. Yet it is notable that the budget has made provision for the AMC of computer hardware. More than half of the allocation made was for meeting the staff salary in 2002-03 and 2004-05 while in 2003-04 the allocation for procurement of books and journals were increased slightly bringing down the proportion of staff salary allotment.

Table 4.16 : KUL Budget during Last 3 Years

Purpose	2002-03		2003-04		2004-05	
	Amount	%	Amount	%	Amount	%
Staff Salary	10052438	57.74	10427890	46.85	10592500	55.50
Books and Journals	4620447	26.54	5000000	22.46	3000000	15.72
Online subscription (journals, databases etc.)	-	-	-	-	-	-
Procurement of Computer Hardware and Software	-	-	-	-	-	-
Recurring charges like Internet subscription	-	-	-	-	-	-
AMC charges for Hardware	162200	0.93	100000	0.44	150000	0.78
AMC charges for software	-	-	-	-	-	-
Total amount allotted to the Library	17407760		22253400		19083300	

* '%' is the percentage of the total amount allocated as the Budget for the year that includes other allocations that are not mentioned in the Table also.

The allotment shown in the above Table is graphically represented in the Figure 4.4.



The Figure 4.4 depicts the allocation of amount in the library budget for various purposes from where it is very clear that a mammoth amount is

spent on its staff salary. It is significant to note that KUL has not utilized the support provided by INFLIBENT in appointing the Information Scientist. As such there is no qualified person to look after the computerised activities. This is an indicator of the negligence of the library for properly manning the computerised activities.

4.4.1.2. Budget Allocation in Mahathma Gandhi University Library

The budgetary allocation on Salary, Books and Journals and Computerisation related purposes in the MGUL during the last three financial years is shown in the following Table 4.17.

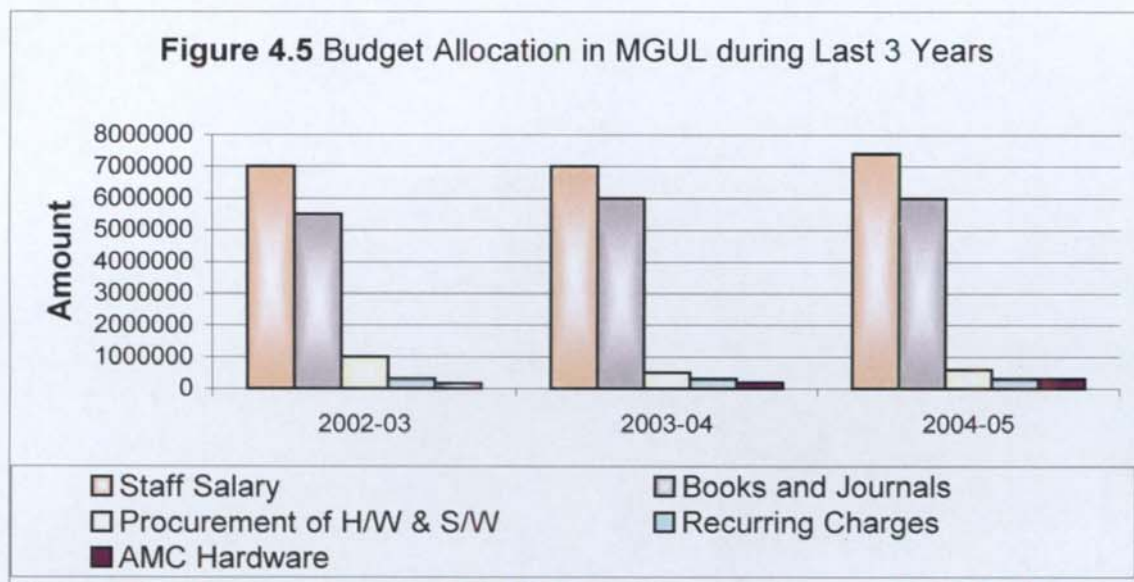
Table 4.17 : MGUL Budget during Last 3 Years

Purpose	2002-03		2003-04		2004-05	
	Amount	%	Amount	%	Amount	%
Staff Salary	7000000	47.61	7000000	46.66	7400000	48.05
Books and Journals	5500000	37.41	6000000	40	6000000	38.96
Online subscription (journals, databases etc.)	-	-	-	-	-	-
Procurement of Computer Hardware and Software	1000000	6.80	500000	3.33	600000	3.89
Recurring charges like Internet subscription	300000	2.04	300000	2	300000	1.94
AMC charges for Hardware	170000	1.15	200000	1.33	300000	1.94
AMC charges for software	-	-	-	-	-	-
Total amount allotted to the library	14700000		15000000		15400000	

* '%' is the percentage of the total amount allocated as the Budget for the year that includes other allocations that are not mentioned in the Table also.

Though the biggest chunk is devoted to staff salary in the MGUL budget also, it is noteworthy that they have made provisions for many computer related affairs in their budget. Allocations made for procurement of hardware and software, recurring charges and AMC of hardware are notable allocations. But the budget does not make any provision for subscription to

online databases. The allotment has been graphically represented in the following Figure 4.5.



The above Figure shows that quite handsome amount has been allocated for books and journals purchase. But the importance of the procurement of online databases has not been taken seriously by the MGUL also and no amount has been set apart for this purpose.

4.4.1.3. Budget Allocation in Cochin University of Science and Technology Library

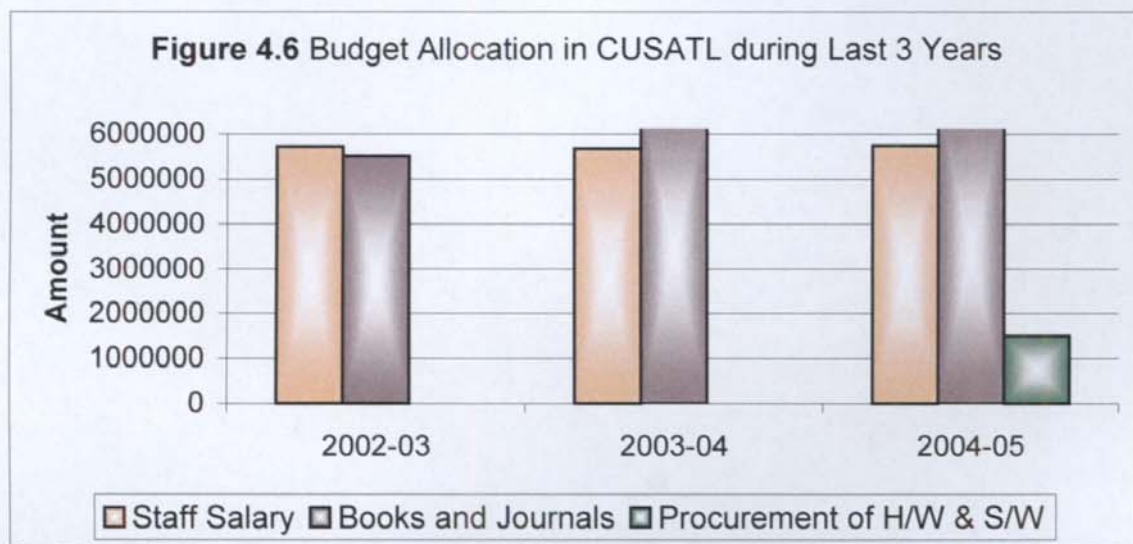
The budgetary allocation on Salary, Books and Journals and Computerisation related purposes in CUSATL for the last three financial years is represented in the Table 4.18. In CUSAT, the library budget has not seriously considered the provision for computerised activities. In the financial year 2004-05, they have allotted Rs.15 Lakhs for the procurement of hardware and software and it is the only one allocation they made in the last three years for computer related matters in the library. It is the only library under study that spends more on purchase of books and journals than the staff salary. Yet they have also not set apart any amount for the procurement of online databases and journals.

Table 4.18 : CUSATL Budget during Last 3 Years

Purpose	2002-03		2003-04		2004-05	
	Amount	%	Amount	%	Amount	%
Staff Salary	5715000	50.06	5676000	48.83	5737000	40.39
Books and Journals	5500000	48.18	6700000	57.05	6700000	47.17
Online subscription (journals, databases etc.)	-	-	-	-	-	-
Procurement of Computer Hardware and Software	-	-	-	-	1500000	10.56
Recurring charges like Internet subscription	-	-	-	-	-	-
AMC charges for Hardware	-	-	-	-	-	-
AMC charges for software	-	-	-	-	-	-
Total amount allotted to the Library	11415000		11744000		1420200	

* '%' is the percentage of the total amount allocated as the Budget for the year that includes other allocations that are not mentioned in the Table also.

The Figure 4.6 graphically represents the allocation of funds for various purposes in the library.



The total amount allocated for the library has shown an increasing trend in last three years and needs to be a separate fund allocation for computerisation related activities. CUSATL is the single instance of allocating more amounts to purchase of documents than to the library staff salary. Yet

in CUSATL also no allocation was made for the subscription to E-Resources and Online journals and databases.

4.4.1.4. Budget Allocation in Calicut University Library

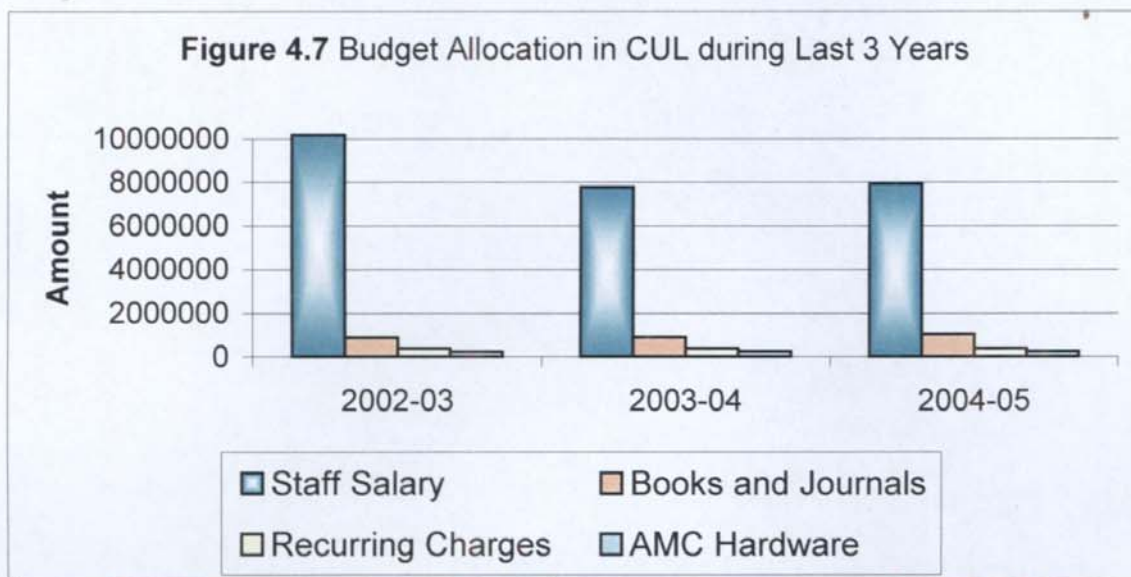
The budgetary allocation on Salary, Books and Journals and Computerisation related purposes in the CUL in the last three financial years is shown in the Table 4.19 below.

Table 4.19 : CUL Budget during Last 3 Years

Purpose	2002-03		2003-04		2004-05	
	Amount	%	Amount	%	Amount	%
Staff Salary	10168000	83.85	7775000	78.37	7931000	76.97
Books and Journals	885000	7.29	900000	9.07	1050000	10.19
Online subscription (journals, databases etc.)	-	-	-	-	-	-
Procurement of Computer Hardware and Software	-	-	-	-	-	-
Recurring charges like Internet subscription	380000	3.13	380000	3.83	380000	3.68
AMC charges for Hardware	225000	1.85	240000	2.41	250000	2.42
AMC charges for software	-	-	-	-	-	-
Total amount allotted to the library	12125700		9920200		10303200	

* '%' is the percentage of the total amount allocated as the Budget for the year that includes other allocations that are not mentioned in the Table also.

In CUL major portion of the fund is set apart for meeting the staff salary and the allocation for even books and journals procurement is very low. Allocation has not been made for subscription to online databases and journals in the CUL budget. Nevertheless, it is notable that regular provisions have been made for AMC of Hardware and Recurring charges for Internet etc. An amount of Rs. 3,80,000 have been allocated every year for Internet subscription and an amount of more than Rs.2,25,000 have been allocated for AMC of computers. But there is no allocation for the AMC of software in the CUL budget also. The Figure 4.7 depicts the budget allocation for various purposes in the CUL during last three years.



It is notable that the major portion of allocation is for meeting staff salary, but the Table 4.22 reveals that the numbers of staff members are less in the CUL. This may be because of the reason that the CUL is the only library that gives UGC scales of pay to its professional staff. But there should be a proportionate qualitative as well as quantitative increase in the services provided by the library also.

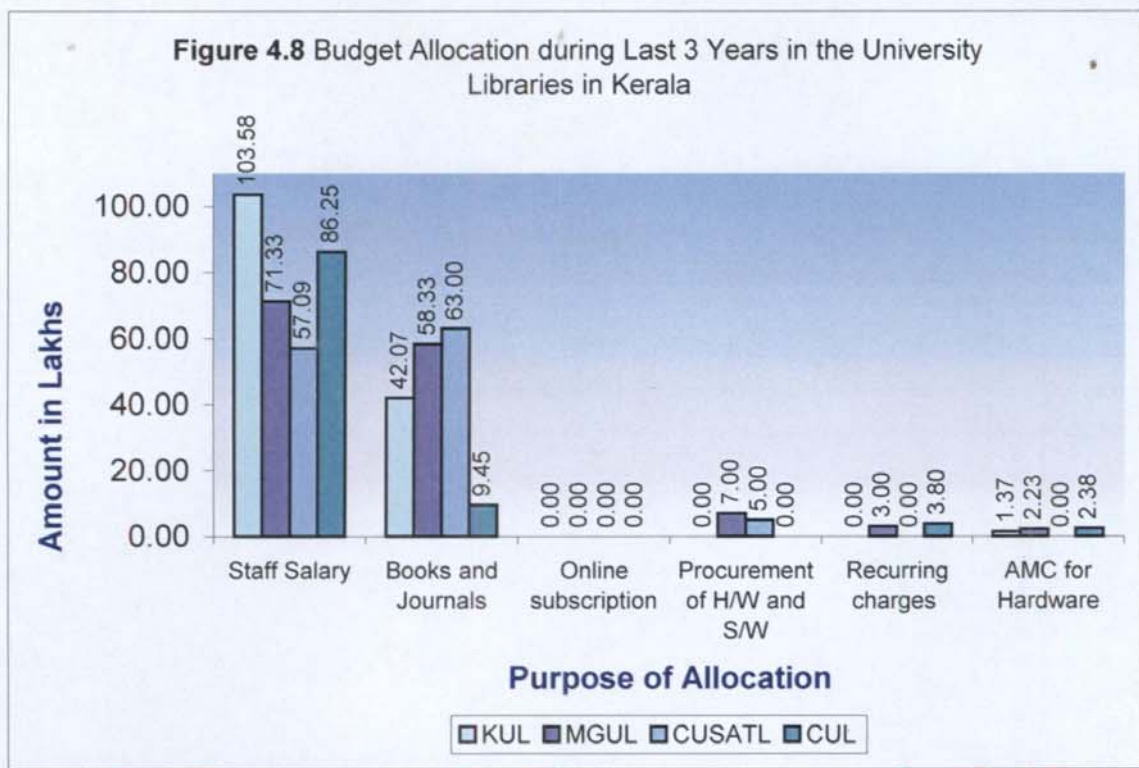
4.4.1.5. Comparison of Budget Allocation to Different University Libraries

The analysis on budget allocation in all the four universities revealed that in last three years the internal allocation of funds in the universities for computerisation was negligible. All the libraries, except CUSATL, have spent more on staff salary. KUL spent 52.89 per cent while MGUL spent 47.45 per cent and CUL was much ahead of others by making 79.98 per cent of the budget allocation for their staff salary. In CUSATL the amount spent was 45.84 per cent and they allocated 50.58 per cent on procurement of Books and Journals. In CUL 8.76 per cent, in MGUL 38.8 per cent and in KUL 21.48 per cent were set apart for the procurement of Books and Journals. The Table 4.20 gives the average of the allotment in last three financial years in the four University Libraries.

Table 4.20 : Budget Allocation in Different University Libraries in Kerala during Last Three Years

Purpose	KUL		MGUL		CUSATL		CUL	
	Average Amount	%	Average Amount	%	Average Amount	%	Average Amount	%
Staff Salary	10357609	52.89	7133333	47.45	5709333	45.84	8624667	79.98
Books and Journals	4206816	21.48	5833333	38.8	6300000	50.58	945000	8.76
Online Subscription	-	-	-	-	-	-	-	-
Procurement of Computer Hardware and Software	-	-	700000	4.65	500000	4.01	-	-
Recurring charges like Internet subscription	-	-	300000	1.99	-	-	380000	3.52
AMC charges for Hardware	137400	0.7	223333	1.48	-	-	238333	2.21
AMC charges for software	-	-	-	-	-	-	-	-
Total amount allotted to the library	19581487		15033333		12453667		10783033	

The MGUL has made provision of an average of Rs. 7 Lakh in last three years for the procurement of computer hardware and software while CUSATL made an average of Rs. 5 Lakhs. The KUL and CUL did not make any provision towards the procurement of hardware and software at all. MGUL has allotted Rs. 3,00,000 towards recurring charges while in the CUL the amount is Rs. 3,80,000. KUL and CUSATL have not made any provision for this. It is observed that KUL meets such expenses from the fee collected from users of Internet and Infonet services. All the libraries except CUSATL have provisions in their budget for AMC of computer hardware. KUL has set apart an average amount of Rs. 1,37,400 while MGUL made provision for Rs. 2,23,333 and CUL for Rs. 2,38,333 for hardware maintenance.



The Table 4.20 has been graphically represented in the Figure 4.8 below where it is clearly revealed that the university authorities have not properly taken into consideration the expenditure towards the application of computers in the libraries shown in the right side of the figure. With regard to the procurement of E-Resources such as databases in the form of CDs and DVDs as well as subscription to online resources very serious negligence is found from the part of libraries.

Allocation of funds in the university budgets for the computerised set up is essential since a system once installed needs to be properly maintained and developed further. So regular allotment of funds has to be made for computerised activities in the library.

4.5. Availability of Different Hardware in the University Libraries

Computers and other peripherals are the most essential part of the computerisation process. Computer technology is fast changing and advancing. Availability of required number of computers for the users and computers and other related gadgets for the staff makes the computerisation

process more momentous and meaningful. Table 4.21 gives the details of computers and other peripherals available in the libraries under study.

Table 4.21 Computer Hardware available in the University Libraries in Kerala

Items	KUL	MGUL	CUSATL	CUL
Server Class machines	3	2	3	3
Laptop Computers	-	-	-	1
486 Machines	-	2	-	-
Pentium I	7	2	-	23
Pentium II	2	13	35	1
Pentium III	-	4	2	1
Pentium IV	6	5	-	
Celron Machine	8			11
Dot Matrix Printers	4	2	4	8
Inkjet Printers	1	6		1
Laser Printers	1	2	2	2
Heavy Duty Network Printers	-	1	-	
CD Server	1	1	1	-
CD ROM Tower	1		1	1
Systems with DVD Drives	1	1		1
Barcode Printer	-	-	2	-
Flat Bed Scanners	-	2	1	1
Over Head Scanners	-	-	-	-
Barcode Scanners	-	2	3	3
Modems	2	2	-	7
Hubs	3	2	1	3
Switches	1	1	1	1
Router	-	-	1	1
LCD Projector	-	-	-	-
Web Camera	-	-	-	-
UPS	16	5	16	5

There are wide ranges of computers available in the market and the processor speed, capacity of memory and hard disc etc. are the main determinants of the performance of the computers. Similarly the basic technology decides the quality of the outputs of the printers. Computers and other peripherals with latest configurations and provision of a good network infrastructure along with a dynamic library management software provides a platform for providing good computerised services to the users. Computers have passed through many generations and the older ones were much inferior compared to the latest ones available in the market. It is the technology of the microprocessor that decides the superiority of the machine over other machines. There were significant changes in the technology in the past, but the university libraries in the state started computerisation mostly around a decade ago and Pentium machines were available in those days. So almost all the machines available in the University Libraries are Pentium machines. The existence of machines prior to that is only reported from MGUL where two computers are 486 machines.

In an integrated library management system all the computers in various sections depend the Server machine for data storage and retrieval. So the availability of good Server class machines is a necessity for having a powerful computer network in the library. All the university libraries studied are found to have Server class machines to use as their Servers. MGUL has two Servers while KUL, CUSATL and CUL have 3 each.

Laptop computers are portable ones that can be easily handled just like brief cases. It can be used for various management purposes and in libraries it can be used especially for conducting user education programmes. Except CUL none of the libraries have Laptop machines.

When the libraries in Kerala started computerisation it was the Pentium I computers dominating the market. KUL has 7 P I machines, MGUL has 2 and CUL has 23 and CUSATL do not have PI machines. More number of Pentium II group computers are available in the libraries under study. In KUL only two P II machines are available while in MGUL 13 and in CUSATL

35 are available. In CUL there is only a single PII machine. MGUL has got 4 P III machines while CUSATL has 3 and CUL has one. KUL has 6 Pentium IV machines, MGUL has got 5 and KUL has two machines in this category. There are 8 Celron machines in KUL and 11 in CUL. Other libraries have no machines with Celron processors.

Printers of various qualities are essential for use in various sections of the library. The basic technology of the printer decides the quality of the output of the printer. Laser printers provide high quality printing while in Inkjet printer quality is not that much high. Dot matrix printers provide hardcopies that are more economical. KUL has got 4 Dot Matrix printers, MGUL 2, CUSATL 4 and CUL has 8 such printers. KUL and CUL have one each Ink Jet Printer, MGUL has 6 and CUSATL do not have any Inkjet printer. KUL has a single Laser Printer while all others have 2 each. Heavy Duty Network Printers are needed for providing hardcopies to users without time delay, especially for taking print out of materials that are downloaded bulkily from Internet from different machines in a network. These printers usually have faster printouts and additional facilities such as scanning options. Only MGUL has got a network printer while no one else is found having such a facility.

KUL, MGUL and CUSATL have CD Server while in CUL there is no CD Server. CD ROM Towers are available in KUL, CUSATL and CUL while MGUL does not have this. Except CUSATL all others are having systems with DVD drives.

Barcode printers are the dedicated printers that are used to print barcodes. None of the libraries other than CUSATL have barcode printers. CUSATL have 2 such printers one in the Circulation Section to print the membership card and other one in the Technical Section to print the accession numbers of the documents.

Scanners are needed to scan texts and images to make digital copies. KUL do not have any scanner while in MGUL there are 2 Flat Bed Scanners and CUSATL and CUL have one each. None of the libraries are having Over

Head Scanners that are high-resolution, high-quality and high-volume scanners used for bulk digitization purposes. Barcode scanners are needed for scanning the barcodes in document transactions and in inventory control. CUSATL and CUL have 3 such scanners and MGUL has two while KUL does not have barcode scanners as the library has not yet computerised their circulation procedures.

KUL and MGUL have 2 modems each while CUL has 7 modems. CUSATL does not have any modem as they have an Optical Fiber backbone in the campus. There are three hubs in each KUL and CUL while two in MGUL and one in CUSATL. All the libraries have single switch for connecting the network. CUSATL and CUL have Router in the library.

LCD Projector is used to project the visual out put to a wider screen. It addresses a group of viewers and helps to make presentations very effectively. It is helpful in conducting demonstrations, user education programmes and training programmes in libraries. None of the university libraries under study are having LCD Projector. Web camera is used for visual interaction especially in Internet sessions of communications. Cost wise it is much cheaper and widely available in the market. Yet no one among the university libraries under study is found possessing any web camera.

Continuous power supply is very essential for keeping the computerised system up all the time. Proper arrangements need to be made to make regular power supply in the library. MGUL and CUL have 5 UPS systems while KUL and CUSATL have 16 systems each. UPS are available with a variety of back up options and if the back up hours are more less systems may be needed. But more number of UPS systems, even if with lesser back up time, makes provisions for alternative sources of power supply and keeps the system up even when one or two UPS systems are down. All the libraries are found to be having enough number of UPS to provide continuous power supply.

All the libraries under study found to be having adequate Server class machines. Pentium IV machines, the latest in personal computers, are

available in the market for last three years and its availability to the libraries under study found to do too less with CUSATL and CUL do not possess any machine in this category. This shows that the libraries under study mostly depends old machines that may put limitations on them in using some of the applications especially in web related applications. Similarly a Laptop computer that helps in conducting effective user education programmes both inside as well as out side the library is not available in majority of the libraries. LCD projector, which is a must in conducting effective training programmes and user education programmes is not available in any of the library under study. Internet related equipments like web camera are not available in any of the library and there should be adequate equipments and tools available for conducting video conferencing especially among the university libraries in the state for creating an effective communication channel between the libraries in higher education in the state. Over-Head Scanners that are necessary for high volume digitization work are also not available in the libraries under study. With a good number of Theses and Dissertation collection in the libraries, these libraries need to have such Scanners for initiating digitization works. These equipments need to be made available in all the university libraries. Other equipments available found to be in tune with the requirements of the libraries under study.

4.6. Software Available for Various Purposes along with the Operating Systems

Software used for the housekeeping operations is the most important software required in libraries. Out of the four libraries, two libraries i.e. KUL and CUL are using the Libsys software for their house keeping operations. KUL uses it on the Windows NT platform while CUL on Sco Unix on server side and Windows95/98 on client side. MGUL is using the SOUL software on Windows platform developed by INFLIBNET. CUSATL makes use of ADLIB software on Windows platform. It is a foreign software received as part of the aid received by the library from Netherlands. It was found that CUSATL only

has a web enabled library system. The Table 4.22 gives details of the software in use in different University Libraries.

**Table 4.22 Application Software and Operating Systems
Used in the University Libraries in Kerala**

Purpose	KUL	MGUL	CUSATL	CUL
Housekeeping Operations	Libsys4/ WindowsNT	SOUL/ Windows	ADLIB/ Windows	Libsys4/ Sco Unix
Word Processing	MS Word/ Windows	MS Word/ Windows	MS Word/ Windows	MS Word/ Windows
Spreadsheets	MS Excel/ Windows	MS Excel/ Windows	MS Excel/ Windows	MS Excel/ Windows
Presentation Software	MS Power Point/ Windows	MS Power Point/ Windows	MS Power Point/ Windows	MS Power Point/ Windows
Web Browsing	Internet Explorer/ Windows	Internet Explorer/ Windows	Internet Explorer/ Windows	Netscape, Mozilla/ Linux IE/Windows
DTP		Page Maker/ Windows		ISM Publisher, Page Maker /Windows
Digital Library software	TechFocus /Linux	-	ACADO/ Windows	-
OCR (Optical Character Recognition)	-	-	-	-
Any Other				Barcode: Label Works/ Windows

For the purposes of Word processors, spreadsheets and presentation software all the libraries are making use of Microsoft Office products MS Word, MS Excel and MS Power Point respectively. For web browsing libraries mostly depend Microsoft product Internet Explorer on Windows operating systems and CUL makes use of Mozilla and Netscape Navigator on Linux platform. For DTP works MGUL uses Page Maker that helps to design the page settings and CUL uses Page Maker and ISM Publisher that provides necessary fonts for DTP works. Both are used on Windows platforms. KUL

and CUSATL have made use of digital library software. KUL uses TechFocus on Linux platform while CUSATL uses ACADO on Windows platform. CUL uses separate software for barcode generation called Label Works and its platform is Windows98. None of the libraries have seen started using Optical Character Recognition software that is needed for recognizing the scanned texts and images. Its application is mainly in the digitization works and none of the libraries have done the digitization process to any considerable extent.

It is found that all the libraries are making use of commercial software while the potential of the open sources are totally neglected by the libraries. The only instance of making use of open source is the use of Linux operating system for very limited applications in CUL and KUL. It can be ascertained that KUL and CUL have spent a large amount on software while MGUL has obtained software with reasonable price. CUSATL received the software under the CUSAT-Netherlands Government project. Open sources like digital library application software, Greenstone should be utilized by the university libraries in the state. Since some of the libraries are investing huge amount on the house keeping software that is not affordable to them also and on observation it was found that all the libraries are not satisfied with the software they are using. In such a situation the university libraries in the state must take a joint initiative to develop software that suits their requirements and that is affordable to them also. Since all the university libraries have almost the same objectives and requirements such an initiative will be most feasible.

4.7. Manpower in the University Libraries

Qualified and trained manpower is an asset for any library. There should be a combination of both professional as well as non-professional staff available for the smooth functioning of a university library. Qualified personnel is needed for performing various tasks that needs professional skill and expertise while non-professionals are to supplement the tasks of professionals in rendering services to the clientele. Apart from these,

professionals with computer skill and qualifications are a necessity of recent origin.

4.7.1. Professional Staff Strength in the University Libraries in Kerala

Professional staff is needed for performing various skilled professional jobs in libraries. The availability of professional staff varies from university to university under study. It is notable that among the libraries under study, only a single library, i.e. CUSATL has a University Librarian, the Head of the library. In all the other libraries the position of the University Librarian is vacant and the senior most professional staff member is put in charge of the University Librarian. Many of the implementation tasks related with computer applications need comparatively long term planning and for making such planning, a full time University Librarian is essential. Persons with short-term assignment may not dare to initiate tasks that need more financial investments, as the person himself/herself has to settle the amount with the university. The Table 4.23 gives the details of the professional staff strength in each library.

Table 4.23 Professional Staff Strength in the University Libraries in Kerala

Category	KUL	MGUL	CUSATL	CUL
Deputy Librarian	2	1	-	1
Asst. Librarian Sel. Gr.	4		4	5
Asst. Librarian Sr. Scale	-	1	2	3
Asst. Librarian	-	-	4	2
Asst. Librarian Gr. I	7	-	-	-
Asst. Librarian Gr. II	13	10	-	-
Jr. Librarian/Reference Assistant	7	5	6	-
Prof. Asst. Gr I/ Technical Asst.	10	6	5	5
Prof. Asst. Gr. II/ Library Assistant	6	-	1	-
Total	49	23	22	16

KUL has two Deputy Librarians while MGUL and CUL have single each. In CUSATL there is no Deputy Librarian, but it is the only library in the entire state with a University Librarian. There are 5 Assistant Librarians Selection Grade in CUL while KUL and MGUL have 4 each and MGUL has none in this grade. CUL has 3 Assistant Librarian Senior Grade while CUSATL has 2 and MGUL has 1. In KUL there is no Senior Grade Assistant Librarian. Junior Librarian and Reference Assistant are in the same grade and there are 7 Reference Assistants in KUL, 5 in MGUL, 6 in CUSATL and none in CUL. Professional Assistants Gr I and Technical Assistants are in the same grade and KUL has 10 Technical Assistants, MGUL has 6 and CUATL and CUL have 5 each. Professional Assistant Gr. II and Library Assistant are in the same grade and KUL has 6 and CUSATL has one while the other two university libraries have none in this category. Altogether there are 49 professionals in KUL, 23 in MGUL, 22 in CUSATL and 16 in CUL. CUL invests more on its staff who are supposed to provide good service. But as the Figure 4.2 shows the number of services provided by this library is the lowest among the libraries under study.

4.7.2. Non-Professional Staff

Non-professional staff are technically not qualified and are needed to perform routine jobs other than those performed by the professional staff. The non-professional staff who help the professionals in their duties and services include Library Attenders/Library Assistants and peons. Table 4.24 gives details regarding the availability of non-professional staff in the library.

Table 4.24 Non- Professional Staff Strength in the University Libraries in Kerala

Category	KUL	MGUL	CUSATL	CUL
Library Assistant/ Attender	2	-	-	8
Peon	1	5	5	2

Only KUL and CUL have Library Attenders or Assistants. KUL has 2 Attenders while CUL has 8. KUL has One Peon while MGUL and CUSATL have 5 each and CUL has 2 peons.

Professional as well as Non-professional staff are needed for performing traditional library duties and services while specially qualified and skilled staff are needed for performing jobs related with computer applications in library routines and services.

4.7.3. Personnel Engaged in Library Computerisation

Among librarians, those dealing with systems represent a subspecies and are called System Librarians. System Librarians exist to handle all things dealing with computers. This unique breed of librarian is a necessity, keeping the library technologically connected and serving as a conduit to the underworld of computer improvements and advancements. They are actually the vital innovators implementing services that allow the library to maintain a valuable place in the lives of the clientele. In our country this profession has not been purely recognized as System Librarianship and those who perform the computer related jobs include both library professionals and computer professionals. In many of the cases, in university libraries, help is sought from the Computer Department. Nevertheless there is a need for regular and fulltime qualified staff in the library. Table 4.25 gives the details of the staff members who are working in the Computer Sections of the University Libraries under study.

Staff working in this section needs qualifications and training in both librarianship and computer applications. Though UGC made provisions for appointing Information Scientists to manage the computerised services and operations only two University Libraries i.e. CUSATL and CUL have filled up these posts.

Table 4.25 Staff Strength of Computer Section in the University Libraries in Kerala

	Designation	Qualifications (General)	Qualifications in Computer Science/IT
KUL	Assistant Librarian	MA, M.Lib.Sc.	-
	Reference Assistant	MA, M.Lib.Sc.	-
	Technical Assistant	MA, M.Lib.Sc.	DCA
	Library Assistant	MA, M.Lib.Sc.	-
MGUL	Assistant Librarian	MLISc.	-
	Assistant Librarian	MLISc.	-
	Reference Assistant	MLISc.	-
	Reference Assistant	BLISc.	PGDCA
CUSATL	Information Scientist	-	M.Tech.
CUL	Information Scientist	MA, MLib.Sc.	PGDCA, PGDLAN
	Professional Assistant	MA, BLISc.	-
	Professional Assistant	MLISc.	-

In KUL four library professionals are working in the computer section and they are postgraduates in Library and Information Science and only one among them has got a formal qualification in computer application, Diploma in Computer Applications, and he is only the third person in the professional hierarchy of the Section.

In MGUL also, there are four persons working in the section and only a single person is having a formal qualification in computer application i.e. PG Diploma in Computer Applications and the person is last in the professional hierarchy and holds only a degree in Library and Information Science while other three persons are having Post Graduation in Library and Information Science.

In CUSATL, there is no formal Computer Section and all the library professionals are involved in the computerised activities. CUSATL has

recently appointed Information Scientist under the INFLIBNET scheme to manage the automated activities. This person is purely a computer professional with Post Graduate degree in Computer Technology. She lacks any experience in library computerisation.

CUL has three persons working in the computer section. One is the Information Scientist appointed under the INFLIBNET scheme and others are pure library professionals on contract basis. Information Scientist is a postgraduate in Library Science and holds Post Graduate Diploma in Computer Applications as well as in Library Automation and Networking.

The study reveals that the University Libraries in the state are not equipped with adequate qualified staff to handle computerised activities. In KUL and MGUL there is no qualified staff for managing the computerised operations and services where as in CUSATL and CUL the number of supporting staff in the computer section is quiet inadequate.

4.7.3.1. Administration of the Computerised Activities

UGC has recognized the need for properly manning the computerised library systems and sanctioned the post of Information Scientist with stipulated qualifications. Among the libraries under study the CUSATL and CUL have utilized this provision and appointed Information Scientist while KUL and MGUL have not utilized. In KUL and MGUL Assistant Librarians without any qualification in Computer Science have been put in charge of the computerised activities. CUSATL appointed the Information Scientist with a pure Computer Science background during 2003 while in CUL the post was filled in 2001 with a person with qualifications in Library Science as well as computer applications. Table 4.26 gives information about the persons in charge of computerisation in various libraries. The Table reveals that the service details of the persons in charge of computerisation are not uniform in the university libraries under study.

Table 4.26 Details of the Personnel in charge of the Computer Sections of University Libraries in Kerala

	KUL	MGUL	CUSATL	CUL-I
Designation	Assistant Librarian (Sel. Grade)	Assistant Librarian Gr II	Information Scientist	Information Scientist
Qualifications (General)	MA, MLib Sc	MSc MLISc	-	MA, MLib Sc
Qualifications (Computer)	Nil	Nil	M Tech (Comp & Inf Sc)	PGDCA, PGDLAN
Date of Joining	8-11-75	7-9-89	28-8-03	19-2-01
Scale of Pay	12000-18300	6675-10500	8000-13500	8000-13500

KUL and MGUL have put Assistant Librarians in charge of Computer Section who were not appointed by the library for the management of Computerised activities. They lack any formal qualifications in the Computer Application also. In the United States and in most of the developed nations of the Europe, this profession has been recognized as 'System Librarianship' and System Librarians are required to have formal qualifications in Library and Information Science as well as in Computer Science in order to cope with the skills needed for both end of the profession. Efforts needs to be made to recognize the requirements of the profession and to develop the skills needed for both library and information services and for computer applications.

In-service training programmes help to gain skill in computer applications especially in case of persons without any formal qualifications in Computer Science/Applications. Similarly it helps pure computer professionals in attaining skills in library related applications. Today library services are moving towards web based services. The skills required to keep abreast of library technology has exploded since the introduction of the World Wide Web and professionals need to get trained and acquainted with web related technologies and applications also.

Table 4.27 Training Undergone by the Persons in charge of Computerisation in the University Libraries in Kerala

	Sl. No.	Training Programme	Agency	Duration	Course Content
KUL	1	Training on Library Automation	Dept of Lib & Inf. Sc., Kerala University	4 Weeks	Use of CDS/ISIS
	2	Training in use of SOUL software	INFLIBNET	1 Week	SOUL Software
MGUL	1	Training on Library Automation	INFLIBNET	1 Month	Basics of Computers and CDS/ISIS
	2	Training on Digital Library	Osmania University	1 Week	Digital Library
	3	UGC Infonet Training	INFLIBNET	1 Week	Use of Infonet Resources
	4	Workshop on Web Page Designing	Dept of Lib & Inf. Sc., Kerala University	1 Week	Web Page Designing
CUL	1	Training on Library Automation	INFLIBNET	1 Month	Basics of Computers and CDS/ISIS
	2	Intensive training on use of ILMS Software	INFLIBNET	1 Week	ILMS software
	3	Training on Digital Library	DRTC Bangalore	1 Week	Digital Library Applications
	4	UGC Infonet Training	INFLIBNET	1 Week	Use of Infonet Resources

The above Table 4.27 provides details of training obtained in library computerisation by the persons in charge of computerisation. The person in charge in CUSATL has not undergone any training programme as she has been appointed recently though she has no exposure in library

computerisation. All others have been trained in different aspects of library computerisation varyingly.

4.7.3.1.1. Duties and Responsibilities of the Persons in charge of Computerisation

The duties and responsibilities of the persons in charge of the computerisation found to be varying in the universities. More involvement in the activities of the section was found among the persons with Library Science background while the person with pure Computer Science background seemed to be not that much involved. Table 4.28 gives details of the duties and responsibilities of the persons in charge of computerisation in various University Libraries.

Table 4.28 Details of Duties and Responsibilities of the Persons in charge of Computerisation in the University Libraries in Kerala

Duties and Responsibilities	KUL	MGUL	CUSATL	CUL
Over all management of section	Y	Y	N	Y
Database administration	Y	Y	N	Y
Training the library staff	N	Y	N	Y
Training users	Y	Y	N	Y
Software development	N	N	N	N
Providing services to users	Y	Y	Y	Y
Communicating with vendors	Y	Y	Y	Y
Planning future programmes /services	Y	Y	N	Y
File works	Y	Y	N	Y
Hardware maintenance	N	Y	Y	Y
Software maintenance	N	Y	Y	Y
Network Management	N	Y	Y	Y

Not much uniformity is found among the persons in charge of the computerised activities in terms of duties and responsibilities. None among

the persons found to be doing the job of software development while all found to be providing services to users as well as corresponding with the vendors. Duties and responsibilities of the persons in MGUL and CUL found to be exactly same.

4.7.3.1.2. Working Environment

Adequate physical facility is a pre requisite for discharging one's duties and responsibilities smoothly. Regarding the physical facility provided, persons from all the libraries found to be satisfied. Required numbers of systems and peripherals is essential for carrying out the job in a computerised environment. Similarly adequate manuals and reference materials are essential for performing the job smoothly. Regarding a question about the provision of sufficient systems and peripherals the persons in charge of computer sections in KUL, MGUL and CUSATL responded that they are provided with sufficient computers and peripherals while the person from CUL responded as 'no'. With regard to the availability of sufficient manuals and reference materials the persons from KUL and MGUL found to be satisfied while the persons from CUSATL and CUL does not found to be satisfied.

Timely attention from vendors and service contractors will enable to keep the system up without any break. With regard to the support from vendors and service contractors, persons from KUL, MGUL and CUL found to be satisfied while the person in charge in CUSATL is dissatisfied.

Freedom in incorporating one's ideas into his work may enable to introduce new and innovative services to the users. The persons in charge of the systems may be more aware about the potential of the automated systems and may be in a better position, compared to the superiors who have not much knowledge about the library computerisation, in chalking out the new programmes. So the freedom granted to the persons in charge may result in improving the existing services as well as introducing new ones. With regard to the question on such freedom, the persons from MGUL, CUSATL and CUL

responded that they enjoy such freedom while the person from KUL did not respond to the question.

Guidance from superiors and assistance from colleagues reduces the workload and provides a conducive atmosphere for working. In response to questions about the guidance from superiors and assistance from colleagues all found to be satisfied while about the encouragement from superiors the person from MGUL found to be dissatisfied.

Communication with counterparts in other institutions enables to discuss the problems as well as prospects in the profession and gain knowledge about developments in the profession. Regarding the question on communication with counterparts in other institutions persons from KUL, MGUL and CUL responded that they communicate with others and discuss their problems while the person from CUSATL responded as 'no'. Similarly the persons from KUL, MGUL and CUL responded that they use to attend Conferences/Seminars/Workshops/User-group meet and found to be getting valuable information to improve their work.

Non-library professional as in charge of the Computer Section of the CUSATL seems to be a fish out of water. The person is not found communicating with counterparts in other universities and has not shown much interest in participating in Workshops/Seminars etc. on the specific field. It is also found the person has not much involvement in the computerisation activities.

4.8. Areas of Applications of Computers

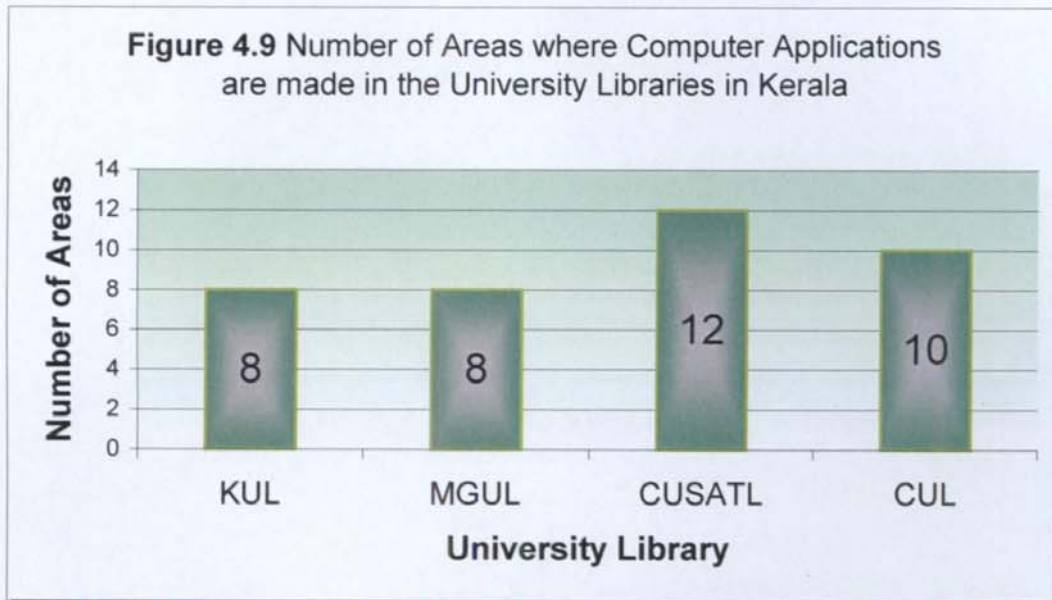
None of the University Library formally conducted a system analysis prior to the computerisation process. Yet all of them made certain planning in an informal way. Regarding the status of computerisation MGUL, CUSATL and CUL have claimed to be fully computerised while KUL claimed to be partially computerised. Table 4.29 gives details about the areas of computer application in various University Libraries under study.

Table 4.29 : Areas of Applications of Computers in the Housekeeping Operations and Office works in the University Libraries in Kerala

Areas of Applications	KUL	MGUL	CUSATL	CUL
Database Creation	Y	Y	Y	Y
Information Retrieval	Y	Y	Y	Y
Circulation Procedures	N	Y	Y	Y
Acquisition Procedures	Y	Y	Y	Y
Serials Control	Y	N	Y	Y
Cataloguing	Y	Y	Y	Y
OPAC	Y	Y	Y	Y
Digitization of Documents	N	N	Y	N
Stock Verification	N	N	N	Y
Reference Services	N	N	Y	N
Inter Office Communication	Y	Y	Y	Y
Intra Library Communication	N	N	Y	N
Financial Management	N	N	N	N
Office File Works	Y	Y	Y	Y

A close examination of the data in the Table reveals that all the libraries are yet to computerise some of the essential operations or services. Above Table reveals that all the libraries have computerised database creation, information retrieval, acquisition procedures, cataloguing works (including online catalogues), inter office communication and office file works. All the libraries except KUL have automated their circulation procedures. KUL is not yet able to provide computerised circulation services to its users even after almost a decade of use of computers in the library. All the three libraries except MGUL have made use of computers in Serial Control. CUSATL only makes use of computers for communication within the library while no one has made use of computers in the financial management of the library. CUL only has made use of computer in Stock verification. The Figure 4.9

represents the number of areas where computer applications are made in these libraries.



Out of the total of 14 possible areas of applications ascertained CUSATL has made applications in 12 areas where as CUL has made in 10 and KUL and MGUL have made in 8 areas each. Thus CUATL found to be the forerunner in the number of areas of computer application in the University Libraries under study.

4.8.1. Computerised Services and Operations

Libraries make use of computers mainly for performing its house keeping operations and for providing services to its users. Table 4.30 gives the details of computerised services and operations in these libraries.

It is found that all the libraries are providing Internet Services, Online Services (Database and Full Text) and Circulation of Accession List to its users. None of the libraries under study is providing Content Page Service. CUL does not provide any multi media services to its users. On observation it was found that other three libraries are also not providing multimedia services to any considerable extent though they have claimed so. MGUL and CUSATL are using computers for imparting User Education programmes while KUL

and CUL are not providing such services. Computerised Current Awareness Service, Selective Dissemination of Information and CD/DVD based services are provided by only MGUL and CUSATL. It was observed that the computerised Reference Service through which a user can collect information from a database or post a query to the Reference Librarian is not being provided by any of the library under study.

Table 4.30 Details of Application of Computers in Services and Operations in the University Libraries in Kerala

Areas		KUL	MGUL	CUSATL	CUL
Services	Current Awareness Services	N	Y	Y	N
	SDI Service	N	Y	Y	N
	Circulation of Accession List	Y	Y	Y	Y
	Content Page Service	N	N	N	N
	Online Services (Database and Full Text)	Y	Y	Y	Y
	Multimedia Services	Y	Y	Y	N
	CD/DVD based Services	Y	Y	Y	N
	Internet Services	Y	Y	Y	Y
	User Education Programs	N	Y	Y	N
Operations	Bar code for stock verification	N	N	N	Y
	Smart Card for member identification	N	N	N	N
	Microchips for document identification	N	N	N	N
	Totally automated check in/Check out	N	N	N	N
	Electronic theft detection systems	N	N	N	N

Latest applications of computers in libraries are found to be absent in the libraries under study. None of the libraries are using Smart Card for member identification, Microchips for document identification, Totally Automated Check-in/Check-out Systems and Electronic Theft Detection

Systems. It was observed that RFID Technology has not been introduced in the libraries under study. Only CUL have computerised stock verification system as well as using barcodes for feeding the data of documents during stock verification.

4.8.1.1. User Awareness About Different Computerised Services and its Availability to Users

The user awareness about different computerised services and its availability to them through their respective libraries were ascertained. Table 4.31 gives the details.

4.8.1.1.1. Current Awareness Service

Users were asked whether they are aware about CAS and do they get the service from their library. In KUL 50.23 percent, in MGUL 57.21 percent, in CUSATL 59.75 percent and in CUL 41.58 per cent responded that they are aware about this particular service provided using computers. Table 4.30 has revealed that MGUL and CUSATL are providing computerised CAS to its users. But in MGUL 45.27 per cent and in CUSATL 52.83 per cent only have responded that they are getting the service from their library. It shows that overall less than half of the population is getting the service and it is not reaching to the majority of the users. In KUL and CUL, where the service is not provided, 8.37 and 20.53 per cent respectively have claimed that they are getting the service and it shows the ignorance of the users regarding the services provided by the libraries. An overall 51.9 per cent awareness was recorded while the libraries where the service is provided it is available to only 49.05 per cent.

The analysis showed that 51.9 per cent of the users are aware about the service and majority (50.05%) of the users are not getting Current Awareness Service where it is provided.

Table 4.31 Awareness about various Computerised Information Services and its Availability to the Users in the University Libraries in Kerala

Services	KUL		MGUL		CUSATL		CUL		Average									
	Awareness		Availability		Awareness		Availability		Awareness		Availability		Aware	Avai lable				
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No						
Current Awareness Service	108 (50.23)	107 (49.77)	18 (8.37)	197 (91.63)	115 (57.21)	86 (42.79)	91 (45.27)	110 (54.73)	95 (59.75)	64 (40.25)	84 (52.83)	75 (47.17)	79 (41.58)	111 (58.42)	39 (20.53)	151 (79.47)	51.90	49.05
Selective Dissemination of Information	61 (28.37)	154 (71.63)	16 (7.44)	199 (92.56)	56 (27.86)	145 (72.14)	39 (19.4)	162 (80.6)	37 (23.27)	122 (76.73)	29 (18.24)	130 (81.76)	40 (21.05)	150 (78.95)	19 (10.00)	171 (90.00)	25.36	18.82
Circulation of New Additions List	61 (28.37)	154 (71.63)	41 (19.07)	174 (80.93)	89 (44.28)	112 (55.72)	68 (33.83)	133 (66.17)	61 (38.36)	98 (61.64)	51 (32.08)	108 (67.92)	55 (28.95)	135 (71.05)	46 (24.21)	144 (75.79)	34.77	26.93
Online Database Service	90 (41.86)	125 (58.14)	66 (30.70)	149 (69.30)	93 (46.27)	108 (53.73)	78 (38.81)	123 (61.19)	87 (54.72)	72 (45.28)	69 (43.4)	90 (56.6)	49 (25.79)	141 (74.21)	22 (11.58)	168 (88.42)	41.70	30.72
Online Full text Services	111 (51.63)	104 (48.37)	75 (34.88)	140 (65.12)	140 (69.65)	61 (30.35)	124 (61.69)	77 (38.31)	89 (55.97)	70 (44.03)	68 (42.77)	91 (57.23)	66 (34.74)	124 (65.26)	42 (22.11)	148 (77.89)	53.07	40.39
CD/DVD Services	91 (42.33)	124 (57.67)	43 (20.00)	172 (80.00)	120 (59.70)	81 (40.30)	104 (51.74)	97 (48.26)	69 (43.40)	90 (56.60)	43 (27.04)	116 (72.96)	40 (21.05)	150 (78.95)	4 (2.11)	186 (97.89)	41.83	33.04
Internet Services	191 (88.84)	24 (11.16)	184 (85.58)	31 (14.42)	196 (97.51)	5 (2.49)	190 (94.53)	11 (5.47)	153 (96.23)	6 (3.77)	148 (93.08)	11 (6.92)	173 (91.05)	17 (8.95)	133 (70.00)	57 (30.00)	93.20	85.62
User Education Services	58 (26.98)	157 (73.02)	20 (9.3)	195 (90.7)	64 (31.84)	137 (68.16)	40 (19.9)	161 (80.1)	60 (37.74)	99 (62.26)	42 (26.42)	117 (73.58)	32 (16.84)	158 (83.16)	13 (6.84)	177 (93.16)	27.97	22.78

* Values in parentheses are the percentage

4.8.1.1.2. Selective Dissemination of Information

As in the case of CAS, MGUL and CUSATL have claimed to be providing this service. An overall 25.36 per cent awareness was found about this specialized service. In KUL 28.37 per cent, in MGUL 27.86 per cent in CUSATL 23.27 per cent and in CUL 21.05 per cent only are aware about this service. It is notable that this service is available to only 18.82 per cent of the respondents with 19.4 per cent in MGUL and 18.24 per cent in CUSATL. KUL and CUL are not providing the service, but as in the earlier case of CAS, here also contrary to the fact 7.44 per cent from KUL and 10 percent from CUL have claimed that they are getting the service.

It is revealed that this service is also not reaching to the majority (81.18%) of the users. The awareness about the service among users is also very poor with 74.64 per cent of them being ignorant about the specialized library service.

4.8.1.1.3. Circulation of New Additions List

Circulation of New Additions List enables the user to be aware about the latest additions of documents to the library collection. In a computerised library system this service can be provided very easily. Computer can generate such report and it can be sent on periodic basis to the users either by means of a hardcopy or the soft copy can be posted to the email box of the users on regular intervals. All the libraries under study are providing this service and an overall 34.77 per cent of users are aware about this service. In KUL 28.37 per cent, in MGUL 44.28 per cent, in CUSATL 38.36 per cent and in CUL 28.95 per cent are aware about this service. But it was found that this service is also not reaching to majority of the users. In KUL 19.07 per cent, in MGUL 33.83 per cent, in CUSATL 32.08 per cent and in CUL 24.21 per cent only have said that they are getting this service.

It is found that 65.23 per cent of the users are not aware about this service and overall availability of the service is to 26.93 per cent of users only leaving the majority of the other 73.07 per cent of users not benefiting from this service.

4.8.1.1.4. Online Database Services

All the universities under study are coming under the purview of UGC Infonet and are supposed to get many of the modern computer based information services like Online Database Services and E-Journal Fulltext Services Online Bibliographic Services etc. through Infonet. Comparatively, better awareness (41.7%) was found with regard to Online Database Service among the users. In KUL 41.86 per cent, in MGUL 46.27 per cent, in CUSATL 54.72 per cent and in CUL 25.79 per cent are aware about this service. But this service is also not reaching to majority of the users. In KUL 30.7 per cent, in MGUL 38.81 per cent, in CUSATL 43.40 per cent and in CUL only 11.58 per cent have responded that they are getting online database services. In CUSATL the service is reaching to more than half of the users while in CUL it is very low with 11.58 per cent only getting the benefit of such valuable services.

It is revealed that 58.3 per cent of the users are not aware about the Online Database Service. Only 30.72 per cent of users are getting the service while rest of the 69.28 per cent are not getting benefit of the service.

4.8.1.1.5. Online Full Text Services

With regard to the online full text services better awareness is found among the users. An overall 53.07 per cent of the users are found to be aware about full text services. All the libraries are getting full text service as part of Infonet Consortia and apart from this, these libraries subscribe to some of the full text databases. In KUL 51.63 per cent, in MGUL 69.65 per cent, in CUSATL 55.97 per cent and in CUL 34.74 per cent of the users are aware about this service. But the overall availability of the service is only 40.39 per

cent only with 34.88 per cent in KUL, 61.69 per cent in MGUL, 42.77 per cent in CUSATL and only 22.11 per cent in CUL. It is in MGUL the service is reaching to a wider community where as in CUL the situation is pathetic. UGC has invested huge amount on providing E-resources to the universities in the form of database access and E-Journal access. The universities under study were fortunate to receive these privileges in the first phase itself. Yet it is frustrating to note that the services are not reaching to the majority of users. Effective steps should be taken to make maximum use of these valuable services.

It is unveiled that 46.93 per cent of the users are not aware about the service and 59.61 per cent are not utilizing the Full text services.

4.8.1.1.6. CD ROM/DVD Based Services

Except CUL, all other three libraries under study are providing CD ROM/DVD based services using dedicated Servers for this purpose. An overall 41.83 per cent awareness is found among the users regarding this service. In KUL 42.33 per cent, in MGUL 59.7 per cent, in CUSATL 43.4 per cent and in CUL 21.05 per cent are aware about this service. 20 per cent in KUL, 51.74 per cent in MGUL, 27.04 per cent in CUSATL have responded that they are getting this service from their respective libraries. In CUL where this service is not provided 2.11 per cent have wrongly stated that they are getting this service. It is notable that the service is reaching only to 33.04 per cent of the users in case of the libraries where it is provided. As in the case of other computerised services, this service also needs to be brought to the users effectively.

It is found that 58.17 per cent of the users are not aware about the service and 66.96 per cent of the users are not utilizing this service where it is provided.

4.8.1.1.7. Internet Services

All the libraries under study are providing Internet services and are found to be the most popular service provided by these libraries with an awareness of 93.2 per cent among the users and to 85.62 per cent the service is available. The high rate of awareness among the users may be part of the popularity of the Internet due to its advent in to the daily life of the society, but it is notable that 85.62 per cent have claimed that this service available to them. Analysis revealed that in KUL the awareness is just below 90 per cent where as among the users of other libraries it is above 90 per cent. 85.58 per cent in KUL, 94.53 per cent in MGUL, 93.08 per cent in CUSATL and 70 per cent in CUL claimed that this service is available to them.

It is revealed that only 6.8 per cent are ignorant about the service and to 14.38 per cent the service is not reaching.

4.8.1.1.8. User Education Services

User education programmes are conducted to educate the users regarding their privileges in the library. Yet it is notable that users are poorly aware about such facility itself. Awareness about User Education services is recorded as 26.98 per cent in KUL, 31.84 per cent in MGUL, 37.74 per cent in CUSATL and 16.84 per cent in CUL.

It is revealed that a huge majority of 72.03 per cent of the users are not aware about User Education Programmes and it is not available to 77.22 per cent of the users.

It is revealed that except the Internet services, all other services are not reaching the target users properly. This handicap is reflected in the general awareness about the services also. Libraries under study have claimed that they are providing many of the services. But it was observed that the libraries are not providing the services in a structured and regular basis. Here it is to be noted that the services they are providing is available to a narrow minority only. It means that majority of the services are not properly interpreted to

users and are not reaching to them. Though MGUL and CUSATL are providing user education services, it is revealed that only 22.78 per cent are getting any orientation in the use of services provided by them. In case of the other two libraries no user education programmes are conducted and there is a pressing need for bringing the services to the notice of the users. But none of the libraries under study possess an LCD Projector, a hardware that is highly essential for interpreting computerised services to users. Without such a facility no university library in this era can properly educate the users about the use of various computerised services provided by them.

4.8.2. Computer Applications in Various Operations and Services

The libraries under study are using computers for various services and operations. The sub-areas of applications within each area were ascertained which are discussed below.

4.8.2.1. Database Creation

Creation of the database is considered to be the first step in computerizing a library. Without a database in digital form, no library can make effective use of computers. All the libraries have prepared their databases in digital form and the details of its application are given in the Table 4.32, which shows that all the libraries have completed their retrospective conversion and databases are available in the digital form. All the libraries used catalogue cards as data source for their retrospective conversion. CUL have made use of Accession Register also but only to complete the data that were not available in the catalogue cards. All the three libraries except CUSATL developed the database in-house while CUSATL got the work done by external agency. KUL and CUL utilized the services of the Library staff as well as data entry operators while MGUL depended only on the library staff for data entry. Three persons were engaged in the data entry in MGUL and completed the work within two years.

Table 4.32 Details of Library Database Computer Applications in the University Libraries in Kerala

Database Creation	KUL	MGUL	CUSATL	CUL
Status of retrospective conversion	Completed	Completed	Completed	Completed
Document source used for conversion	Catalogue Card	Catalogue Card	Catalogue Card	Catalogue Card then Accession Register
By whom created	In house	In house	External Agency	In house
Created in house by	Staff members and data entry operators	Staff members	NA	Staff members and data entry operators
Number of persons engaged	Not known	3	4 to 10 persons	6
Document in languages other than English entered by means of	Transliteration	Transliteration	Transliteration	Transliteration/Using Gist Card
Duration taken for database creation	6 months to 1 year	1 to 2 years	Up to 6 months	1 to 2 Years
Standards followed	ISO 2709	ISO 2709	ISO 2709	ISO 2709
Classification notation used in the database	CC	DDC	UDC	DDC
Cataloguing Rules followed	CCC	AACR II	AACR II	AACR II
Subject descriptor standard followed	Chain Indexing	LC Subject Headings	Sears List	LC Subject Headings
Frequency of database back up taken	Once in 2 days	Daily	Daily, Weekly, Monthly	Daily
Medium used for backup	CD	DAT Drive and Harddisc	Cartridge	Harddisc and CD
Automatic back up mechanism	Nil	Nil	Nil	RAID
Standby server used	No	Yes	Yes	No

In CUSATL the retro-conversion was done by external agency involving 4 to 10 persons and managed to complete the work within 6 months. In CUL the work took 2 years and a total of 6 persons consisting of

staff members and data entry operators were involved in the work. In KUL the work took only 6 months to 1 year but the data regarding the number of persons involved in the work is not available.

4.8.2.1.1. Standards Followed for Library Database

Regarding the adherence to the standards for database description, it is more dependent on the software used by the libraries than the policy of the library. It is learnt that all the software used by the libraries adheres to ISO 2709 standard and are also Z39.5 compatible. In the case of Classification numbers, Cataloguing rules for description of data element and assigning keywords the libraries adhered to the standards they were following in the library traditionally.

4.8.2.1.2. Data Security Measures Taken by the University Libraries

It is very important to back up the database so as to secure the valuable data from any possible damage or loss. In a totally automated system, any damage to the database will bring the whole system in to a halt. Regarding the back up of the data CUSATL is found to be more conscious. CUSATL takes the back up daily and they use to have a separate weekly and monthly back up additionally. MGUL and CUL take the backup daily. KUL use to back up the data once in two days only because they have not computerised their circulation procedures and have no transaction data. KUL is using Compact Discs as the backup medium while MGUL uses DAT drives and hard discs for back up. CUSATL uses Cartridge for backup while CUL makes use of hard disc as well as re-writable CDs for making the data secure. Except CUL none of the libraries have any automatic back up mechanism to secure the data. In CUL the server has RAID feature which automatically copies the contents of the original hard disc to one or more separate hard discs. MGUL and CUSATL have stand by Servers for making use during any emergency while KUL and CUL does not have standby machines.

All the libraries have made their complete bibliographical database and found using the standards for technical processing as used by them traditionally. The standards followed by MGUL and CUL are as per the internationally widely used standards while the standards followed by KUL are not up to international standards and CUSATL is found using the internationally well accepted standard for cataloguing rules only. Proper care have been taken by all the libraries in securing their data from any damage and MGUL and CUSATL have provision for using stand by Server to bring the system back immediately during any failure of Server.

4.8.2.2. Areas of Applications in Acquisition Procedures

The job involved in the acquisition works of documents includes procedures from accepting the request for acquisition of the document to making the document the property of the library by accessioning it. Table 4.33 gives the details of applications of computers in various works in the Acquisition procedures in different libraries.

Table 4.33 Details of Computer Applications in the Acquisition Works in the University Libraries in Kerala

Areas	KUL	MGUL	CUSATL	CUL
Duplication Checking	Y	Y	Y	Y
Ordering	Y	Y	Y	Y
Receipt of Document	Y	Y	Y	Y
Accessioning	Y	Y	Y	Y
Invoice Processing	Y	Y	N	Y
Budget Handling	N	Y	N	Y
Any other areas	-	-	-	-

MGUL and CUL found to be making use of all the options listed in the questionnaire. CUSATL does not make use of computers for Invoice processing and budget handling. KUL also is not using computer for the budget handling in the Acquisition works. None of the libraries mentioned any other area in the Acquisition procedure where computer is used.

All the University Libraries were found occasionally using Internet as an aid in the acquisition work such as to know the availability and price of documents and the exchange rate of currencies etc. On observation it was found that the Acquisition modules in the library under study have provision for sending the titles to be procured for the approval of a higher committee or authority. None of the library found using this option as the library do not follow such practices. Apart from the functions discussed above report generation at several stages are possible and the libraries were found not making use of the facility, as they do not require it.

4.8.2.3. Applications in Circulation Procedures

Computerisation of circulation procedures helps to save time of the library staff as well as the users of the library and provide better service to users. It is an area of computerisation that has a direct bearing on the users. Table 4.34 shows the areas of application within the circulation procedure in various libraries.

Table 4.34 Computer Applications in Circulation Procedures in the University Libraries in Kerala

Areas	KUL	MGUL	CUSATL	CUL
Membership Management	Y	Y	Y	Y
Check out/Check in/ Renewal	N	Y	Y	Y
Enquiries	N	Y	Y	Y
Reservation of documents	N	Y	Y	Y
Fine collection	N	Y	N	Y
Sending reminders	N	Y	Y	Y
Use of barcode in Check out/Check in	N	Y	Y	Y

The KUL has not yet started computerised circulation procedures. They have just started the creation of the member database for initiating a computerised circulation system. All the other libraries are making use of computers for circulation of documents. Over due charges calculation is one

of the most important applications of computer in the circulation of documents. It helps to save time of the members as well as the staff at the circulation desk. During rush hours manual calculation of fine may cause for overcrowding at the circulation counter. Despite all these factors CUSATL has not computerised the fine collection works in the circulation. Documents as well as members are identified on the basis of numbers allotted in the circulation counter and feeding the accurate number to the computer is crucial. So use of barcodes for identifying the members as well as the document is a necessity for avoiding keying in wrong numbers, which may lead to chaos. All the libraries under study that provides computerised circulation services are found to be using this technology. All, but KUL, are using computers for issue/return of documents, renewal of documents, reservation of documents and sending reminders for long overdue items.

4.8.2.3.1. User Response About Circulation Services

Computerised Circulation Services are one of the areas of library computerisation where the users get direct benefit of the facility. In a purely manual system users in large libraries may have to wait a long time for getting documents issued out and returned. Similarly the overdue charges collection procedure is a cumbersome process especially in rush hours stealing a good amount of time of the users as well as the library staff. A computerised circulation procedure makes provisions for effective document reservation facilities and is capable of entertaining different enquiries from the users that are not possible in a purely manual system. Thus a computerised circulation system provides many fold advantages over the traditional circulation procedures. As already mentioned, among the four university libraries studied the KUL does not provide computerised circulation services. Users were asked to express their awareness about the computerised circulation services. Table 4.35 gives university wise details of the responses of the users.

Table 4.35 User Awareness about Computerised Circulation Services in the University Libraries in Kerala

Library	Yes	%	No	%	Total
KUL	7	3.26	208	96.74	215
MGUL	170	84.58	31	15.42	201
CUSATL	122	76.73	37	23.27	159
CUL	175	92.11	15	7.89	190
All Libs.	467	84.91	83	15.09	550
Pearson Chi-square: 15.9980, df=2, p=.000336					

It is fairly evident from the Table that users are almost aware about the facility and getting the services from their libraries. In KUL where the services are not provided 3.26 per cent have wrongly responded that they are getting the facility. It is notable that in CUSATL where the facility is provided 23.27 per cent have said that they are not getting the service. This shows their ignorance about the library services. Similarly in MGUL 15.42 per cent have responded that the facility is not available. But in CUL only 7.89 per cent are ignorant about the service. Yet it is notable that in all the libraries where the service is available a good number of users are not aware about the services and may not be making use of the service. This service needs to be brought to the notice of the users. The Chi-square test proved that the association between awareness of the users regarding computerised circulation services and the University Library is highly significant.

4.8.2.3.2. Circulation Services Available to Users

Users were asked about the computerised services available to them under the circulation module so as to check the level of reach of different services to the users. Table 4.36 below gives details of the responses marked by them.

**Table 4.36 Details of Circulation Services Available to
Users in the University Libraries in Kerala**

Circulation Services	MGUL	CUSATL	CUL	Total
Issue/Return/Renewal	65 (38.24%)	60 (49.18%)	81 (46.29%)	206 (44.11%)
Reservation	0 (0.00%)	4 (3.28%)	1 (0.57%)	5 (1.07%)
Fine collection	1 (0.59%)	0 (0.00%)	2 (1.14%)	3 (0.64%)
Enquiry	1 (0.59%)	0 (0.00%)	0 (0.00%)	1 (0.21%)
Issue/Return/Renewal and Reservation	27 (15.88%)	13 (10.66%)	10 (5.71%)	50 (13.06%)
Issue/Return/Renewal and Fine collection	10 (5.88%)	10 (8.20%)	40 (22.86%)	60 (12.85%)
Issue/Return/Renewal and Enquiry	4 (2.35%)	12 (9.84%)	9 (5.14%)	25 (5.35%)
Issue/Return/Renewal, Reservation and Fine Collection	18 (10.59%)	2 (1.64%)	4 (2.29%)	24 (5.14%)
Issue/Return/Renewal, Reservation and Enquiry	6 (3.53%)	9 (7.38%)	2 (1.14%)	17 (3.64%)
Issue/Return/Renewal, Fine collection and Enquiry	6 (3.53%)	4 (3.28%)	18 (10.29%)	28 (6.00%)
Issue/Return/Renewal Reservation, Fine collection and Enquiry	32 (18.82%)	8 (6.56%)	8 (4.57%)	48 (10.28%)

In all the university libraries most of the users responded that they are getting the document issue, return and renewal facilities only. The other features of the system like its capability to reserve documents as well as to entertain different queries from the users are not seen familiar to the users.

4.8.2.3.3. Time Saving in the Circulation Procedures

A computerised circulation procedure, apart from providing additional facilities to the users, should be time saving also. It was observed that the libraries though make use of computers for circulation of documents, are still maintaining the traditional manual system as a safety measure. Users were asked whether they find the system time saving for them. Table 4.37 reveals the responses of the users to the question.

Table 4.37 User Response Regarding Time Saving in the Circulation Procedures in the University Libraries in Kerala

Library	Yes	%	No	%	No Response	%	Total
MGUL	162	95.29	2	1.18	6	3.53	170
CUSATL	103	84.43	9	7.38	10	8.20	122
CUL	160	91.43	15	8.57	0	0.00	175
All Libs.	425	91.01	26	5.57	16	3.43	467
Pearson Chi-square: 24.4737, df=4, p=.007314							

91.01 per cent of the users find the computerised circulation procedure time saving while 5.57 per cent have the opinion that it is not time saving. 3.43 per cent did not respond to this question. Libraries under study were found to be using traditional record keeping procedures for the circulation of documents as an additional precautionary measure. Yet it is significant that above 90 per cent find the system time saving. In MGUL the highest percentage rated the system as time saving while in CUSATL the lowest rated so. The Chi-square test proved the association between the time saving in circulation procedures and the university library is significant.

4.8.2.3.4. Improvement Over the Existing Circulation Services

In order to know the perception of the users regarding improvement over the existing circulation services, question was asked whether they need any other computerised circulation services. Majority of the users found to be satisfied with the existing services and did not feel the need for any other services in this aspect. Table 4.38 gives details of the responses of the users.

Table 4.38 User Response Regarding Other Computerised Circulation Services needed in the University Libraries in Kerala

Library	Yes	%	No	%	Total
MGUL	11	6.47	159	93.53	170
CUSATL	16	13.11	106	86.89	122
CUL	18	10.29	157	89.71	175
All Libs.	45	9.64	422	90.36	467

A very small portion of the users responded that they need other computerised circulation services. But none, but a very few, were able to specify what other services are needed by them. A Teacher from KUL suggested for Totally Automated Check in/Check out System so that the time delay as well as staff intervention can be eliminated. Similarly a Student respondent from CUSATL suggested for getting the item checked out through Internet and making the item available through home delivery.

4.8.2.4. Areas of Applications in Serials Control

Serials Control is the module that creates a lot of problems from the point of view of the designers of the module as well as the librarians because of the ever-changing nature of different aspects of the periodicals publications. Serials are considered to be the resources in the library that have the highest potential value for research. A well-designed serials module helps to reduce the manual work done in the periodicals section of the library and to provide a wide range of services to the users of the library. Table 4.39

given below provides the details of applications of computers in the serials control module in various university libraries.

Table 4.39 Details of Computer Applications in Serials Control in the University Libraries in Kerala

Areas	KUL	MGUL	CUSATL	CUL
Ordering	N	Y	Y	Y
Receipt	N	Y	Y	Y
Reminders	N	N	Y	Y
Budget Handling	N	N	Y	Y
Invoice Processing	N	N	Y	Y
Routing	N	N	N	N
Sending for Bindery	N	N	N	Y
Accessioning	N	N	Y	Y
Article Indexing	Y	N	N	Y
Current Awareness Service	N	N	Y	N
Selective Dissemination of Information	N	N	N	N
Check in/Check out	N	N	N	N

All the libraries studied found to be making use of Internet as an aid in the Serial Control work such as obtaining details of Serials, communicating with vendors etc. None of the university libraries under study found making total utilization of the computerised serial system. KUL has not started making use of the serials control module of the software they use. Yet they have started indexing of journal articles with the help of computers. KUL and CUL are using the same house keeping operation software and CUL is found to be making use of the module to a good extent. This means that KUL is not making proper use of the serials control system available with them and are still depending on manual system that have many limitations in providing advanced services. MGUL is also not making use of the serials module to any considerable extent and are using it only for ordering and receipt of the journals only. CUSATL and CUL use computers for some of the operations of

serial module. But both of these libraries are not making use of the system for providing advanced services like routing of periodicals and Selective Dissemination of Information. CUL use it for article indexing while CUSATL is not using it for this purpose. Similarly CUSATL uses it for Current Awareness Service while CUL does not use the same. None of them are using it for check-in/check-out of the Serials, as they do not provide this service for serials collection. The above analysis shows that the use of computers in the serials module is more confined to the house keeping operations whereas its use in the provisions of services to the clientele is very limited.

4.8.2.5. Areas of Applications and Provisions Made in OPACs

Online Public Access catalogues are the most commonly and heavily used computer based service by the library users. It replaces the traditional card and other forms of catalogues and provides many fold additional facilities to the users of the library. It is one of the first areas of computer applications in libraries. All the university libraries under study have developed their online catalogues and are accessible to its members. Table 4.40 gives the details of the OPACs of various university libraries.

Access points provided by all the OPACs include Author, Title, Words in title and Subject. Access through class number is not given by the CUSATL while all other libraries have this provision. KUL and MGUL do not provide access through Place of publication of the document while CUSATL and CUL OPACs have this provision. Access through Publisher is not given by CUSTAL while other three library OPACs have this provision. MGUL online catalogue entertains access through the series of publication of the document while no other library has this provision. CUSATL OPAC only makes provision for access through the year of publication of the document.

Libraries may have different databases for different category of documents and all these databases can be made available over OPAC. MGUL

and CUL have made books, journals and theses databases available over the OPAC while KUL has only book database and the other two are in the development stage only. CUSATL has Books, Journals and Audiovisual materials databases available over their OPAC.

Table 4.40 Details of Online Public Access Catalogues in the University Libraries in Kerala

		KUL	MGUL	CUSATL	CUL
Access points Provided	Author	Y	Y	Y	Y
	Title	Y	Y	Y	Y
	Words in Title	Y	Y	Y	Y
	Subject	Y	Y	Y	Y
	Class Number	Y	Y	N	Y
	Place	N	N	Y	Y
	Publisher	Y	Y	N	Y
	Series	N	Y	N	N
	Year	N	N	Y	N
Databases Available	Books	Y	Y	Y	Y
	Journals	N	Y	Y	Y
	Thesis	N	Y	Y	Y
	Other	-	-	Audio Visual Materials	-
Search facilities	Boolean Search	Y	Y	Y	Y
	Truncation	Y	Y	Y	Y
	Word Proximity	Y	N	N	Y
Provisions	To Reserve Document	N	N	N	N
	To Know Current Status of document	Y	Y	Y	Y
	To Suggest New Titles	Y	N	N	N
	To Access Over Campus LAN	N	N	Y	N
	Web OPAC	N	N	Y	N
Numbers of Terminals Provided for Users		1	2	4	2

There are different search strategies that can be entertained by a computerised catalogue where as in a traditional library catalogue no such

provision could be made. This includes Boolean search comprising 'AND', 'OR' and 'NOT' operators, Truncation and Word Proximity searches. All the OPACs under study supports Boolean search and provides users with greater easiness while making a comprehensive search of the library catalogue. Truncation search helps to search the documents that have certain words beginning with the same characters. Providing option to search such words helps the user to retrieve information on a comprehensive subject. All the libraries under study have this provision in their OPAC. Word proximity search helps the occurrence of one term in relation with another term and helps for advanced search of the catalogue. KUL and CUL have this provision in their catalogue.

Apart from making provisions for searching the database of the library, OPACs can be used as tool for interaction between the automated system and the user. Users can use the OPAC for making suggestions or giving feedback to the library. One such application found in OPACs is the provision for suggesting new titles to be procured. By providing such option valid members of the library can post their suggestion for the required title without meeting the library staff. Only the OPAC of KUL provides such a privilege while other libraries are not giving the option to users of OPAC. Similarly the user through OPAC can reserve documents that are issued out. KUL has not computerised the circulation procedure and is not making provision for this facility. All the other libraries under study have made provision to the users for knowing the current status of the document. The OPAC of KUL, MGUL and CUL are accessible only within the library while the OPAC of CUSATL is available over the campus LAN as well as over the Internet making the services available to a very wider community round the clock. Similarly within the library also CUSATL has made provision for more members to access the catalogue at a time by providing 4 terminals to the users, while MGUL and CUL have made two nodes available and KUL has provided only a single machine to the members of the library.

4.8.2.5.1. Awareness of Users About OPAC

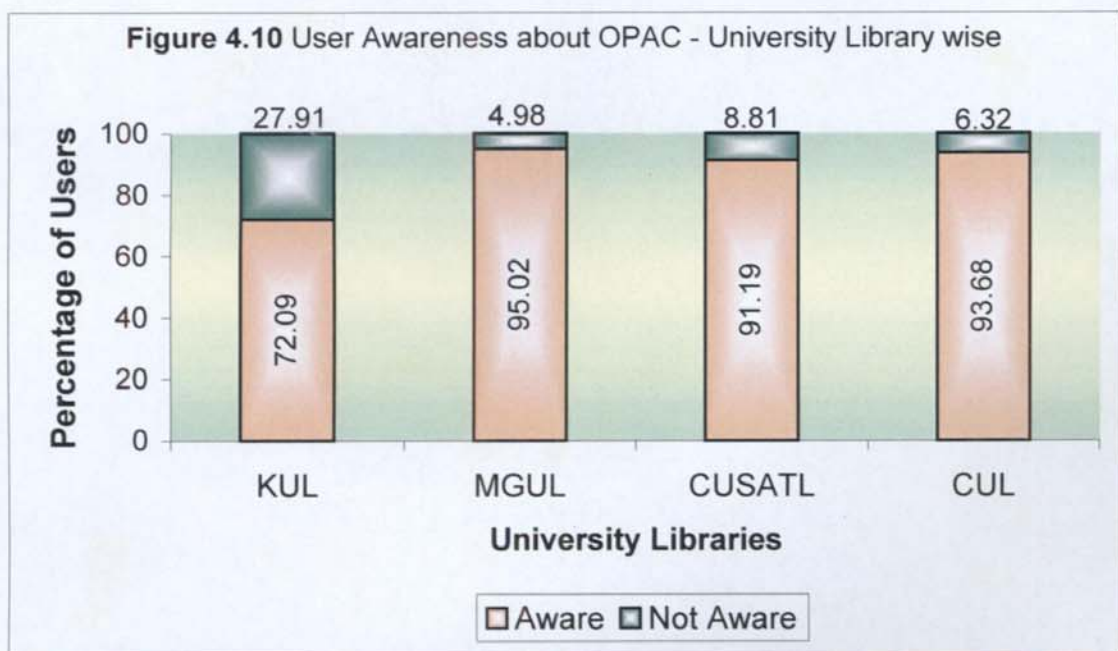
Library OPACs are the primary key to the resources of a computerised library. It has many advantages over the traditional card and other forms of catalogue and is extensively being made use in modern computerised libraries. Apart from providing several access points for search, OPAC has provisions to entertain several complex search queries. Online catalogue is one of the first areas of services provided by computerised libraries. All the libraries under study have their OPAC and it was observed that they are maintaining the traditional catalogue also as these traditional catalogues are also still found to be used by many. A question was asked to the users in order to check their awareness about the existence of OPAC in their respective university library as the traditional card catalogues are also in use. Table 4.41 gives details about the awareness of users about OPAC.

Table 4.41 User Awareness about OPAC in the University Libraries in Kerala

Library	Yes	%	No	%	Total
KUL	155	72.09	60	27.91	215
MGUL	191	95.02	10	4.98	201
CUSATL	145	91.19	14	8.81	159
CUL	178	93.68	12	6.32	190
All Libs.	669	87.45	96	12.55	765
Pearson Chi-square: 65.4737, df=3, p=.000000					

All the users of the library except KUL are well aware about the OPAC. In KUL 27.91 per cent responded that they do not have an OPAC and it shows that they are not aware about the provision of the online catalogue in the library and may be using the traditional card catalogue for searching documents. An over all 87.45 per cent are aware about the existence of OPAC and the remaining 12.55 per cent are ignorant about this. MGUL has got the highest rate regarding the awareness about OPAC with 95.02 per cent responding positively. The Chi-square test proved that the association

between the awareness of users about OPAC and the university library is highly significant. The awareness of the users in different university libraries is graphically represented in the Figure 4.10 below.



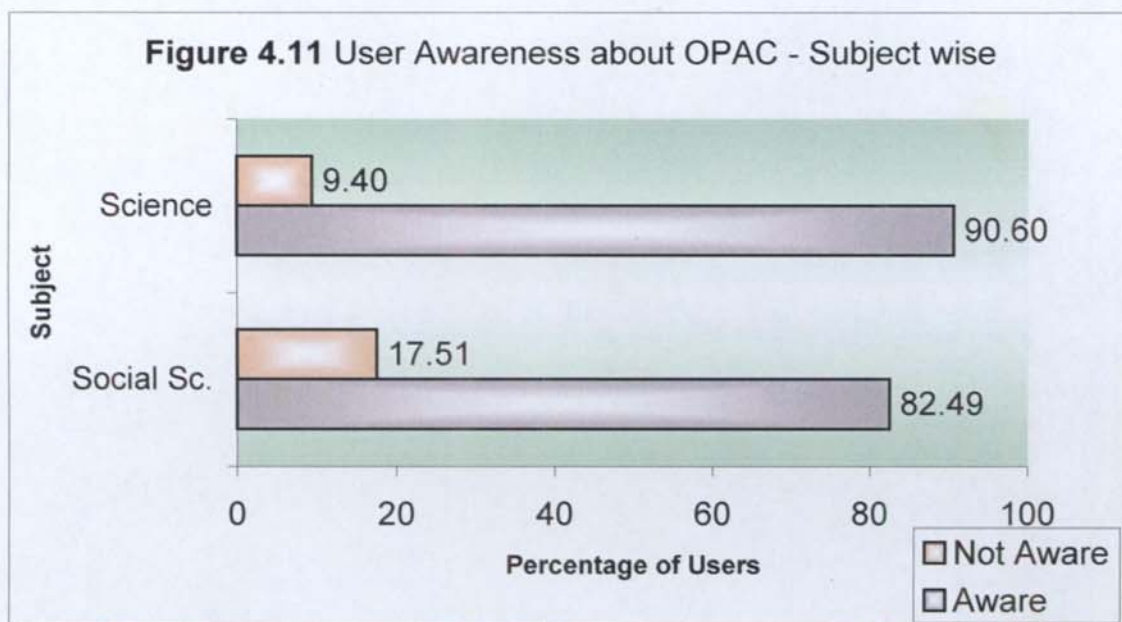
An analysis based on the subject background of the users about their awareness on OPAC shows that respondents belong to Science subjects are more aware than those in Social Science subjects. Table 4.42 gives the details of the subject wise analysis of awareness.

Table 4.42 User Awareness about Library OPAC in the Universities of Kerala - Subject Wise

Subject	Yes	%	No	%	Total
Social Science	245	82.49	52	17.51	297
Science	424	90.60	44	9.40	468
All Groups	669	87.45	96	12.55	765
Pearson Chi-square: 10.8807, df=1, p=.000973					

Awareness among those who belongs to Science subjects is above 90 percent while among Social Sciences group it is around 82.5 per cent only. The Chi-square test proved the association between the subject group of the

respondents and awareness about OPAC is highly significant. The Table 4.42 has been graphically represented in Figure 4.11 below.

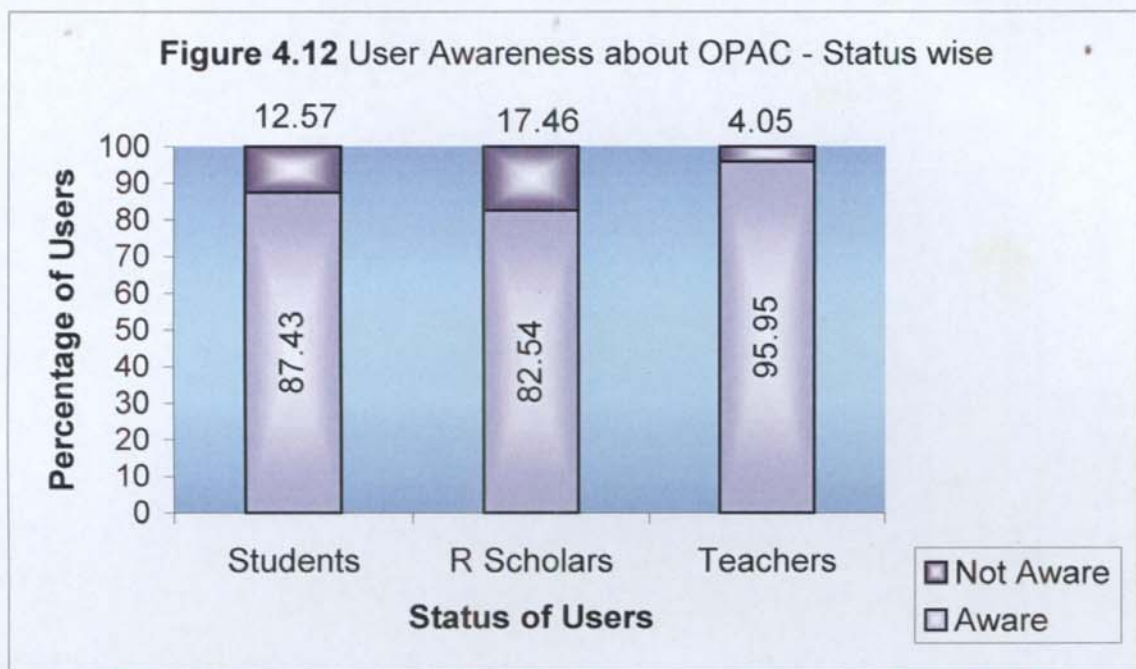


Status wise analysis showed that Research Scholars have the least awareness while Teachers have a high degree of awareness about OPAC. Table 4.43 gives details.

Table 4.43 User Awareness about OPAC in the University Libraries in Kerala - Status wise

Status	Yes	%	No	%	Total
Students	494	87.43	71	12.57	565
Research Scholars	104	82.54	22	17.46	126
Teachers	71	95.95	3	4.05	74
All Groups	669	87.45	96	12.55	765
Pearson Chi-square: 7.63567, df=2, p=.021985					

The Chi-square test proved that the association between the Status of the user and awareness about OPAC is significant. Table 4.43 has been graphically represented in the Figure 4.12 given below.



The above graph clearly indicates the high degree of awareness among the Faculty members while among students it is 87.43 per cent and among Research Scholars it is 82.54 per cent. Overall, much difference is not found among various categories of users regarding awareness about OPAC.

4.8.2.5.2. Users of OPACs in the University Libraries

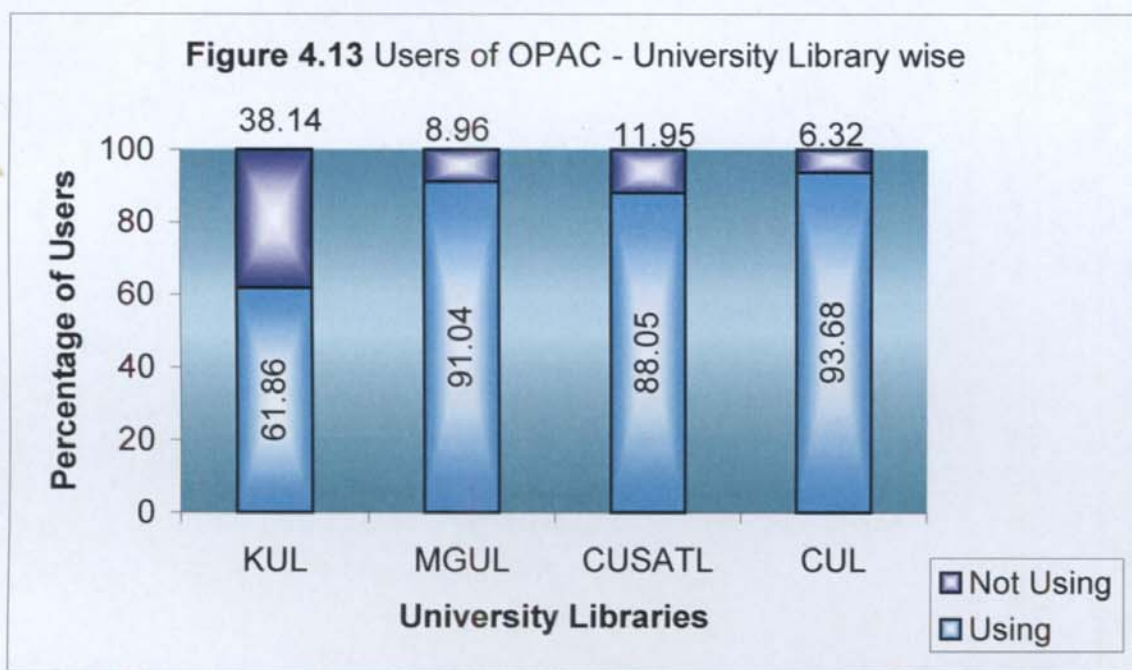
Out of the total 765 respondents only 669 were found aware about OPAC and out of this, only 634 found to be using OPAC. Remaining 35 are though aware about the OPAC, did not mark to show their use of OPAC. The figure of 131 not using OPAC includes those who are not aware about the OPAC as well as those 35 who are aware but not using the OPAC.

Table 4.44 shows an overall 82.88 per cent of the users are making use of OPAC for searching the library resources. Library wise analysis of users showed that in CUL 93.68 per cent users are making use where as in KUL it is only 61.86 per cent. In MGUL and CUSATL also library users extensively make use of OPAC and the percentage of use are 91.04 and 88.05 respectively.

Table 4.44 Users of OPAC in the University Libraries in Kerala - Library wise

Library	Yes	%	No	%	Total
KUL	133	61.86	82	38.14	215
MGUL	183	91.04	18	8.96	201
CUSATL	140	88.05	19	11.95	159
CUL	178	93.68	12	6.32	190
All Libs.	634	82.88	131	17.12	765
Pearson Chi-square: 94.9986, df=3, p=.000000					

The Chi-square test proved that the association between the use of OPAC made and the university library is highly significant. A much higher level of OPAC use is found in CUL while in KUL it is comparatively low. Table 4.43 has been graphically represented in the Figure 4.13 below.

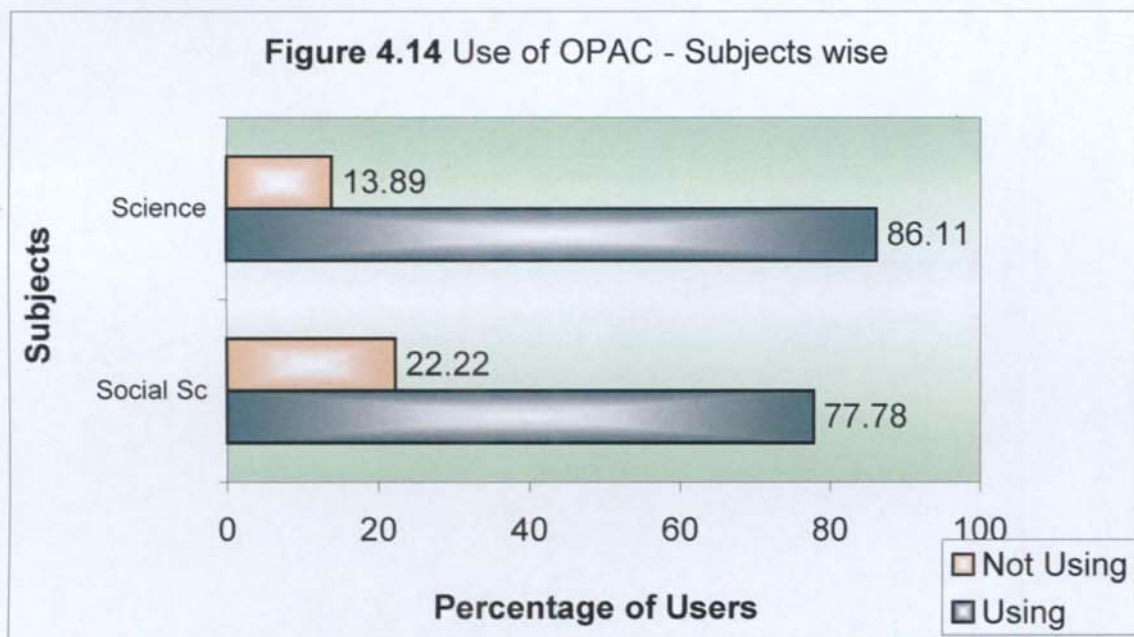


Subject wise analysis of users of OPAC showed that people from Science subjects are making more use of OPAC compared to those from Social Sciences. In Social Sciences the usage rate is 77.78 per cent only while in Science subjects it is 86.11 per cent. Regarding the awareness about OPAC also Science people were found ahead of those from Social Sciences. Details have been given in the Table 4.45 below.

Table 4.45 Users of OPAC in the University Libraries in Kerala - Subject wise

Subject	Yes	%	No	%	Total
Social Science	231	77.78	66	22.22	297
Science	403	86.11	65	13.89	468
All Groups	634	82.88	131	17.12	765
Pearson Chi-square: 8.89080, df=1, p=.002868					

The Chi-square test proved that there is a significant association between the use of OPAC made and the subject background of the users. The Table has been graphically represented in the Figure 4.14 below.

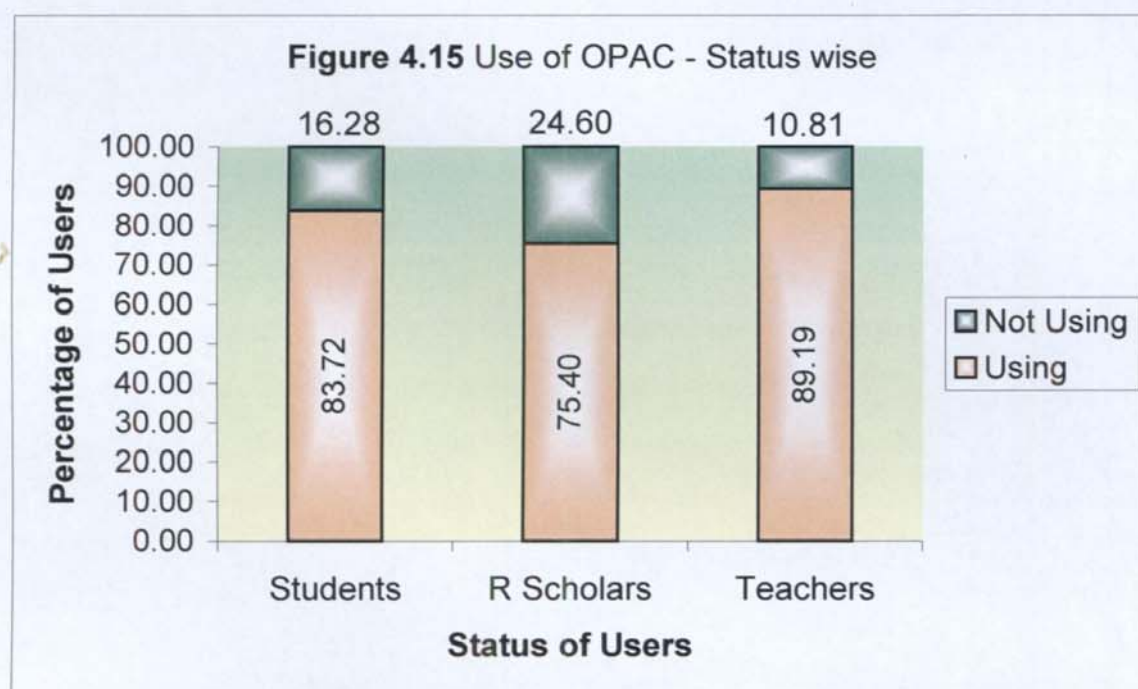


Status wise analysis of OPAC usage showed that Teachers are the highest users of OPAC. It is notable that Research Scholars who usually spend a period more than Post Graduate Students in universities are making less use of OPAC compared to the Students.

Table 4.46 Users of OPAC in the University Libraries in Kerala - Status wise

Status	Yes	%	No	%	Total
Students	473	83.72	92	16.28	565
Research Scholars	95	75.40	31	24.60	126
Teachers	66	89.19	8	10.81	74
All Groups	634	82.88	131	17.12	765
Pearson Chi-square: 7.32606, df=2, p=.025665					

The Chi-square test did not prove any significant association in the case of status wise analysis. The above Table has been graphically represented in the Figure 4.15 below.



Comparatively lower level of OPAC use found among Research Scholars and higher level among Teachers are visible in the above figure.

4.8.2.5.3. Various Access Points and Level of its Usage Among Different Categories of Users

Various access points provided in OPAC enables the user to locate document as well as to filter the query for obtaining result of an advanced

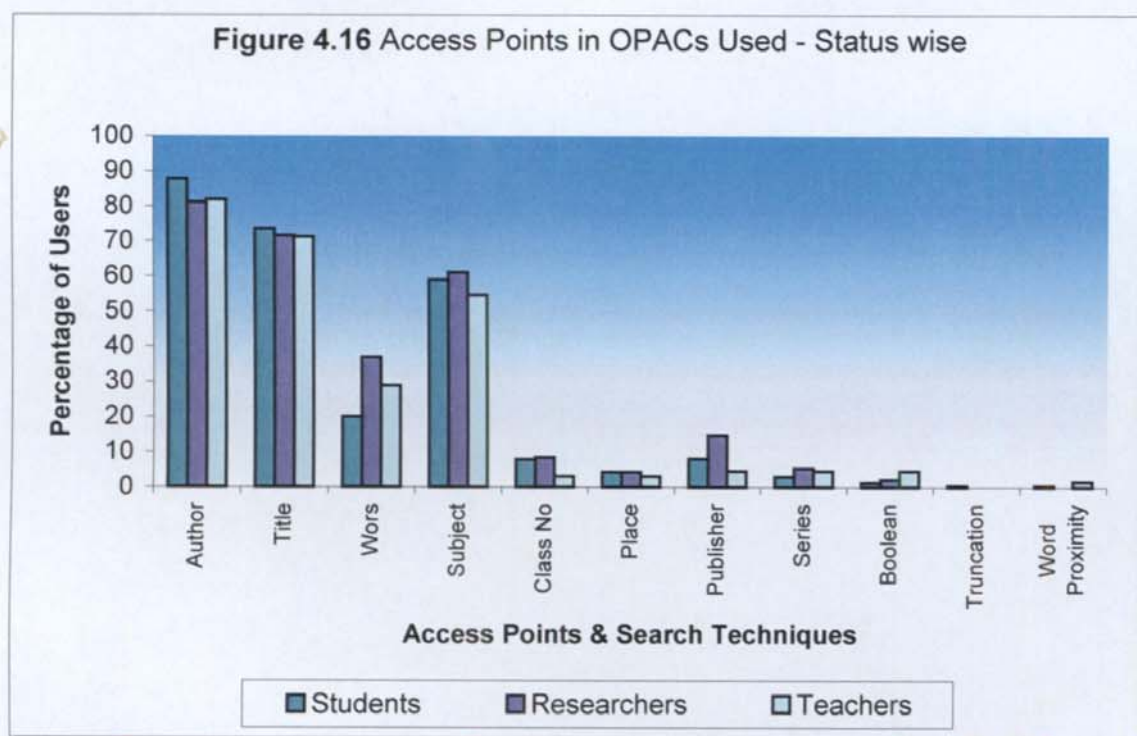
search. Advanced search provides details of the documents that satisfy particular features or characteristics. Question was asked to disclose the access points generally used by the respondents. Choices were given and users were allowed to specify the access points used by them. Table below gives the details of the access points used by various categories of users. It was found that the most used search key is the author and is followed by the title and the subject. Words in the title was also found to be made use by many users while the usage of other points were too limited.

Table 4.47 Use of Various Access Points in OPAC in the University Libraries in Kerala - Status wise

Access Point	Students		Researchers		Teachers		Average
	Yes	No	Yes	No	Yes	No	
Author	415 (87.74%)	58 (12.26%)	77 (81.05%)	18 (18.95%)	54 (81.82%)	12 (18.18%)	86.12%
Title	348 (73.57%)	125 (26.43%)	68 (71.58%)	27 (28.42%)	47 (71.21%)	19 (28.79%)	73.03%
Words in Title	95 (20.08%)	378 (79.92%)	35 (36.84%)	60 (63.16%)	19 (28.79%)	47 (71.21%)	23.50%
Subject	279 (58.99%)	194 (41.01%)	58 (61.05%)	37 (38.95%)	36 (54.55%)	30 (45.45%)	58.83%
Class Number	37 (7.82%)	436 (92.18%)	8 (8.42%)	87 (91.58%)	2 (3.03%)	64 (96.97%)	7.41%
Place	20 (4.23%)	453 (95.77%)	4 (4.21%)	91 (95.79%)	2 (3.03%)	64 (96.97%)	4.10%
Publisher	38 (8.03%)	435 (91.97%)	14 (14.74%)	81 (85.26%)	3 (4.55%)	63 (95.45%)	8.68%
Series	14 (2.96%)	459 (97.04%)	5 (5.26%)	90 (94.74%)	3 (4.55%)	63 (95.45%)	3.47%
Boolean	6 (1.27%)	467 (98.73%)	2 (2.11%)	93 (97.89%)	3 (4.55%)	63 (95.45%)	1.74%
Truncation	2 (0.42%)	471 (99.58%)	0 (0.00%)	95 (100%)	0 (0.00%)	66 (100%)	0.32%
Word Proximity	2 (0.42%)	471 (99.58%)	0 (0.00%)	95 (100%)	1 (1.52%)	65 (98.48%)	0.47%

It was found that name of the author is preferred by the majority of (86.12%) users while title is used by 73.03 per cent and 58.83 per cent using subject of the document as the access points. Keywords in title, that were

usually not available in the traditional catalogue, are used by 23.5 per cent of the users. All other access points like Place of Publication; Publisher and Series of the document are used by a very limited number of users only. The access point, year of publication was not listed and was not mentioned also by anyone as making use. The other three terms listed were Boolean search, Truncation search and word proximity search. These are the typical features of electronic catalogue and were not at all possible with the traditional catalogues. It helps the users to filter their query and find out their document of interest very easily and save their time considerably. It is unfortunate to find that the users are not exploring these potentials of the OPAC properly. This may be because of the fact that users do not know the proper use of these methods. This indicates the need for proper interpretation of the service through effective user education programme. Table 4.47 has been graphically represented in Figure 4.16 given below.



Here it is evident that the access points used by different categories are almost same and in the traditional catalogue also almost the same access points are found used. This leads to the conclusion that the peculiar features

of electronic catalogue have not been made use by any category to any considerable extent.

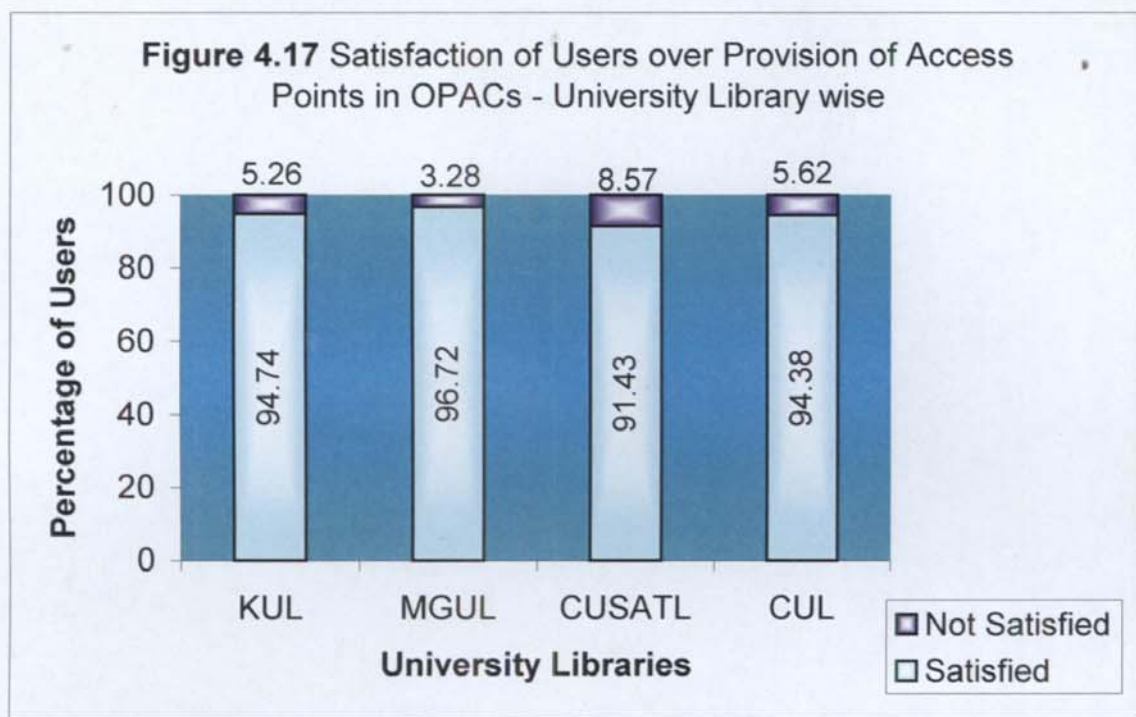
4.8.2.5.3.1. Satisfaction of Users Over Access Points Provided in OPAC

Question was asked to ascertain whether the users are satisfied over the access points provided in the OPACs in their respective libraries and the analysis showed that the users are highly satisfied with the access points provided.

Table 4.48 Satisfaction Over Access Points Provided in OPAC in the University Libraries in Kerala - Library wise

Library	Yes	%	No	%	Total
KUL	126	94.74	7	5.26	133
MGUL	177	96.72	6	3.28	183
CUSATL	128	91.43	12	8.57	140
CUL	168	94.38	10	5.62	178
All Libs.	599	94.48	35	5.52	634
Pearson Chi-square: 4.28194, df=3, p=.232607					

As shown in Table 4.48 analysis revealed that an overall 94.48 per cent are satisfied with the provisions made in the OPACs for finding out the library resources and not much difference exists among the users of different libraries with regard to the provision of access points in OPAC. The Chi-square test did not reveal any association between the University Library and the satisfaction of the users. This shows that irrespective of the library users are highly satisfied over the access points. Table 4.48 has been graphically represented in the Figure 4.17 in which the higher level of satisfaction is very clear.



Subject wise analysis also did not show any dissatisfaction over the access points available in OPACs as shown in the Table 4.49.

Table 4.49 Details of Satisfaction Over Access Points Provided in OPAC in the University Libraries in Kerala - Subject wise

Subject	Yes	%	No	%	Total
Social Science	218	94.37	13	5.63	231
Science	381	94.54	22	5.46	403
All Groups	599	94.48	35	5.52	634
Pearson Chi-square: .008007, df=1, p=.928699					

The Chi-square test proved any relation between the subject background and the user satisfaction highly insignificant. It was examined whether there is any difference in the level of satisfaction between various categories of users over the provisions of access points made in OPAC. It showed, as seen in the Table 4.50, that all the status group have of almost the same level of satisfaction in the provided access points. The Chi-square test proved that the association between the level of satisfaction over the access points in OPAC and the category of users is quiet insignificant.

**Table 4.50 Satisfaction Over Access Points Provided in OPAC
in the University Libraries in Kerala- Status wise**

Status	Yes	%	No	%	Total
Students	445	94.08	28	5.92	473
Research Scholars	91	95.79	4	4.21	95
Teachers	63	95.45	3	4.55	66
All Groups	599	94.48	35	5.52	634
Pearson Chi-square: .577354, df=2, p=.749256					

The above analysis showed that the users irrespective of library, status group, sex, subject and age group found to be satisfied over the access points provided in OPAC and Chi-square test did not prove any association between the category of users and satisfaction over access points.

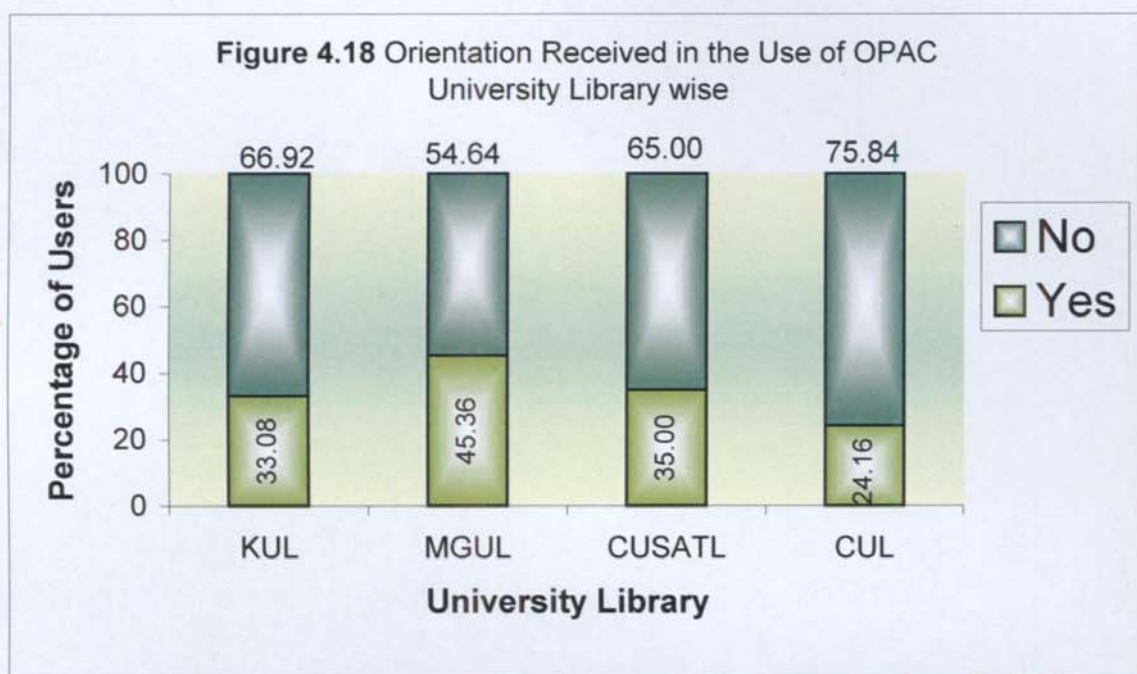
4.8.2.5.4. Orientation Received by Users in the Use of OPAC

OPAC is a development of recent origin and not older than 6 years in these libraries. So providing proper orientation is a must for making best use of the facility. OPAC has got several advanced features that were not available or possible in the traditional catalogues. It entertains complex search queries and enables the users to get more concrete bibliographical information. Being a development of recent origin providing proper orientation will help the users to reap the maximum benefits of the OPAC.

**Table 4.51 Details of Users who Received Orientation
in the Use of OPAC - University Library wise**

Library	Yes	%	No	%	Total
KUL	44	33.08	89	66.92	133
MGUL	83	45.36	100	54.64	183
CUSATL	49	35.00	91	65.00	140
CUL	43	24.16	135	75.84	178
All Libs.	219	34.54	415	65.46	634
Pearson Chi-square: 18.0913, df=3, p=.000422					

Library wise analysis showed that users were not being adequately trained in the use of OPAC. Table 4.51 revealed that more than 65 per cent have not received any orientation in the use of Online Public Access Catalogue in the libraries. In MGUL just above 45 per cent have received orientation while in CUL it is below 25 per cent. In KUL 33.08 per cent responded that they have received orientation in the use of OPAC while in CUSATL 35 per cent received orientation. Chi-square test showed significant difference between the users of different libraries in the orientation received in the use of OPAC. Table 4.51 is graphically represented in Figure 4.18.



As Table 4.52 revealed there was no subject wise distinction among the users in getting orientation in the use of OPAC and around 35 per cent in both subjects only received orientation in the use of OPAC. The Chi-square test proved that any relation between the Subject background and the level of orientation received is highly insignificant.

Table 4.52 Details of Users who Received Orientation in the Use of OPAC in the University Libraries in Kerala - Subject wise

Subject	Yes	%	No	%	Total
Social Science	80	34.63	151	65.37	231
Science	139	34.49	264	65.51	403
All Groups	219	34.54	415	65.46	634
Pearson Chi-square: .001286, df=1, p=.971394					

Status wise analysis of the users showed that Research Scholars are the category that got the highest rate of orientation (38.95%) in the use of OPAC. Among teacher respondents only 31.82 per cent got orientation in the use of OPAC. Chi-square test did not show any association between the subject backgrounds of the user and level of orientation received by them.

Table 4.53 Details of Users who Received Orientation in the Use of OPAC in the University Libraries in Kerala - Status wise

Status	Yes	%	No	%	Total
Students	161	34.04	312	65.96	473
Research Scholars	37	38.95	58	61.05	95
Teachers	21	31.82	45	68.18	66
All Groups	219	34.54	415	65.46	634
Pearson Chi-square: 1.08510, df=2, p=.581270					

The fact that advanced features of the OPAC like Boolean search, truncation search and word proximity searches have not been explored by the users should be viewed in the light of absence of proper orientation to the users. Once the potential of the OPAC is exposed to the users, they will definitely get real benefits of the electronic catalogue.

4.8.2.5.5. Methods Adopted for Learning Use of OPAC

Question was asked to those who have not received any orientation, about the method adopted by them in understanding the use of OPAC. Since

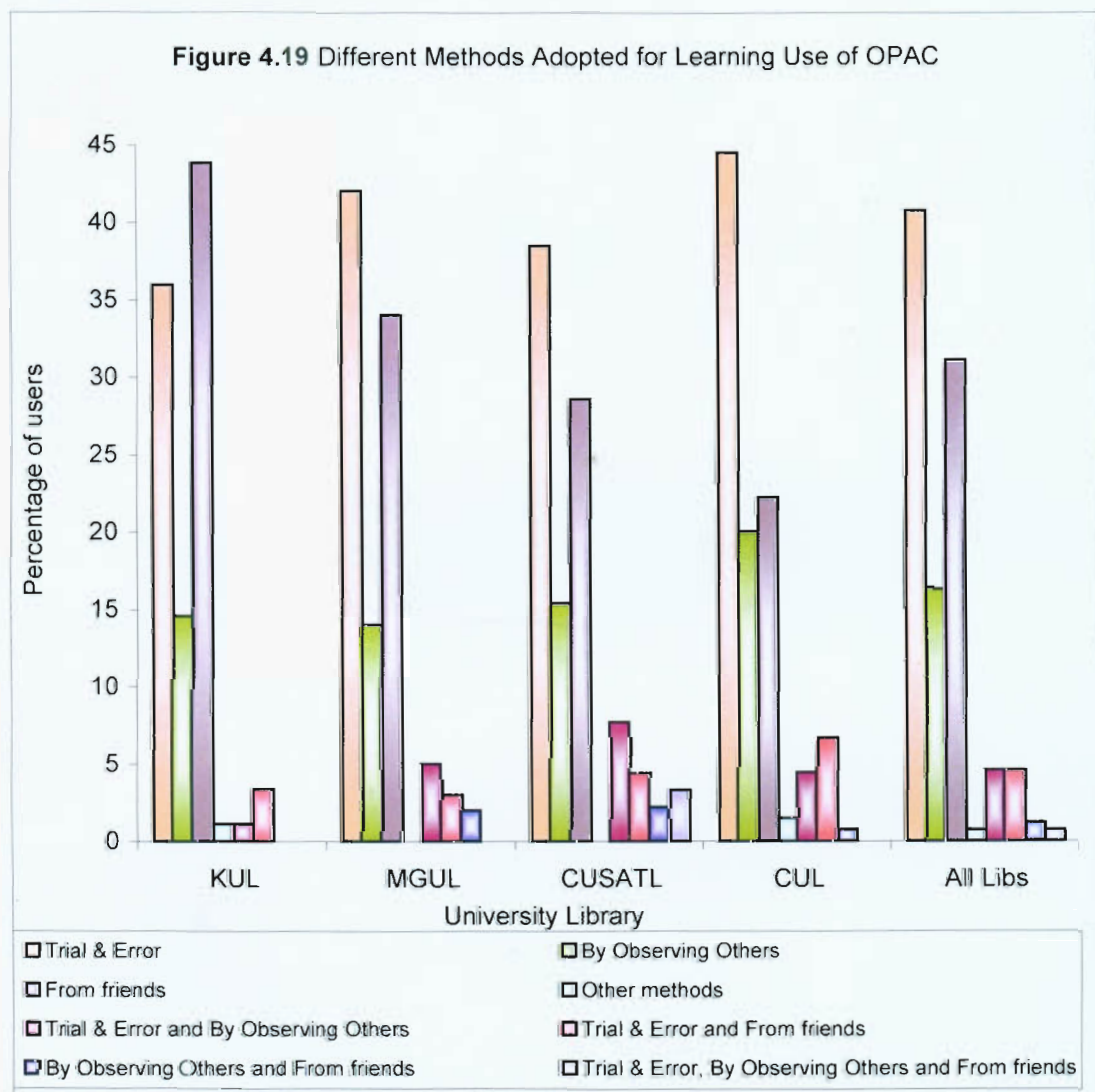
82.88 per cent of the users found to be using OPAC and only less than 35 per cent among them have received orientation in the use of OPAC, this question has greater relevance. Three possible choices were given and users were asked to indicate any other method (if any) also. Table 4.54 shows the details of the methods and combinations of methods adopted by users in making use of OPAC.

Table 4.54 Details of Methods adopted for learning use of OPAC in the University Libraries in Kerala

Method	KUL	MGUL	CUSATL	CUL	All Libs
Trial & Error	32 (35.96%)	42 (42.00%)	35 (38.46%)	60 (44.44%)	169 (40.72%)
By Observing Others	13 (14.61%)	14 (14.00%)	14 (15.38%)	27 (20.00%)	68 (16.39%)
From friends	39 (43.82%)	34 (34.00%)	26 (28.57%)	30 (22.22%)	129 (31.08%)
Other methods	1 (1.12%)	0 (0.00%)	0 (0.00%)	2 (1.48%)	3 (0.72%)
Trial & Error and By Observing Others	1 (1.12%)	5 (5.00%)	6 (7.69%)	7 (4.44%)	19 (4.58%)
Trial & Error and From friends	3 (3.37%)	3 (3.00%)	4 (4.40%)	9 (6.67%)	19 (4.58%)
By Observing Others and From friends	0 (0.00%)	2 (2.00%)	2 (2.20%)	1 (0.74%)	5 (1.20%)
Trial & Error, By Observing Others and From friends	0 (0.00%)	0 (0.00%)	3 (3.30%)	0 (0.00%)	3 (0.72%)

The adoption of methods found to be varying among universities. The first two methods were seen made use by more users in the CUL. 'Trial and error method' of self-learning was adopted by 44.44 per cent and 'observing others use the OPAC' were adopted by 20 per cent of users in CUL. In KUL 43.82 per cent adopted 'learning from friends' and 'self-learning' was adopted by 35.96 per cent. In MGUL the main method was 'trial and error' (42%) while 34 per cent 'learned it from their friends'. In CUSATL, majority (38.46%) of the users adopted the method of 'trial & error' while the method

of 'learning from friends' (28.57%) was also adopted considerably. As shown in the Table in certain cases more than one method was seen adopted by users to know the use of OPAC and these were below 8 per cent only.



Learning from other users enables only to understand the methods and techniques that are known to others and there may be limitations in such cases. 'Trial and error' method will also not enable one to explore the full potential of the OPAC. Using the help file will solve this problem up to certain extent. Providing adequate training by the library staff is the best method to make maximum use of the technology. Large libraries will find it difficult to train the users individually. Hence demonstrations with the help of LCD Projectors at the beginning of the academic session will help the

students in acquiring skill in using the OPAC. Such training programmes should be conducted on regular intervals so that newly joined members can attain skill in using OPAC.

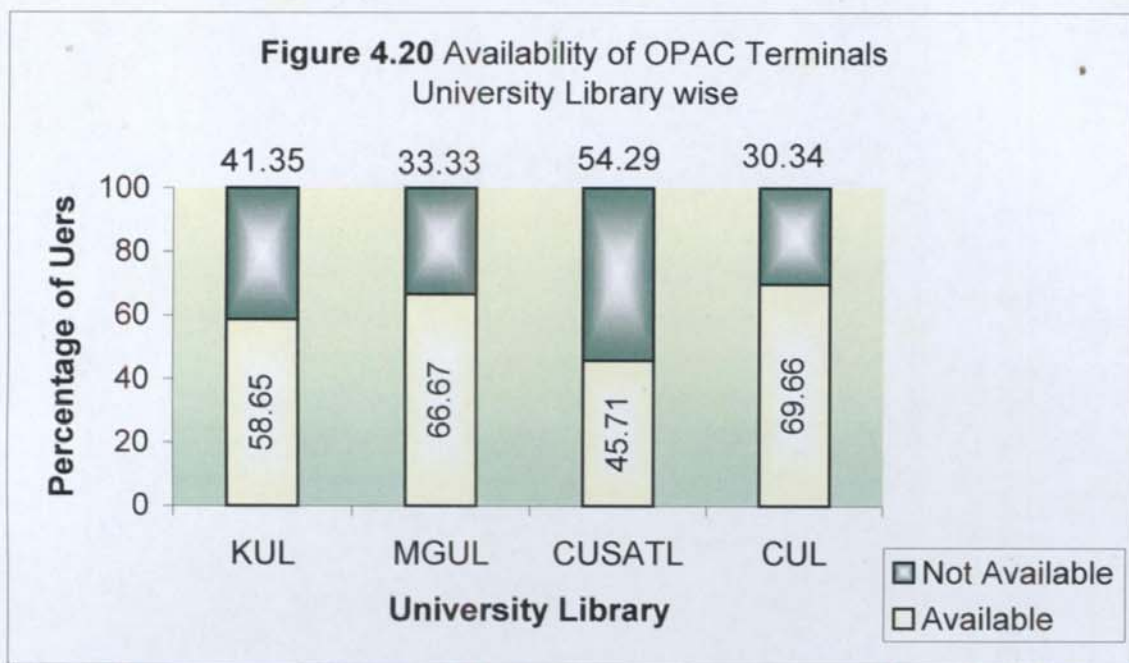
4.8.2.5.6. Availability of Terminals for Using OPAC

In order to ascertain the adequacy of terminals to the users, question was asked whether the users had to wait for their turn while some one else is using the OPAC terminal. Table 4.21 has revealed that in KUL a single terminal has been provided as OPAC while in MGUL and CUL there are two each and in CUSATL there are 4 terminals provided for users to browse the OPAC. Table shows the user response about this question. It is evident that there is a higher level of dissatisfaction among users over the number of terminals provided in the libraries under study. Table 4.55 reveals the library wise details of satisfaction over terminals provided.

Table 4.55 Response of Users Regarding Availability of OPAC Terminals in the University Libraries in Kerala - Library wise

Library	Yes	%	No	%	Total
KUL	78	58.65	55	41.35	133
MGUL	122	66.67	61	33.33	183
CUSATL	64	45.71	76	54.29	140
CUL	124	69.66	54	30.34	178
All Libs.	388	61.20	246	38.80	634
Pearson Chi-square: 22.1754, df=3, p=.000060					

In CUL 69.66 per cent have said that they had to wait for their turn to use the OPAC while in MGUL 66.67 per cent and in KUL 58.65 per cent have responded similarly. In CUSATL where 4 nodes are provided for users only 45.71 per cent have said that they keep on waiting for their turn to use the OPAC. Chi-square test proved significant association between the University Library and the availability of OPAC terminals. The above Table has been graphically represented in the Figure 4.20 given below.



Though two terminals are provided in MGUL and CUL the percentage of users who responded 'yes' to this question were higher compared to KUL. But it is notable that the percentage of users of OPAC in KUL was only 61.86 per cent while this was 91.04 per cent and 93.68 per cent in MGUL and CUL respectively. This analysis shows that the numbers of terminals provided in the libraries under study are inadequate when the demand from the users is considered. The Chi-square test analysis proved that the association between the availability of terminals and university library is highly significant.

4.9. INFLIBNET Support and Participation

It is with the establishment of the INFLIBNET the momentum of computer applications in university libraries in the country started. Since the very beginning of its coming into existence the INFLIBNET has played a key role in the process through different activities mainly through providing financial assistance to the libraries and helping the libraries to develop manpower required for computerisation. Table 4.7 has given the picture of financial assistance provided by the INFLIBNET to the libraries under study. Considering the importance of qualified personnel needed for the

development and management of a computerised system, the INFLIBNET sanctioned a post of Information Scientist to each library in the scale of pay equal to that of Lecturer. As in the case of other UGC posts this post is also supported by the UGC for the initial 5 years period. After that the concerned state government has to support this post. Out of the 4 universities under study only two universities i.e. University of Calicut and CUSAT filled up the post while the other two universities did not take any initiatives in filling up the post. Table 4.56 gives the details of the support provided by INFLIBNET in developing manpower to look after the computerised systems in these libraries.

Table 4.56 Details of Training Obtained from INFLIBNET by the Library Professionals in the University Libraries in Kerala

Library	Name of Training Programme	No. of persons	Duration
KUL	Application of Computer to Library & Information Services	3	One month
	Use of Infonet Resources	1	One week
	On site training programme	20	One day
	SOUL software training	1	Two weeks
MGUL	Application of Computer to Library & Information Services	3	One month
	On site training programme on SOUL	20	One Week
	Use of Infonet Resources	1	One Week
	Use of Internet Resources	2	One Week
CUSATL	Application of Computer to Library & Information Services	1	One month
	Use of Infonet Resources	1	One Week
CUL	Application of Computer to Library & Information Services	2	One month
	Use of ILMS	1	One week
	Use of Infonet Resources	1	One week

It is with the training programmes conducted by the INFLIBNET, majority of the university libraries in the country gained initial know how in automating library procedures. The above Table reveals that all the libraries under study have received manpower training from the INFLIBNET. The one-month training in Application of computer to Library and Information

Services was catalyst in the process of starting database creation in libraries. Similarly all the libraries have obtained training in the use of Infonet resources also. The other training programmes such as those conducted in the use of automation packages like ILS and SOUL have also been obtained by the libraries varying. KUL and MGUL have received on site training programme conducted by the INFLIBNET.

4.9.1. Records Provided to the Union Database

The INFLIBNET maintains a union database of documents available in the Indian universities. All the universities provide their data with CCF tags to the INFLIBNET for making it available through Internet. Table 4.57 gives the details of the data sent by each university along with the total number of documents available in the library.

Table 4.57 Records Contributed to INFLIBNET
Union Database by University Libraries in Kerala

Library	Document	Sent to INFLIBNET	Available in Library
KUL	Books	1,45,000	286155
	Theses	1500	
	Serials	1133 Titles	
MGUL	Books	28000	33379
	Theses	282	4282
	Serials	470 Titles	500
CUSATL	Books	Nil	55882
	Theses	552	552
	Serials	220 Titles	220
CUL	Books	68200	89568
	Theses	2800	3005
	Serials	409 Titles	409

The Table 4.57 shows that bibliographical details of a good number of documents especially books in the universities are yet to be sent to the INFLIBNET. The KUL maintains a special collection on Kerala Studies and availability of the complete details of such unique collection in the union database is very much appreciable. Regarding the serial titles all the

universities have sent the details of their available holdings summary to the INFLIBNET.

4.9.2. UGC Infonet and Participation of the University Libraries

All the universities under study come under the UGC Infonet purview and are provided with 1 Mbps bandwidth Leased Line connection through Asianet. All the libraries have provided the connection to the existing Internet provision in the library and KUL and CUSATL have extended the connection to the teaching departments while in MGUL and CUL the services have not been extended beyond the library premises. Since the facility is provided through the existing channel KUL and CUL are charging fee for the use of Internet provision through which Infonet resources are also accessed. But in CUL exclusive center for access to Infonet resources without charging any fee is under construction and expected to be completed shortly. MGUL and CUSATL are not charging any fee for Infonet use and in all libraries the category of members given access is not different from that of Internet use which is given in the Table 4.28.

4.9.3. INFLIBNET Regional Training Programme in Library Automation

INFLIBNET Regional Training Programme in Library Automation abbreviated as IRTPLA, is a training programme conducted by INFLIBNET at various universities providing training in the use of SOUL software. It is mainly intended at training library professionals from Colleges and Universities. In a programme 20 persons are admitted and hands on training is imparted in the use of SOUL. Among the universities under study all except CUSATL conducted the programme helping library professionals from universities and affiliated colleges to gain knowledge in the use of SOUL. MGUL has conducted the programme twice, training a total of 50 librarians.

4.10. Network Facilities in the University Libraries

Use of integrated library systems necessitates computer network facilities in libraries. It is needed for providing facilities for all sections in the

library to access the database and for effective communication between various sections. Table 4.58 gives the details of network infrastructure available in the libraries under study. All the libraries under study are using integrated library management systems and most of the housekeeping operations are done using computers. So all the libraries have developed a Local Area Network within the library building. Except CUSATL all the libraries have UTP cables as medium of transmission while CUSATL uses Optical Fiber Cable for its networking. Only KUL and CUSATL have LAN in the campus and CUSATL has made their library accessible over their LAN. KUL is not available over their campus LAN as the library is somewhat away from the campus. MGUL and CUL have no LANs in their campus and the library resources and services are available inside the library only. Yet the website of CUL is available over Internet providing certain information while MGUL has not yet hosted their website.

Table 4.58 Network Infrastructure Available in University Libraries in Kerala

		KUL	MGUL	CUSATL	CUL
LAN in Library		Y	Y	Y	Y
Medium of Transmission		UTP Cable	UTP Cable	OFC	UTP Cable
LAN in Campus		Y	N	Y	N
Participation in Networks	INFLIBNET	Y	Y	Y	Y
	DELNET	N	Y	Y	N
	Others		AIRC		
Library Services Network accessible through campus LAN/Internet		N	N	Y	N
Availability of Router in Library		N	N	Y	Y
Implemented Firewall		NA	NA	Y	Y
Mode of Protection		NA	NA	Through Software	Through Software

CUSATL and CUL have Router in the library that connects the LAN with the Internet. But only the Library services network of CUSATL is accessible through campus LAN and Internet. In CUL the LAN set up for library functions are not connected with the Internet and there is a separate network for accessing Internet. This is done to secure the library network. In both instances Firewall implementation is done through software restricting unauthorized access from outside. All the libraries are participating in the INFLIBNET while CUSATL and MGUL are making use of DELNET resources. MGUL is also making use of American Information Resource Center (AIRC) network. No other participation in any other network is worth mentioning in the case of the libraries under study.

4.11. Internet Services and Facilities in the Libraries

All the libraries under study have Internet facilities and are providing Internet based services to its users. It is found that with the introduction of Infonet facilities all the libraries were able to get high-speed connection with comparatively good bandwidth. The university libraries under study have different types of Internet connectivity with different service providing agencies through different modes of transmission. Table 4.59 gives the details of the Internet connectivity as well as the provisions of services to the users. All the libraries have got 1 Mbps leased line connection through Asianet for accessing UGC Infonet. Considering the Internet infrastructure in the state, this is found to be a good option providing a high-speed connection for the universities. KUL, MGUL and CUL have a separate 64 Kbps ISDN dialup connection through BSNL. KUL has got another 256 Kbps leased line through BSNL while MGUL has a PSTN dial up connection using the services provided by Satyam Online and CUSATL has another leased line connection from BSNL. All these alternative sources make provision for a non-stop Internet service facility in the university libraries under study.

Table 4.59 Details of Internet Facilities Available in University Libraries in Kerala

		KUL	MGUL	CUSATL	CUL
Type of Connectivity/ Service Provider/ Bandwidth of the connection		1. ISDN Dial up/BSNL/ 64 Kbps 2. Leased Line/Asianet/ 1Mbps 3. Leased Line/BSNL/ 256Kbps	1. ISDN Dial up/BSNL/ 64 Kbps 2. Leased Line/Asianet/ 1Mbps 3. PSTN Dialup/Satyam Online/ 9.6 Kbps	1. Leased Line/BSNL/ 512Kbps 2. Leased Line/Asianet/ 1Mbps	1. ISDN Dial up/BSNL/ 64 Kbps 2. Leased Line/Asianet/ 1Mbps
Training in the use of Internet provided to users		Y	Y	Y	Y
No. of machines provided to users		12	10	12	10
Status of Users and Fee Rates	Students	Rs.15/ Hour	Nil	Nil	Rs.350/ Year
	Research Scholars	Rs.15/ Hour	Nil	Nil	Rs.525/ Year
	Teaching Staff	Rs.20/ Hour	Nil	Nil	Rs.875/ Year
	Non Teaching Staff	Rs.20/ Hour	Nil	Nil	Rs.875/ Year
	Public	Rs.20/ Hour	NA	NA	NA

Numbers of computers made available to the members found to be scanty in all the University Libraries. KUL and CUSATL have made available 12 computers to the users while in MGUL and CUL it is only 10. It is notable that in the Universities of Kerala and Cochin the departments have Internet connection and Infonet resources are also available in the departments. But in MGUL and CUL these facilities are not available in the department and the number of terminals provided in the central facility is too inadequate. All the libraries are providing Internet services to the Students, the Research Scholars, the Teachers and the Non-teaching staff while KUL alone has extended the service to the public also. MGUL and CUSATL are providing the service without charging any fee while KUL charges a fee on hourly basis while CUL charges it on a yearly basis. In KUL students and Research Scholars are charged Rs. 15 for one hour of Internet use while staff, both

teaching and non-teaching, and public are charged Rs. 20 per use of the facility for one hour. In CUL the fee is charged on a yearly membership basis and the rate charged has a proportionate increase every financial year. The rate prevalent in the current financial year is Rs.350 for students, Rs. 525 for Research Scholars and Rs. 875 for Teaching and Non-teaching staff. They are permitted to use the facility unlimited subject to the availability of the machine.

4.11.1. Utilization of Internet Services

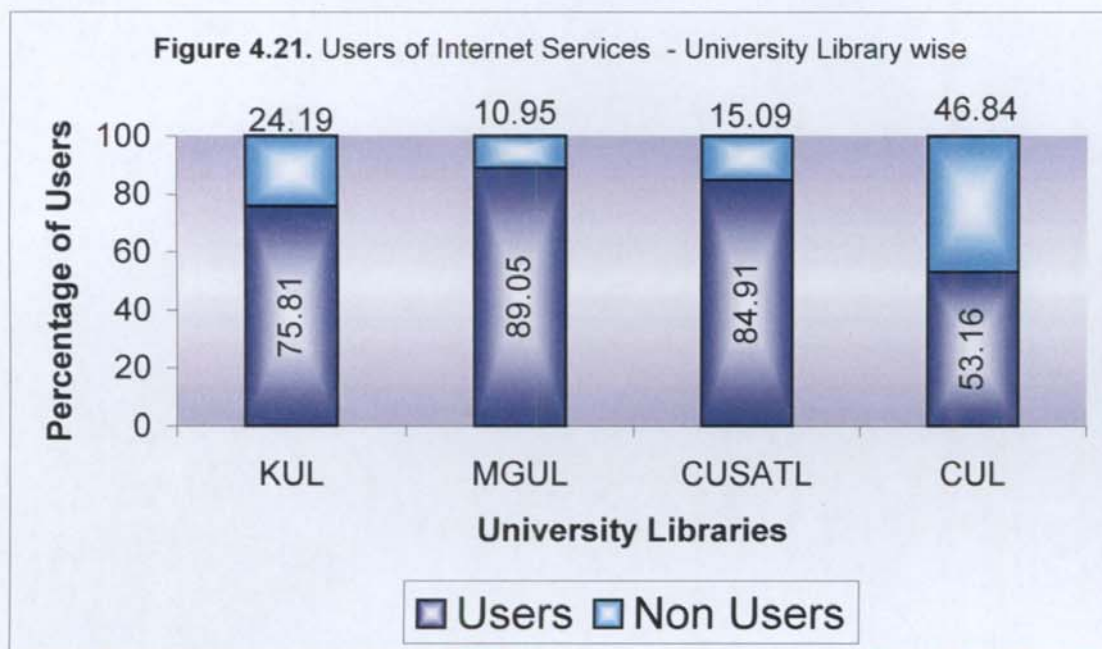
Internet is the most popular source of information today. With its dynamic features it fetches required information in many formats like text, sound, vision etc. from anywhere in the world without any geographical or time barriers. One third of the respondents were found to be using the Internet services in the University Libraries in Kerala. Table 4.60 provides details of the users of Internet in various university libraries. The highest use rate was recorded in the MGUL and the lowest in the Calicut University Library.

Table 4.60 Internet Users in the Universities in Kerala - Library wise

Library	Yes	%	No	%	Total
KUL	163	75.81	52	24.19	215
MGUL	179	89.05	22	10.95	201
CUSATL	135	84.91	24	15.09	159
CUL	101	53.16	89	46.84	190
All Libs	578	75.56	187	24.44	765
Pearson Chi-square: 78.9734, df=3, p=.000000					

In all the three universities except Calicut University more than 75 per cent of the respondents are using the Internet facility while in the University of Calicut it is only 53.16 per cent. In CUSATL and MGUL where the Internet services are provided without charging any fee the usage rate is found to be very high. The Chi-square test analysis proved that association between the

use of Internet and University Library is highly significant. The low rate of Internet usage in CUL may be because of the high fee charged. Table 4.60 is graphically represented in the Figure 4.21 below.

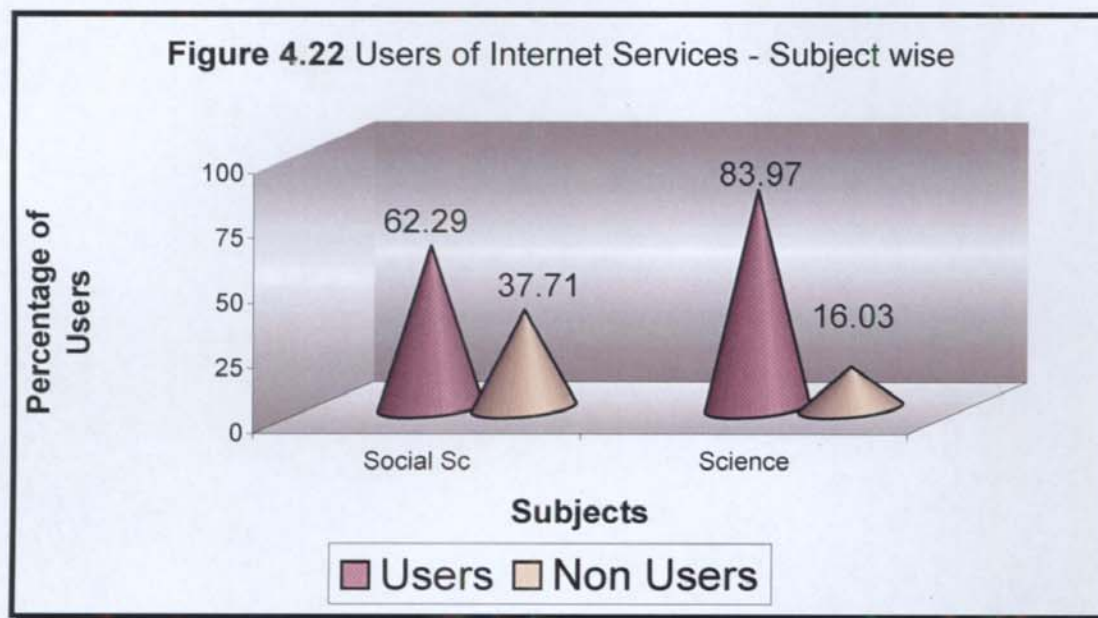


A faculty-wise analysis of the respondents showed that users from Science subjects are using Internet services more than those from Social Science subjects. 83.97 per cent of the respondents from Science faculty are using the Internet services while the rate among Social Science subjects respondents are only 62.29 per cent. The Table 4.61 reveals the data of faculty wise use of Internet by respondents. The Chi-square test analysis proved that association between the use of Internet and the subject background of the respondents is highly significant.

Table 4.61 Internet Users in the University Libraries in Kerala - Subject wise

Subject	Yes	%	No	%	Total
Social Science	185	62.29	112	37.71	297
Science	393	83.97	75	16.03	468
All Groups	578	75.56	187	24.44	765
Pearson Chi-square: 46.2599, df=1, p=.000000					

The Chi-square test proved that the association between the subject background and the use of Internet services is highly significant. The graphical representation of Table 4.61 is given in Figure 4.22 below.

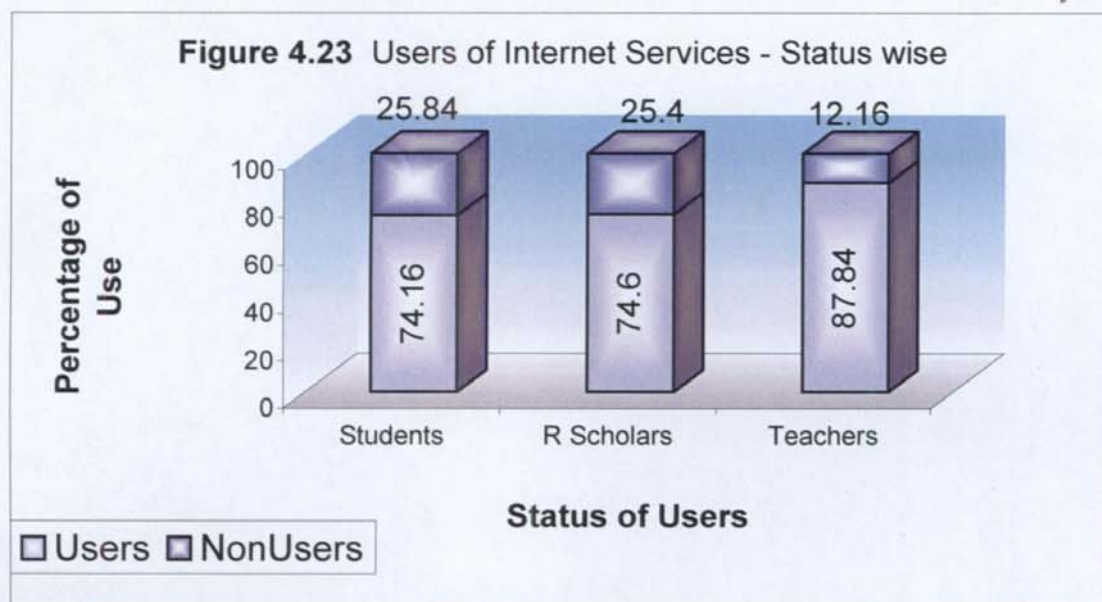


Status wise analysis showed that there is not much difference among Students, Research Scholars and Faculty members in the matter of using Internet services. Table 4.62 below has the details.

Table 4.62 Status wise Details of Internet Users in the University Libraries in Kerala

Status	Yes	%	No	%	Total
Students	419	74.16	146	25.84	565
Research Scholars	94	74.60	32	25.40	126
Teachers	65	87.84	9	12.16	74
All Groups	578	75.56	187	24.44	765
Pearson Chi-square: 6.70254, df=2, p=.035052					

Table shows that the use of Internet among teacher community under study is 87.84 per cent while among students and researchers it is around 75 per cent only. The Chi-square test analysis proved that association between the use of Internet and the category of the respondents is insignificant. The above Table is graphically represented in Figure 4.23 below.



Almost similar level of usage habit among various categories of users is clearly depicted in the Figure above.

4.11.1.1. Internet Services Used

Internet services used were listed in the questionnaire as Web Browsing, Email, Chatting, Newsgroups, Discussion Groups, Searching Databases, Accessing E Journals, Accessing Reference Sources, Accessing the Catalogues and Databases of Other Libraries and also provided option for marking any other purposes used by the respondents. On the basis of the preferences made by the users these purposes could be grouped in to five as Browsing (browsing), Communication (Email, Chatting), Forums (News groups, Discussion Groups), E-Contents (Searching Databases, Accessing E Journals, Accessing Reference sources) and Accessing other Libraries (access the Catalogues and databases of other libraries). The following Table 4.63 provides the details of the purposes of the users library wise.

Table 4.63 Internet Services Usage in the University Libraries in Kerala - Library wise

Services & Combinations	UJL	MCUL	CUSATL	CUL	Total
Browsing	21 (12.88%)	12 (6.70%)	13 (9.63%)	9 (8.91%)	55 (9.52%)
Communication	13 (7.98%)	7 (3.91%)	2 (1.48%)	5 (4.95%)	27 (4.67%)
E-Contents	13 (7.98%)	12 (6.70%)	6 (4.44%)	5 (4.95%)	36 (6.23%)
Browsing & Communication	28 (17.18%)	19 (10.61%)	25 (18.52%)	23 (22.77%)	95 (16.44%)
Browsing & E Contents	7 (4.29%)	12 (6.70%)	7 (5.19%)	6 (5.94%)	32 (5.54%)
Communication & E-Contents	12 (7.36%)	18 (10.06%)	4 (2.96%)	9 (8.91%)	43 (7.44%)
Browsing, Communication & Forums	2 (1.23%)	14 (7.82%)	11 (8.15%)	11 (10.89%)	38 (6.57%)
Browsing, Communication & E-Contents	45 (27.61%)	58 (32.40%)	33 (24.44%)	18 (17.82%)	154 (26.64%)
Browsing, Communication & Accessing Other Libraries	1 (0.61%)	0 (0.00%)	6 (4.44%)	0 (0.00%)	7 (1.21%)
Browsing, Forums & E-Contents	4 (2.45%)	2 (1.12%)	3 (2.22%)	1 (0.99%)	10 (1.73%)
Browsing, Communication, Forums & E-Contents	8 (4.91%)	16 (8.94%)	13 (9.63%)	10 (9.90%)	47 (8.13%)
Browsing, Communication, E-Contents & Accessing Other Libraries	8 (4.91%)	8 (4.47%)	6 (4.44%)	3 (2.97%)	25 (4.33%)
Browsing, Communication, Forums, E-Contents & Accessing Other Libraries	1 (0.61%)	1 (0.56%)	6 (4.44%)	1 (0.99%)	9 (1.56%)

Out of the total 578 persons using the net services, the combination of Browsing, Communication and E-Contents found to be the top priority of the 26.64 per cent of users. Browsing, Communication and Accessing Other Libraries is the combination least used with a total of 1.21 per cent only. Analysis on the various Internet services and its different combinations used

by respondents from Science and Social Science backgrounds are given in the Table 4.64.

Table 4.64 Internet Services Usage in the University Libraries in Kerala - Subject wise

Service combination	Social Science	Science	Total
Browsing	27 (14.59%)	28 (7.12%)	55 (9.52%)
Communication	8 (4.32%)	19 (4.83%)	27 (4.67%)
E-Contents	14 (7.57%)	22 (5.60%)	36 (6.23%)
Browsing & Communication	40 (21.62%)	55 (13.99%)	95 (16.44%)
Browsing & E Contents	7 (3.78%)	25 (6.36%)	32 (5.54%)
Communication & E-Contents	8 (4.32%)	35 (8.91%)	43 (7.44%)
Browsing, Communication & Forums	16 (8.65%)	22 (5.60%)	38 (6.57%)
Browsing, Communication & E-Contents	33 (17.84%)	121 (30.79%)	154 (26.64%)
Browsing, Communication & Accessing Other Libraries	1 (0.54%)	6 (1.53%)	7 (1.21%)
Browsing, Forums & E-Contents	6 (3.24%)	4 (1.02%)	10 (1.73%)
Browsing, Communication, Forums & E-Contents	14 (7.57%)	33 (8.40%)	47 (8.13%)
Browsing, Communication, E-Contents & Accessing Other Libraries	7 (3.78%)	18 (4.58%)	25 (4.33%)
Browsing, Communication, Forums, E-Contents & Accessing Other Libraries	4 (2.16%)	5 (1.27%)	9 (1.56%)

Analysis based on the subject background of the users showed that users with Science background are ahead of Social Science users in the use of 'E-contents' such as databases, full text articles etc. which are more needed for

academic purposes. In the other combinations not much significant difference was found between these two groups.

Status wise analysis of various Internet services used is given in the Table 4.65.

Table 4.65 Internet Services Usage in the University Libraries in Kerala - Status wise

Services & Combinations	Students	Research Scholars	Teachers	Total
Browsing	45 (10.74%)	4 (4.26%)	6 (9.23%)	55 (9.52%)
Communication	23 (5.49%)	3 (3.19%)	1 (1.54%)	27 (4.67%)
E-Contents	23 (5.49%)	8 (8.51%)	5 (7.69%)	36 (6.23%)
Browsing & Communication	76 (18.14%)	9 (9.57%)	10 (15.38%)	95 (16.44%)
Browsing & E Contents	18 (4.30%)	9 (9.57%)	5 (7.69%)	32 (5.54%)
Communication & E-Contents	31 (7.4%)	8 (8.51%)	4 (6.15%)	43 (7.44%)
Browsing, Communication & Forums	33 (7.88%)	3 (3.19%)	2 (3.08%)	38 (6.57%)
Browsing, Communication & E-Contents	110 (26.25%)	34 (36.17%)	10 (15.38%)	154 (26.64%)
Browsing, Communication & Accessing Other Libraries	2 (0.48%)	0 (0.00%)	5 (7.69%)	7 (1.21%)
Browsing, Forums & E-Contents	9 (2.15%)	0 (0.00%)	1 (1.54%)	10 (1.73%)
Browsing, Communication, Forums & E-Contents	34 (8.11%)	6 (6.38%)	7 (10.77%)	47 (8.13%)
Browsing, Communication, E-Contents & Accessing Other Libraries	9 (2.15%)	9 (9.57%)	7 (10.77%)	25 (4.33%)
Browsing, Communication, Forums, E-Contents & Accessing Other Libraries	6 (1.43%)	1 (1.06%)	2 (3.08%)	9 (1.56%)

Here it is seen that majority of the Students (26.25%) and Research Scholars (36.17%) makes use of the Internet the services Browsing, Communication & E-Contents that are usually needed for general purpose, communication purposes and Study and Research purposes. Among the Teachers the same purpose is mentioned by majority (15.38%) of users while the same percentage is found to be using the services Browsing and Communication alone excluding the E-Contents.

The analysis showed that Research Scholars are using Internet services that are more related with academic purposes while Students comes to next to them and Teachers found to be behind others in this aspect.

4.11.1.2. Purpose of Internet Use

Users were asked about their purpose of Internet use and they were given choices such as Study, Research, General, Recreational and Communication and were given option to indicate Any Other purposes of Internet use. Multiple choices were indicated by most of the users and the choices and their combinations as marked by the users are given in the Table 4.66.

The main purposes indicated by the users were Study as well as Research and the combinations consisting both purposes. Non-serious purpose of Internet use found to be very limited with only 0.52 per cent responding as their purpose of Internet use as mere Recreational. An over all 78.32 per cent found to be using Internet for their Study purposes while 43.89 per cent is using it for Research purposes. A total of 9.51 per cent found to be using Internet neither for Study nor for Research purposes and their interest was focused towards purposes other than these.

Table 4.66 Purpose of Internet Use in the Universities in Kerala - Library wise

Purpose of Internet Use	KUL	MGUL	CUSATL	CUL	Total
Study	35 (21.47%)	31 (17.32%)	19 (14.07%)	9 (8.91%)	94 (16.26%)
Research	19 (11.66%)	11 (6.15%)	4 (2.96%)	4 (3.96%)	38 (6.57%)
General	11 (6.75%)	3 (1.68%)	9 (6.67%)	5 (4.95%)	28 (4.84%)
Recreational	2 (1.23%)	0 (0.00%)	0 (0.00%)	1 (0.99%)	3 (0.52%)
Communication	4 (2.45%)	5 (2.79%)	0 (0.00%)	8 (7.92%)	17 (2.94%)
Study and Research	14 (8.59%)	11 (6.15%)	5 (3.7%)	7 (6.93%)	37 (6.4%)
Study and General	8 (4.91%)	12 (6.7%)	11 (8.15%)	6 (5.94%)	37 (6.4%)
Study and Recreational	4 (2.45%)	0 (0.00%)	0 (0.00%)	1 (0.99%)	5 (0.87%)
Study and Communication	3 (1.84%)	15 (8.38%)	12 (8.89%)	5 (4.95%)	35 (6.06%)
Research and Communication	4 (2.45%)	5 (2.79%)	4 (2.96%)	2 (1.98%)	15 (2.6%)
Communication and General	1 (0.61%)	0 (0.00%)	5 (3.7%)	1 (0.99%)	7 (1.21%)
Study, Research and General	9 (5.52%)	4 (2.23%)	2 (1.48%)	2 (1.98%)	17 (2.94%)
Study, Research and Recreational	3 (1.84%)	5 (2.79%)	1 (0.74%)	1 (0.99%)	10 (0.99%)
Study, Research and Communication	13 (7.98%)	11 (6.15%)	9 (6.67%)	5 (4.95%)	38 (6.57%)
Study, General and Recreational	5 (3.07%)	3 (1.68%)	1 (0.74%)	1 (0.99%)	10 (1.73%)
Study, General and Communication	2 (1.23%)	20 (11.17%)	13 (9.63%)	10 (9.9%)	45 (7.79%)
Study, Recreational and Communication	1 (0.61%)	3 (1.68%)	2 (1.48%)	2 (1.98%)	8 (1.38%)
Research, General and Communication	0 (0.00%)	5 (2.79%)	7 (5.19%)	1 (0.99%)	13 (2.25%)
Study, Research, General and Communication	13 (7.98%)	20 (11.2%)	10 (7.41%)	8 (7.92%)	51 (8.82%)
Study, General Recreational and Communication	4 (2.45%)	6 (3.35%)	7 (5.19%)	14 (13.86%)	31 (5.36%)
Study; Research, General Recreational and Communication	8 (4.91%)	9 (5.03%)	14 (10.37%)	8 (7.92%)	39 (6.75%)

Table 4.67 Purpose of Internet Use in the Universities in Kerala - Subject wise

Purpose of Internet Use	Social Science	Science	Total
Study	37 (20%)	57 (14.50%)	94 (16.26%)
Research	9 (4.86%)	29 (7.38%)	38 (6.57%)
General	15 (8.11%)	13 (3.31%)	28 (4.84%)
Recreational	0 (0.00%)	3 (0.76%)	3 (0.52%)
Communication	5 (2.70%)	12 (3.05%)	17 (2.94%)
Study and Research	19 (10.27%)	18 (4.58%)	37 (6.4%)
Study and General	12 (6.49%)	25 (6.36%)	37 (6.4%)
Study and Recreational	2 (1.08%)	3 (0.76%)	5 (0.87%)
Study and Communication	7 (3.78%)	28 (7.12%)	35 (6.06%)
Research and Communication	4 (2.16%)	11 (2.8%)	15 (2.6%)
Communication and General	3 (1.62%)	4 (1.02%)	7 (1.21%)
Study, Research and General	6 (3.24%)	11 (2.8%)	17 (2.94%)
Study, Research and Recreational	6 (3.24%)	4 (1.02%)	10 (0.99%)
Study, Research and Communication	9 (4.86%)	29 (7.38%)	38 (6.57%)
Study, General and Recreational	2 (1.08%)	8 (2.04%)	10 (1.73%)
Study, General and Communication	5 (2.70%)	40 (10.18%)	45 (7.79%)
Study, Recreational and Communication	0 (0.00%)	8 (2.04%)	8 (1.38%)
Research, General and Communication	4 (2.16%)	9 (2.29%)	13 (2.25%)
Study, Research, General and Communication	19 (10.27%)	32 (8.14%)	51 (8.82%)
Study, General Recreational and Communication	7 (3.78%)	24 (6.11%)	31 (5.36%)
Study, Research, General Recreational and Communication	14 (7.57%)	25 (6.36%)	39 (6.75%)

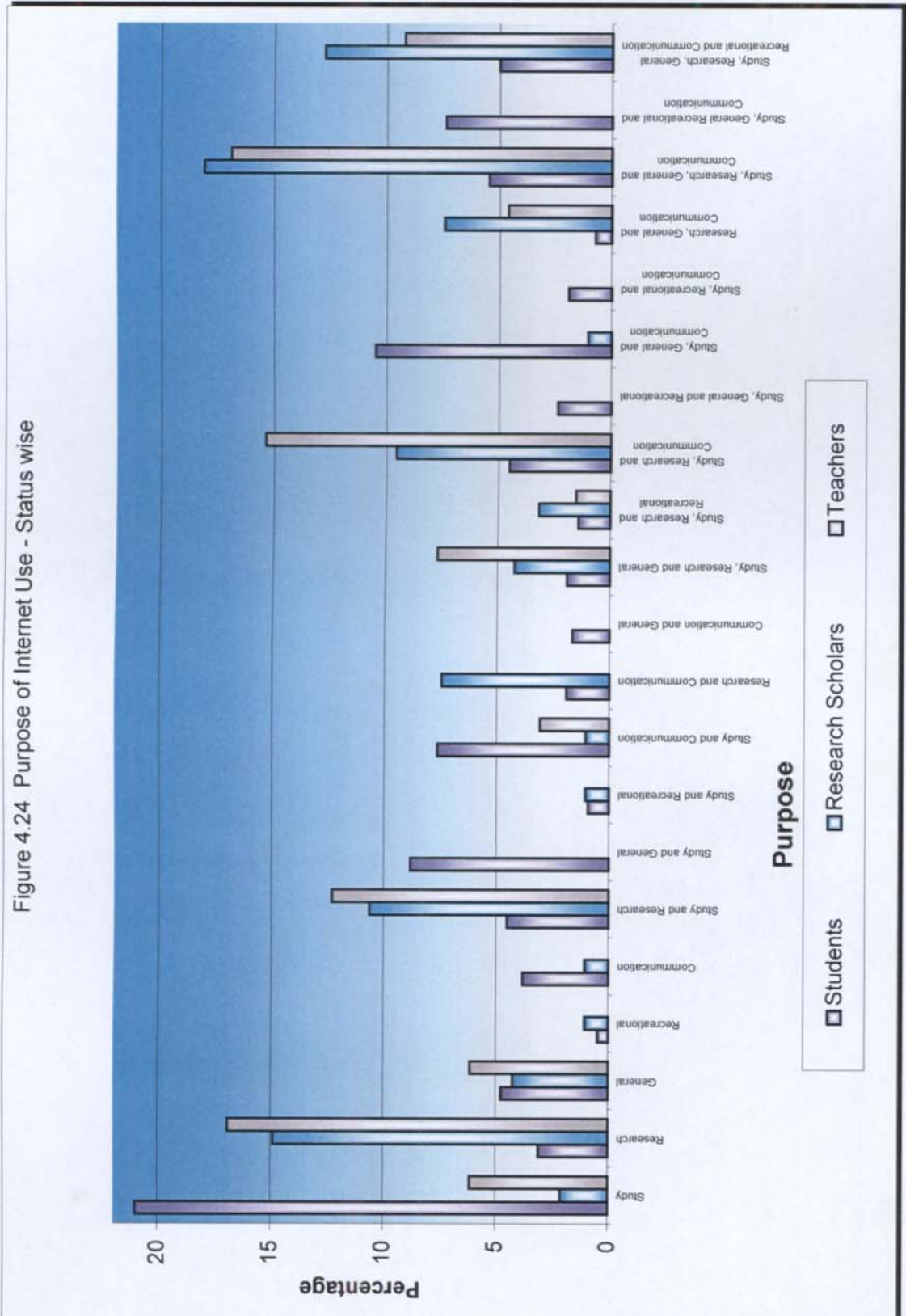
Analysis of the purpose of Internet use based on the subject background of the Users is given in the Table 4.67. The percentage of users making use of Internet for study purpose alone found to be higher in Social Sciences (20%) while it is only 14.5% among Science users. But the use for Research purpose alone is found to be higher among those from Science subjects (7.38%) while it is only 4.86 per cent among users from Social Science background. Use of Internet for pure Recreational purpose was not found among Social Science users while a minority of 0.76 per cent from Science subjects found to be using Internet for mere Recreational purposes.

Status wise purpose of Internet use is given in the Table 4.68 and it is graphically represented in the Figure 4.24. An overall 83.52 per cent among Students, 63.84 per cent among Research Scholars and 72.30 per cent among Teachers found using Internet for Study purposes. Similarly, an overall 24.1 per cent among Students, 78.75 per cent among Research Scholars and 69.21 per cent among Teachers were found using Internet for their Research purpose while the use of Internet for purposes other than Study and Research were found among 10.74 per cent of Students, 6.38 per cent of Research Scholars and 6.015 per cent of Teachers.

Table 4.68 Purpose of Internet Use in the University Libraries in Kerala - Status wise

Purpose of Internet Use	Students	Research Scholars	Teachers	All Groups
Study	88 (21.00%)	2 (2.13%)	4 (6.15%)	94 (16.26%)
Research	13 (3.10%)	14 (14.89%)	11 (16.92%)	38 (6.57%)
General	20 (4.77%)	4 (4.26%)	4 (6.15%)	28 (4.84%)
Recreational	2 (0.48%)	1 (1.06%)	0 (0.00%)	3 (0.52%)
Communication	16 (3.82%)	1 (1.06%)	0 (0.00%)	17 (2.94%)
Study and Research	19 (4.53%)	10 (10.64%)	8 (12.31%)	37 (6.40%)
Study and General	37 (8.83%)	0 (0.00%)	0 (0.00%)	37 (6.40%)
Study and Recreational	4 (0.95%)	1 (1.06%)	0 (0.00%)	5 (0.87%)
Study and Communication	32 (7.64%)	1 (1.06%)	2 (3.08%)	35 (6.06%)
Research and Communication	8 (1.91%)	7 (7.45%)	0 (0.00%)	15 (2.60%)
Communication and General	7 (1.67%)	0 (0.00%)	0 (0.00%)	7 (1.21%)
Study, Research and General	8 (1.91%)	4 (4.26%)	5 (7.69%)	17 (2.94%)
Study, Research and Recreational	6 (1.43%)	3 (3.19%)	1 (1.54%)	10 (1.73%)
Study, Research and Communication	19 (4.53%)	9 (9.57%)	10 (15.4%)	38 (6.57%)
Study, General and Recreational	10 (2.39%)	0 (0.00%)	0 (0.00%)	10 (1.73%)
Study, General and Communication	44 (10.50%)	1 (1.06%)	0 (0.00%)	45 (7.79%)
Study, Recreational and Communication	8 (1.91%)	0 (0.00%)	0 (0.00%)	8 (1.38%)
Research, General and Communication	3 (0.72%)	7 (7.45%)	3 (4.62%)	13 (2.25%)
Study, Research, General and Communication	23 (5.49%)	17 (18.1%)	11 (16.9%)	51 (8.82%)
Study, General Recreational and Communication	31 (7.40%)	0 (0.00%)	0 (0.00%)	31 (5.36%)
Study, Research, General Recreational and Communication	21 (5.01%)	12 (12.77%)	6 (9.23%)	39 (6.75%)

Figure 4.24 Purpose of Internet Use - Status wise



4.11.1.3. Training in the Use of Internet Facility

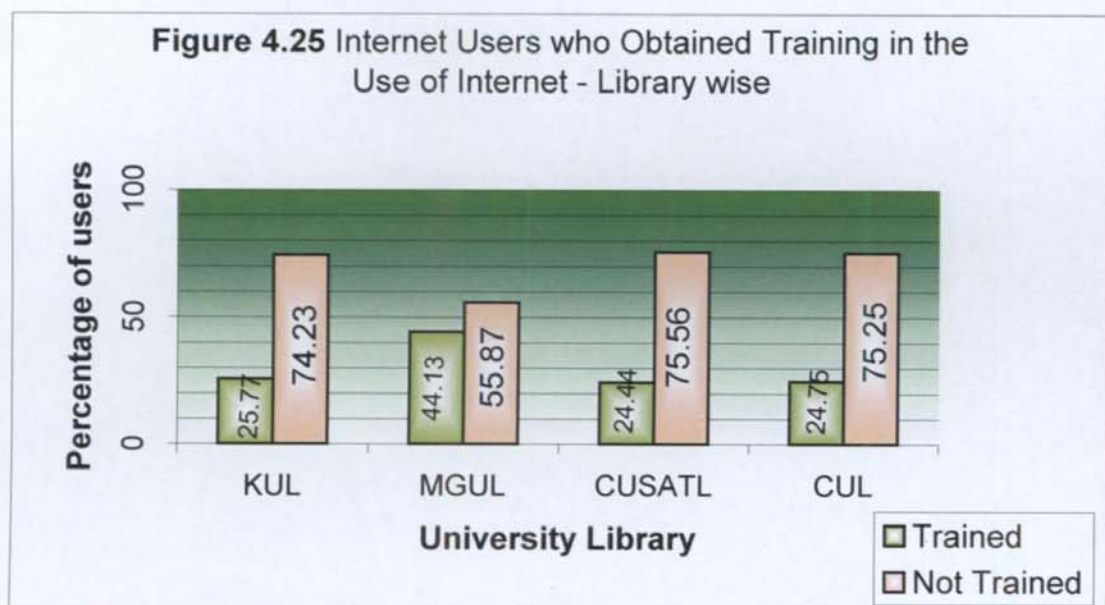
Internet is a very vast ocean of information and one has to navigate properly for collecting the required information from Internet. User should be conversant with right techniques and should be provided with right tools for getting the right information. He/She has to understand the potential of the technology and should be able in dealing with different hardware and software. Without proper training, no one can explore the full potential of Internet services. All the university libraries under study claimed to be providing training in the use of Internet. On observation it was found that the libraries are not conducting any training programme in an organized manner rather users are given instruction in the basics of browsing on the basis of their request made at the time of they first come to use Internet in the library. Table 4.69 shows the library wise details of the users who got training in the use of Internet.

Table 4.69 Trained and Non-Trained Users of Internet - Library wise

Library	Yes	%	No	%	Total
KUL	42	25.77	121	74.23	163
MGUL	79	44.13	100	55.87	179
CUSATL	33	24.44	102	75.56	135
CUL	25	24.75	76	75.25	101
All Libs	179	30.97	399	69.03	578
Pearson Chi-square: 21.0895, df=3, p=.000101					

Above Table reveals that only around 30 per cent of the users were trained in the use of Internet and a majority of 70 per cent is using the facility without any orientation in making best use of the services. The MGUL has the highest rate of trained users 44.13 per cent while in CUSATL it is the lowest i.e. 24.44 per cent. But there is not much difference between KUL, CUSATL and CUL where almost only one fourth of the Internet users only received any training in the use of Internet. This is a serious handicap of the

provision of services and adequate training need to be imparted to the users for enabling them to get better results out of their efforts. The Chi-square test also proved significant association between the university library and the number of users who got training in the use of Internet. The above Table has been represented graphically in the Figure 4.25.



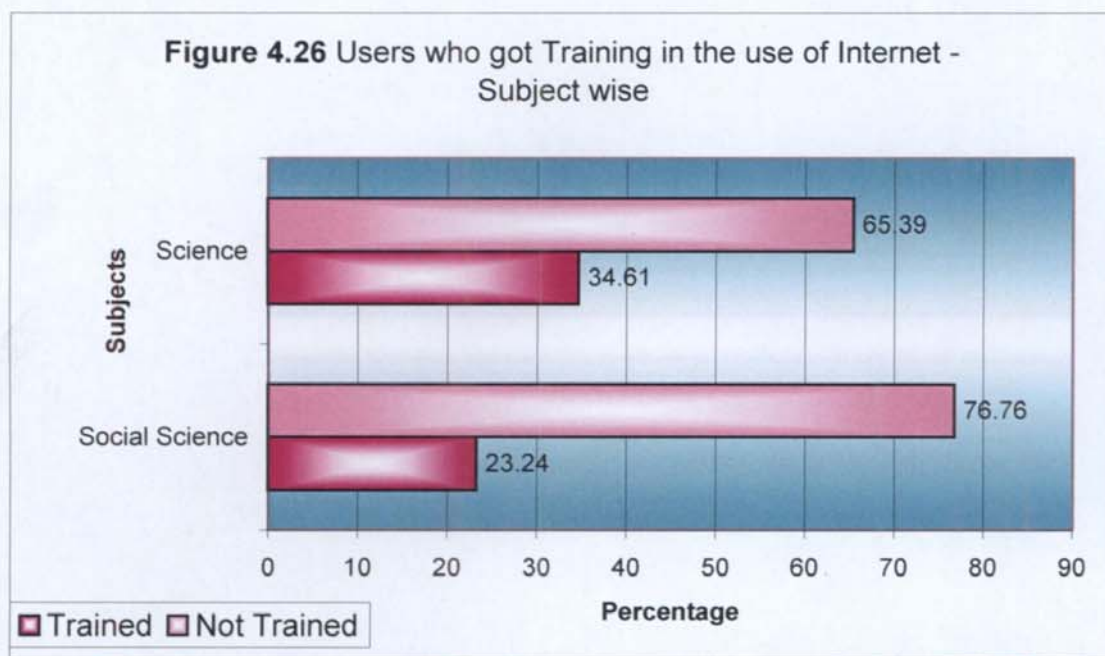
Details of the users of Internet from Science as well as Social Science subjects who obtained training in the use are given in the Table 4.70 given below.

Table 4.70 Trained and Non-Trained Users of Internet - Subject wise

Subject	Yes	%	No	%	Total
Social Science	43	23.24	142	76.76	185
Science	136	34.61	257	65.39	393
All Groups	179	30.97	399	69.03	578
Pearson Chi-square: 7.59631, df=1, p=.005852					

Subject wise analysis showed that from Social Sciences, only 23.24 per cent have got training while in Science it is 34.61 per cent and Chi-square test also proved that there is significant difference between users from both

subjects in the matter of training obtained in the use of Internet. The Table given above is graphically represented in the Figure 4.26 below.



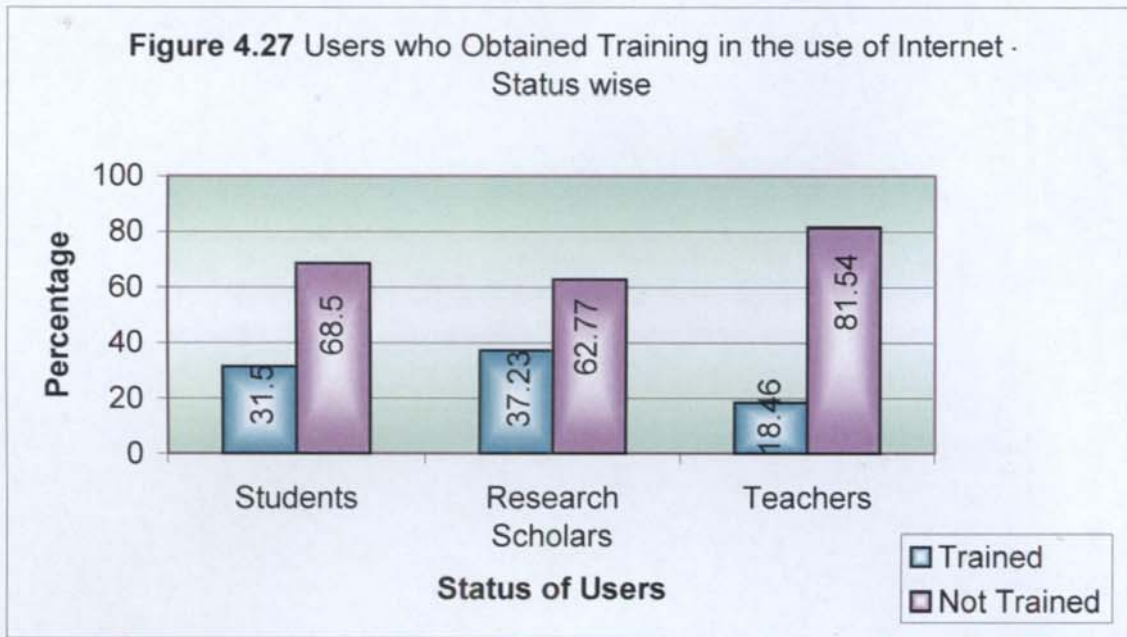
In the above figure lower level of obtaining training among both group and comparatively higher number of trained users in Science subjects is clearly visible.

Status wise analysis showed that Research Scholars (37.23%) have the highest percentage among the users in the matter of training obtained while the lowest is among the teachers (18.46%). Among students 31.50 per cent have said that they received training in the use of Internet services. Chi-square test did not find any significant difference among the different status groups in obtaining training.

Table 4.71 Trained and Non-Trained Users of Internet - Status wise

Status	Yes	%	No	%	Total
Students	132	31.50	287	68.50	419
Research Scholars	35	37.23	59	62.77	94
Teachers	12	18.46	53	81.54	65
All Groups	179	30.97	399	69.03	578
Pearson Chi-square: 6.53830, df=2, p=.038051					

Table 4.71 is graphically represented in the Figure 4.27 given below.



It is evident from the figure that majority of the users are using the Internet services without any training in the utilization of the service. Teachers are the least trained user group while Researchers are the most trained and Students stands in between the other groups. The graphical user interface features may enable one to navigate through many areas in the net. But to fetch the appropriate information one need to be familiar with various tools and techniques and one need to know the pattern of adopted by different leading websites in storing their valuable information.

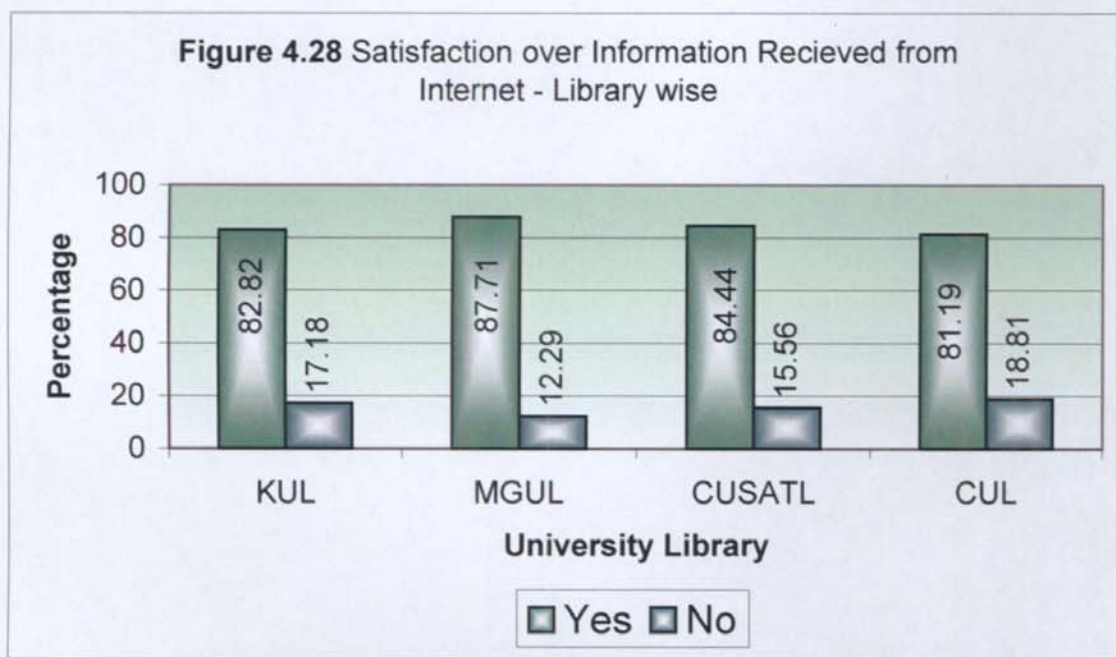
4.11.1.4. Satisfaction Over Availability of Information from Internet

Though training was not received by majority of the users, they claimed to be getting required information from the Internet. As Table 4.72 reveals much difference is not found among users from different universities. An overall 84.43 per cent responded that they are getting required information and the responses from different universities are not varying more than 4 per cent and this is evident in the p value of Chi-square test also.

Table 4.72 Respondents who receive Required Information from Internet - Library wise

Library	Yes	%	No	%	Total
KUL	135	82.82	28	17.18	163
MGUL	157	87.71	22	12.29	179
CUSATL	114	84.44	21	15.56	135
CUL	82	81.19	19	18.81	101
All Libs.	488	84.43	90	15.57	578
Pearson Chi-square: 2.59242, df=3, p=.458831					

Table 4.72 is graphically represented in the Figure 4.28 given below.



Users from MGUL found to be ahead of others in getting the required information and it was in MGUL the higher percent of trained users were also found.

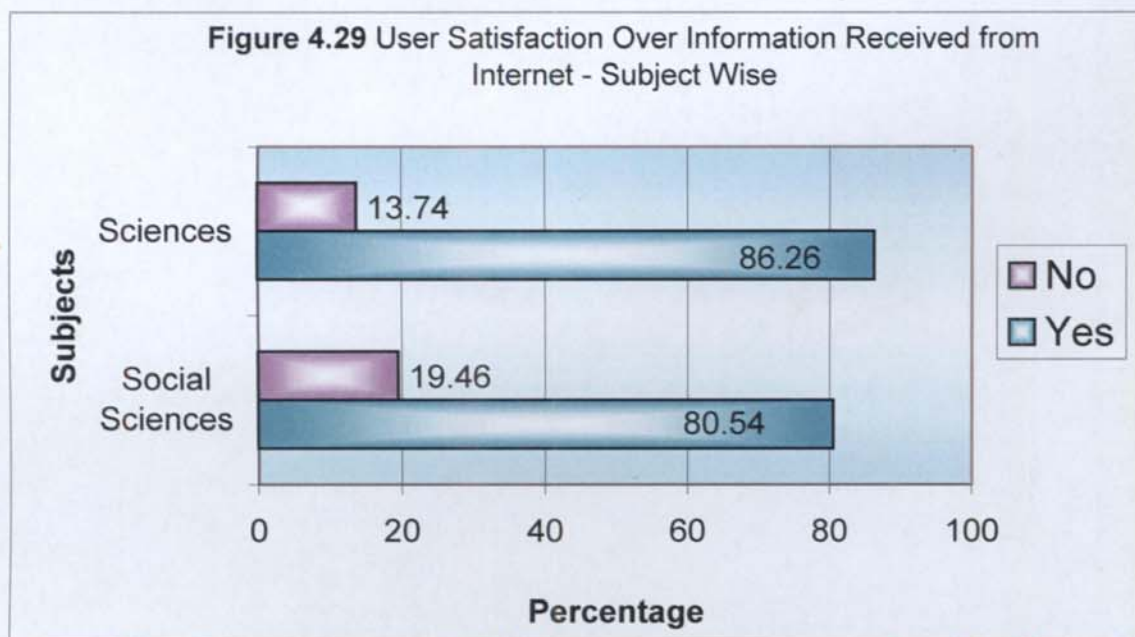
Subject wise analysis proved that those from Science subjects are more satisfied on getting required information from Internet compared to those who belongs to Social Science subjects. When 80.54 per cent Social Science persons claimed as getting the required information, the rate in Science

subject is found to be a little higher with 86.26 per cent. Chi-square test did not prove any association between the subject backgrounds and getting required information from Internet.

Table 4.73 Respondents who Receive Required Information from Internet - Subject wise

Subject	Yes	%	No	%	Total
Social Science	149	80.54	36	19.46	185
Science	339	86.26	54	13.74	393
All Groups	488	84.43	90	15.57	578
Pearson Chi-square: 3.12947, df=1, p=.076898					

Table 4.73 is graphically represented in the Figure 4.29 given below.



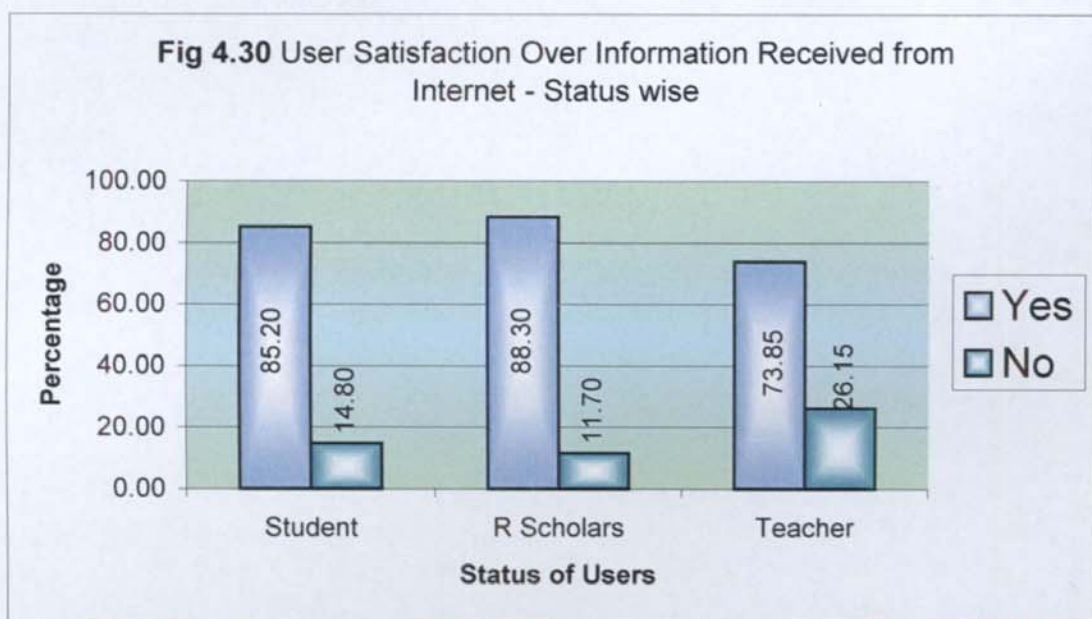
In the above figure, higher level of satisfaction is very clearly seen among the users with Science background.

In the status wise analysis given in the Table 4.74 it is seen that Research Scholars (88.30%) are more satisfied with the information they are getting while the rate among teachers it is 73.85 per cent. The Chi-square test did not prove any significant association between the category of the user and the level of receiving information from Internet.

Table 4.74 Respondents who Receive Required Information from Internet – Status wise

Status	Yes	%	No	%	Total
Students	357	85.20	62	14.80	419
Research Scholars	83	88.30	11	11.70	94
Teachers	48	73.85	17	26.15	65
All Groups	488	84.43	90	15.57	578
Pearson Chi-square: 6.79860, df=2, p=.033409					

The Table 4.74 has been graphically represented in the Figure 4.30 below.



The graph given above clearly indicates comparatively better level of satisfaction among Research Scholars over getting required information from net. Students are just behind the Research Scholars and Teachers found to be behind other two categories.

4.11.1.5. Speed of the Internet Connection

Different universities have different types of Internet connectivity with different bandwidth. Speed of the Internet connection depends upon many factors such as the bandwidth of the connection as well as the Internet traffic over the particular service provider. Likewise the processor speed of the

machine used also contributes to the speed of Internet connection. Internet users found to be complaining against the low speed and difficulty in getting the required data due to poor bandwidth. Question was asked to indicate the satisfaction of the users with regard to the speed of the connection. Except in MGUL more than half of the respondents from all other universities are found to be dissatisfied with the speed of the connection. Table 4.75 gives the university wise details of the satisfaction over the speed of the connection.

Table 4.75 Details of Respondents Regarding the Speed of the Internet Connection - Library wise

Library	Yes	%	No	%	Total
KUL	75	46.01	88	53.99	163
MGUL	97	54.19	82	45.81	179
CUSATL	51	37.78	84	62.22	135
CUL	43	42.57	58	57.43	101
All Libs	266	46.02	312	53.98	578
Pearson Chi-square: 8.98419, df=3, p=.029517					

In KUL 53.99 per cent have of the opinion that the Internet connection is not fast enough while in CUL it is 57.43 per cent and in CUSATL it is 62.22 per cent. In the category wise analysis all the categories expressed almost the same opinion. Teachers found to be the most dissatisfied about the speed of the connection. Chi-square test showed that the association between the Library and speed of Internet connection is significant.

Table 4.76 Responses Regarding the Speed of the Internet Connection - Status wise

Status	Yes	%	No	%	Total
Students	194	46.30	225	53.70	419
Research Scholars	43	45.74	51	54.26	94
Teachers	29	44.62	36	55.38	65
All Groups	266	46.02	312	53.98	578
Pearson Chi-square: .067783, df=2, p=.966676					

Chi-square test did not prove any association between the status of the user and the their satisfaction over the speed of Internet connection. Irrespective of the status of the users, majority of the users find the speed of the Internet connection inadequate.

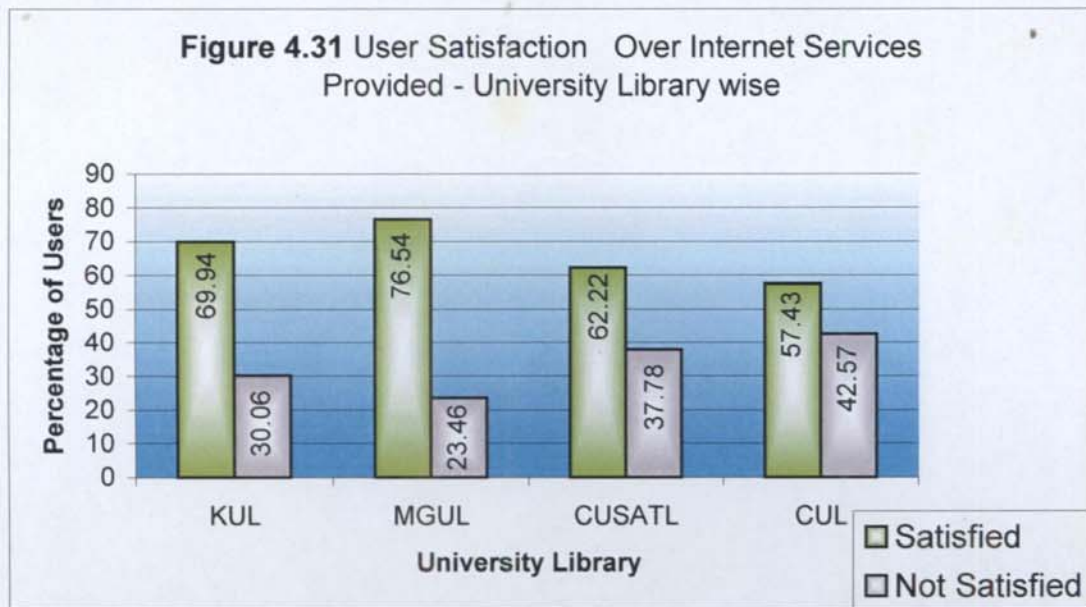
4.11.1.6. Satisfaction Over Internet Services Provided by the Libraries

Question was asked about the overall satisfaction of the users regarding the Internet services provided by the library. In MGUL 76.54 per cent of the respondents found to be satisfied with the existing provisions and did not want to suggest any other improvement over the existing facility. In KUL 69.94 per cent of the respondents were satisfied and in CUSATL 62.22 per cent responded the existing services sufficient to meet their requirements. But in CUL it was 57.43 per cent and the remaining 42.57 per cent are not satisfied and wanted improvement over the existing provisions. Table 4.77 gives library wise details of the respondents.

Table 4.77 Responses Regarding the Satisfaction over the Internet Services Provided - Library wise

Library	Yes	%	No	%	Total
KUL	114	69.94	49	30.06	163
MGUL	137	76.54	42	23.46	179
CUSATL	84	62.22	51	37.78	135
CUL	58	57.43	43	42.57	101
All Libs	393	67.99	185	32.01	578
Pearson Chi-square: 13.5352, df=3, p=.003616					

Chi-square test showed that the association between the University Library and the satisfaction of users over the Internet services provided is significant. The above Table has been graphically represented in the Figure 4.31 given below which clearly depicts the higher level of satisfaction among users in MGUL and lower level among users in CUL.



A subject wise analysis revealed that satisfaction over the existing facility is more among Social Science people compared to those from Science background. Table 4.78 gives details about the satisfaction of different subject groups.

Table 4.78 Subject wise Details of Respondents
Regarding the Satisfaction over the Internet Services Provided

Subject	Yes	%	No	%	Total
Social Science	130	70.27	55	29.73	185
Science	263	66.92	130	33.08	393
All Groups	393	67.99	185	32.01	578
Pearson Chi-square: .648332, df=1, p=.420716					

70.27 per cent of the Social Science people found to be satisfied with the existing provisions of Internet while among Science people it is 66.92 per cent only. But the Chi-square test did not prove any association between the subject background and level of satisfaction over the Internet services provided.

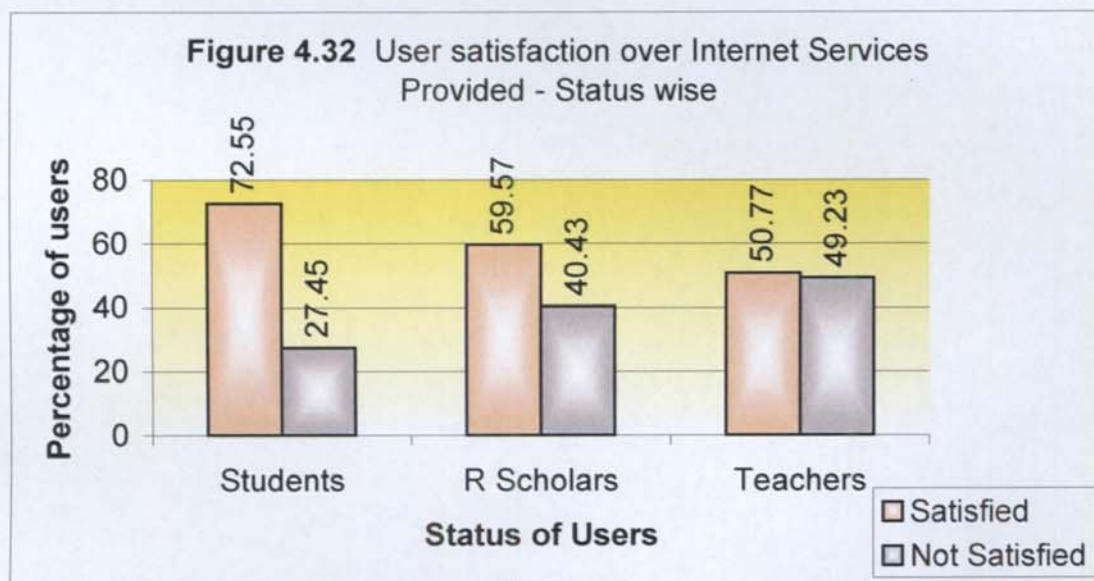
Status wise analysis has shown that Students (72.55%) are more satisfied with the existing facility while Teachers (50.77%) are less satisfied.

Among the Research scholars 59.57 per cent found to be satisfied with facilities provided at present. Table 4.79 provides the details.

Table 4.79 Details of Respondents Regarding the Satisfaction Over the Internet Services - Status wise

Status	Yes	%	No	%	Total
Students	304	72.55	115	27.45	419
Research Scholars	56	59.57	38	40.43	94
Teachers	33	50.77	32	49.23	65
All Groups	393	67.99	185	32.01	578
Pearson Chi-square: 15.9264, df=2, p=.000349					

Chi-square test has proved significant association between the status of the user and the level of satisfaction over the Internet services provided.



Graphical representation of the Table 4.79 in Figure 4.31 clearly shows the poor level of satisfaction among the faculty members over the Internet services provided by the university libraries.

4.11.1.6.1. Improvement Over Internet Services/Facilities Provided by the University Libraries

In order to understand the shortcomings with regard to the Internet services provided, users of the Internet facilities were asked whether they find

the Internet services provided by the library sufficient or do they feel need for any other facility with regard to the Internet services. This question was an open ended one as users may have different needs and views with regard to the improvement of the services. Out of the 578 users of Internet, 67.99 per cent responded that they find the services provided sufficient while the remaining 32.01 per cent respondents found to be dissatisfied with the facilities provided and wanted improvement over the facility. 49 of them were from KUL, 42 from MGUL, 51 from CUSATL and 43 from CUL. They were asked to mention their requirements hence they specified it. It was found that the highest demand made was for sufficient number of computers. A total of 58.38 per cent responded thus. Lack of sufficient E-resources was reported by 6.49 per cent users and they wanted the respective libraries subscribe to more E-resources. Copying facility (both hard copy and soft copy) was demanded by 11.76 per cent of the respondents from CUSATL while in CUL no one has demanded this. Internet service without charging any fee was demanded by 6.12 per cent from KUL and 2.33 per cent from CUL. Extension of the Internet service to the departments were demanded by respondents from MGUL while in other three universities the Internet facility is available in many of the teaching departments and users found to be satisfied over it. Users also demand secrecy at the time of browsing and they account to 2.04 per cent from KUL and 4.77 per cent from MGUL. Other suggestions included extension of time duration allotted to users and many of them complained that by the time they locate required information their allotted time might be over and had to leave the place for the next person in waiting without downloading the information. Users also suggested instructors in the use of Internet as well as providing proper guidance in the use of facility.

**Table 4.80 Response of Users Regarding
Other Internet Facilities and Services Needed - Library wise**

Other Services Needed	KUL	MGUL	CUSATL	CUL	Total
Copying Facility (Hard & Soft)	2 (4.08%)	1 (2.38%)	6 (11.76%)	0 (0.00%)	9 (4.86%)
Adequate Machines	32 (65.31%)	26 (61.90%)	27 (52.94%)	23 (53.49%)	108 (58.38%)
Free Service	3 (6.12%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	3 (1.62%)
Secrecy	1 (2.04%)	2 (4.76%)	0 (0.00%)	0 (0.00%)	3 (1.62%)
Adequate Machines, More E Resources	4 (8.16%)	3 (7.14%)	2 (3.92%)	1 (2.33%)	10 (5.41%)
Free Service, Adequate Machines	2 (4.08%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	3 (1.62%)
Instructor/Orientation, Adequate Machines	1 (2.04%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	2 (1.08%)
Sufficient Time Allocation	1 (2.04%)	0 (0.00%)	2 (3.92%)	3 (6.98%)	6 (3.24%)
More E Resources	1 (2.04%)	4 (9.52%)	5 (9.80%)	2 (4.65%)	12 (6.49%)
Instructor/Orientation	1 (2.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation, More E Resources	1 (2.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation	0 (0.00%)	1 (2.38%)	5 (9.80%)	3 (6.98%)	9 (4.86%)
Extension of Service to Department	0 (0.00%)	3 (7.14%)	1 (1.96%)	0 (0.00%)	4 (2.16%)
Adequate Machines, Sufficient Time Allocation, Extension of Service to Department	0 (0.00%)	2 (4.76%)	0 (0.00%)	0 (0.00%)	2 (1.08%)
Adequate Machines, Copying Facility (Hard & Soft)	0 (0.00%)	0 (0.00%)	3 (5.88%)	2 (4.65%)	5 (2.70%)
Adequate Machines, Extension of Service to Department	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	1 (0.54%)
Adequate Machines, Copying Facility (Hard & Soft), Sufficient Time Allocation	0 (0.00%)	0 (0.00%)	0 (0.00%)	3 (6.98%)	3 (1.62%)
Instructor/Orientation, Adequate Machines and Sufficient Time Allocation	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	1 (0.54%)
Access to Other International Libraries	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	1 (0.54%)
Free Service, Adequate Machines and More E Resources	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (2.33%)	1 (0.54%)
All Groups	49	42	51	43	185

Table 4.81 Subject wise Response of Users Regarding
Other Internet Facilities and Services Needed

Other Services Needed	Social Science	Science	Totals
Copying Facility (Hard & Soft)	4 (7.27%)	5 (3.85%)	9 (4.86%)
Adequate Machines	38 (69.09%)	70 (53.85%)	108 (58.38%)
Free Service	1 (1.82%)	2 (1.54%)	3 (1.62%)
Secrecy	1 (1.82%)	2 (1.54%)	3 (1.62%)
Adequate Machines, More E Resources	2 (3.64%)	8 (6.15%)	10 (5.41%)
Free Service, Adequate Machines	0 (0.00%)	3 (2.13%)	3 (1.62%)
Instructor/Orientation, Adequate Machines	0 (0.00%)	2 (1.54%)	2 (1.08%)
Sufficient Time Allocation	1 (1.82%)	5 (3.85%)	6 (3.24%)
More E Resources	1 (1.82%)	11 (8.46%)	12 (6.49%)
Instructor/Orientation	0 (0.00%)	1 (0.77%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation, More E Resources	0 (0.00%)	1 (0.77%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation	2 (3.64%)	7 (5.38%)	9 (4.86%)
Extension of Service to Department	0 (0.00%)	4 (3.08%)	4 (2.16%)
Adequate Machines, Sufficient Time Allocation, Extension of Service to Department	0 (0.00%)	2 (1.54%)	2 (1.08%)
Adequate Machines, Copying Facility (Hard & Soft)	2 (3.64%)	3 (2.31%)	5 (2.70%)
Adequate Machines, Extension of Service to Department	0 (0.00%)	1 (0.77%)	1 (0.54%)
Adequate Machines, Copying Facility (Hard & Soft), Sufficient Time Allocation	2 (3.64%)	1 (0.77%)	3 (1.62%)
Instructor/Orientation, Adequate Machines and Sufficient Time Allocation	0 (0.00%)	1 (0.77%)	1 (0.54%)
Access to Other International Libraries	1 (1.82%)	0 (0.00%)	1 (0.54%)
Free Service, Adequate Machines and More E Resources	0 (0.00%)	1 (0.77%)	1 (0.54%)
All Groups	55	130	185

Table 4.81 gives the details of demand for other services and facilities with regard to Internet by Science and Social Science groups. It was found that Science people compared to those who belong to Social Sciences demanded more E-resources.

In whichever combination more e-resources is demanded the percentage of Science people is found to be higher. This shows that they are not satisfied with the subject contents they receive through Internet and want the respective libraries subscribe to more E-Resources. Libraries need to take measures to procure more E resources in Science subjects on a consortia basis.

Table 4.82 provides Status wise demand of other Internet services and facilities. The percentage of faculty members who demand for adequate machines are found to be much higher compared to the other category of users. This shows that the teachers find it difficult to get sufficient nodes for browsing.

It is found in all the analysis regarding the other services/facilities needed that there is an acute shortage of adequate number of computers in proper working conditions in all the universities. The highest number of respondents demanded for sufficient computers and their need for more E-resources comes after this need only. Analysis on the available hardware in the libraries have proved that libraries are running with very old computers and the latest Pentium IV machines are very less and in some libraries it is not available also. Hence steps need to be taken to procure latest computers by making sufficient funds available for the purpose.

Table 4.82 Response of Users Regarding Other Internet Facilities and Services Needed - Status wise

Other Services Needed	Students	Research Scholars	Teachers	Totals
Copying Facility (Hard & Soft)	8 (6.96%)	1 (2.63%)	0 (0.00%)	9 (4.86%)
Adequate Machines	68 (59.13%)	18 (47.37%)	22 (68.75%)	108 (58.38%)
Free Service	2 (1.74%)	1 (2.63%)	0 (0.00%)	3 (1.62%)
Secrecy	3 (2.61%)	0 (0.00%)	0 (0.00%)	3 (1.62%)
Adequate Machines, More E Resources	6 (5.22%)	3 (7.89%)	1 (3.13%)	10 (5.41%)
Free Service, Adequate Machines	2 (1.74%)	1 (2.63%)	0 (0.00%)	3 (1.62%)
Instructor/Orientation, Adequate Machines	1 (0.87%)	1 (2.63%)	0 (0.00%)	2 (1.08%)
Sufficient Time Allocation	5 (4.35%)	1 (2.63%)	0 (0.00%)	6 (3.24%)
More E Resources	4 (3.48%)	7 (18.42%)	1 (3.13%)	12 (6.49%)
Instructor/Orientation	0 (0.00%)	1 (2.63%)	0 (0.00%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation, More E Resources	0 (0.00%)	0 (0.00%)	1 (3.13%)	1 (0.54%)
Adequate Machines, Sufficient Time Allocation	7 (6.09%)	2 (5.26%)	0 (0.00%)	9 (4.86%)
Extension of Service to Department	1 (0.87%)	0 (0.00%)	3 (9.38%)	4 (2.16%)
Adequate Machines, Sufficient Time Allocation, Extension of Service to Department	0 (0.00%)	0 (0.00%)	2 (6.25%)	2 (1.08%)
Adequate Machines, Copying Facility (Hard & Soft)	5 (4.35%)	0 (0.00%)	0 (0.00%)	5 (2.70%)
Adequate Machines, Extension of Service to Department	1 (0.87%)	0 (0.00%)	0 (0.00%)	1 (0.54%)
Adequate Machines, Copying Facility (Hard & Soft), Sufficient Time Allocation	2 (1.74%)	0 (0.00%)	1 (3.13%)	3 (1.62%)
Instructor/Orientation, Adequate Machines and Sufficient Time Allocation	0 (0.00%)	1 (2.63%)	0 (0.00%)	1 (0.54%)
Access to Other International Libraries	0 (0.00%)	1 (2.63%)	0 (0.00%)	1 (0.54%)
Free Service, Adequate Machines and More E Resources	0 (0.00%)	0 (0.00%)	1 (3.13%)	1 (0.54%)
All Groups	115	38	32	185

4.12. Digitization of Documents

Our universities generate huge intellectual contents and these valuable contents are usually marketed and profit made out of it by outside publishers. Internal contents of each university include Theses and Dissertations, Research or Annual Reports and other publications issued by the university. Similarly there may be research publications and proceedings of conferences hosted by the universities. Contents generated in-house by not-for-profit institutions can also be collected and hosted in a distributed fashion by different departments and institutions in the universities and made available at least for the use of the academics in the state.

No university library under study has made digitization of documents to any considerable extent. CUSATL has just made a beginning in this direction by attempting digitization of their Theses collection and it is in the infancy stage only. Kerala University Library has decided to digitize their archive collection under the Kerala Studies Section. Table 4.1 reveals that all the universities have a good collection of Theses that are unique sources of information hence very valuable also. Making it available in digital form will enhance its use and the same will help the libraries to preserve such unique sources without any damage in future. Digitization and sharing of the information will help to reduce duplication of studies conducted on local situations as well as in the regional literature. There should be concrete efforts to begin Electronic Thesis and Dissertation (ETD) projects and to digitize unique collections that do not come under the purview of copyright act.

4.13. Services Provided over Internet by the University Libraries

Out of the four University Libraries under study, KUL, CUSATL and CUL have their official web pages as part of the university website while MGUL has not yet hosted their web page though the official university web site is available over net and it is known that the site will be hosted soon. Services of the library can be extended beyond the library premises through

the web sites reaching a wide range of users without geographical barriers. Libraries can provide their general as well as specialized services to remote users through their web site. It was observed as well as ascertained by examining the University Library websites that none of the library provides web based Reference Service and specialized services like CAS, SDI etc. through their websites. CUSATL is the only library that makes its catalogue available over the web while none of the others have this facility. All the three libraries provide their new additions list through their home page and are seen frequently updated and this is the single information service provided by all the libraries through their websites. The following Table 4.83 depicts the information provided and services rendered by the libraries through their web sites.

Table 4.83 Comparison of Websites of University Libraries in Kerala

Website Details	KUL	CUSATL	CUL
General Information	Y	Y	Y
Library Collection details	Y	Y	Y
Library Services details	Y	Y	Y
Contact details (Email & telephone)	Y	Y	Y
Library Working Hours	Y	Y	Y
Library Holidays	N	N	Y
Staff details	N	N	N
Membership attainment details	Y	Y	Y
Downloadable membership application form	N	N	Y
Online Registration of Membership	N	N	N
New Arrivals List	Y	Y	Y
Online Catalogue Access	N	Y	N
Online renewal of borrowed items	N	N	N
Online reservation of documents	N	N	N
Link to other libraries and institutions	Nil	2	1
Events Notifications	N	Y	Y

All the libraries provide general information about the library, collection and service details and information regarding attaining membership in the library. None of the libraries provide online membership registration facility. All the libraries have given library working-hours while CUL only lists the library holidays of the year. Similarly CUL only has provision for downloading the membership form from the site. None of the sites provides links to other University Libraries in the state. CUSATL has provided link to two sources of free journals while CUL has provided link to the INFLIBNET web site. Staff member details are not provided by any of the library and there is no facility for online renewal of borrowed items and online reservation of issued out documents. CUL and CUSATL have provision for notifying the events related with the library while KUL is seen ignored this. The sites under study found to be informative about the library activities while the information services provided through these sites are not remarkable.

4.14. Conclusion

The above analysis based on information collected from the university libraries of the state as well as the representative samples of users of these libraries has revealed the present state of affairs of computer applications in these libraries and its level of reach to the users for whom it is intended and the aspirations and requirements of the users.

Having discussed the state of the art of computerisation in the University Libraries in Kerala along with the responses of the user in this chapter, the major findings of the study as well as certain suggestions for the improvement of the existing facilities are given in the succeeding chapter.

Reference:

1. Kumbar, T S et.al. (2000). **Development of Union databases at INFLIBNET and role of University Libraries.** In *Information Services in a networked world*. Seventh National Convention for Automation of Libraries in Education and Research (CALIBER 2000), Chennai, India, 16 - 18 February 2000, Organized by University of Madras, Chennai and INFLIBNET Centre, Ahmedabad, edited by R Vengan, HR Mohan and KS Raghavan. Ahmedabad: INFLIBNET Centre.. P. 3.43.

CHAPTER 5

SUMMARY OF FINDINGS AND SUGGESTIONS

- ❖ Summary of Findings
- ❖ Tenability of the Hypotheses
- ❖ Suggestions for improving the
computerised University Library System
- ❖ Suggestions of Areas for Further Research

This chapter contains the summary of findings of the Analysis, Tenability of the Hypotheses, Suggestions for improving the computerised University Library System in the state of Kerala and Suggestions on Areas for further Research.

5.1. Summary of Findings

The analysis of the data collected through various sources unveiled a number of findings. They are discussed below:

5.1.1 Library Collections

1. Library collections of University Libraries in Kerala were found mostly print based and the share of digital resources in the collection is very limited. KUL has a total collection of 286155 documents including Books, Bound Volumes of Journals, Theses and Dissertations, Approximately 150 Video Cassettes, 1500 Microfiches, 3000 CDs and 2 DVDs. MGUL has 33379 Books, 2881 Bound volumes of Journals, 428 Theses and Dissertations and 150 CDs. CUSATL has 55882 Books, 20798 Bound Volumes of Journals, 573 Theses and Dissertations, 1891 Patents and 168 CDs. CUL has 89568 Books, 2105 Bound Volumes of Journals, 3005 Theses and Dissertations, Audio and Video Cassettes one each, 250 Microfiches and 140 CDs. The share of digital collection in KUL, MGUL, CUSATL and CUL are only 1.03 per cent, 0.4 per cent, 0.21 per cent and 0.15 per cent respectively of their total collection of documents.

2. KUL has not properly recorded the library collection and even after completion of complete retro-conversion KUL is not able to provide the exact data regarding various types of documents available in the library collections.

5.1.2 Journals

3. KUL subscribes to a total of 294 Journals, MGUL to 269, CUSATL to 220

and CUL to 197 Journals. Out of these, 56 in KUL, 107 in MGUL, 122 in CUSATL and 36 in CUL are foreign Journals and 238 in KUL, 162 in MGUL, 98 in CUSATL and 161 in CUL are Indian Journals.

4. Subscription to online database by the University Libraries in Kerala is awfully less and KUL and MGUL have subscribed to two online databases each while CUSATL and CUL have not subscribed any.

5.1.3 Technical Processing

5. University Libraries in Kerala follow different standards for Technical processing of documents

6. MGUL and CUL follow Dewey Decimal Classification, Anglo American Cataloguing Rules II and Library of Congress Subject Headings that are the standards internationally well accepted for technical processing of documents while KUL follows Colon Classification, Classified Catalogue Code and Chain Indexing which are not in wider use, and CUSATL follows AACR II, for Cataloguing rules and Universal Decimal Classification and Sears List of Subject Headings for classification and assigning subject heading respectively.

5.1.4 Library Services

7. It was found that University Libraries differ on traditional library and information services provided to the users. KUL provide 6, MGUL 8, CUSATL 7 and CUL 5 total number of services to their users. All the University Libraries provide Book Lending, Reference Service and Reprographic Service. None of the libraries provide Content Page Service, Local Indexing/Abstracting Services, Routing of Periodicals and Translation Services. MGUL and CUSATL provide Current Awareness Service, Selective Dissemination of Information, Inter Library Loan Services and User Education Programmes. KUL and CUL provide Circulation of Accession List. Compilation of Bibliographies is provided by KUL, MGUL and CUL.

5.1.5 Utilization of the Library

8. The analysis on frequency of visit by the users, purpose of library visit and time spent on a visit revealed that the academic community uses the University Libraries in Kerala mainly for Study and Research purposes. Majority of the users usually makes regular visit to the library on daily or alternative days. They are heavily depended on their respective libraries for satisfying their information requirements with regard to their higher education purposes.

5.1.6 Financial Assistance

9. There are disparities with regard to financial assistance received for computerisation purposes from various agencies by the University Libraries in Kerala.

10. INFLIBNET provided Rs. 52 Lakhs to KUL and Rs. 6.5 Lakhs each to other three libraries. KUL got Rs. 8 Lakhs while MGUL got Rs. 33 Lakhs and CUL Rs. 10 Lakhs and CUSATL got nil as financial assistance from the State Government annual plan fund for Computerisation purpose.

11. CUSATL got Rs. 2 Crores from MHO project Netherlands while no other library received any such huge amount from external source.

12. Substantial portion of the budget of the University Libraries studied are set apart for staff salary and purchase of books and journals while computer application related aspects are over looked in the university budgets.

13. During the last three financial years, KUL spent an average of 52.89 per cent, MGUL spent 47.45 per cent, CUSATL spent 45.84 per cent and CUL spent 79.98 per cent of their respective budget for their staff salary. KUL, MGUL, CUSATL and CUL spent an average of 21.48 per cent, 38.8 per cent, 50.58 per cent and 8.76 per cent respectively of their budget allocations for

purchase of Books and Journals. On the other hand, for computerisation related matters the allocation of KUL, MGUL, CUSATL and CUL were 0.7 per cent, 8.12 per cent, 4.01 per cent and 5.73 per cent respectively.

14. MGUL and CUSATL have made budgetary provisions for the procurement of computer hardware and software while KUL and CUL have not made any provision towards the procurement of hardware and software. MGUL and CUL have financial provision towards Recurring Charges related with computer applications whereas KUL and CUSATL have not made provision for this.

15. All the libraries except CUSATL have budgetary provision for AMC of Computer Hardware.

16. The meager budgetary provision made for computerisation in the university budgets reveals that the university authorities have not properly taken into consideration the expenditure towards the application of computers in libraries.

5.1.7. Hardware Available

17. All the University Libraries studied found to be having adequate Server Class machines.

18. Large majority of the Computer Nodes available in the University Libraries in Kerala belongs to 486, Pentium I, Pentium II or Celron class machines that are very old and out dated models.

19. Pentium IV machines, the latest in the personal computer series, are not available in CUSATL and CUL. KUL have only 6 and MGUL only 5 Pentium IV computers. This reveals that the University Libraries under study mostly depend on old machines that are error prone and may put limitations on the users in using some of the applications especially in web related applications.

20. Laptop Computer that helps in conducting effective user education programmes both inside as well as outside the library is available only in CUL.

21. LCD projector, which is very essential for conducting effective training programmes and user education programmes is not available in any of the University Library under study.

22. Web Camera, an equipment very much needed during Internet visual communication sessions is not available in any of the University Libraries.

23. Over-Head Scanner that is necessary for high volume digitization work is not available in the University Libraries in Kerala.

24. CUL does not have a CD Server which is very much needed for providing CD based Services.

5.1.8. Software Used

25. All the libraries are using proprietary software. KUL and CUL use Libsys, a costly commercial software, MGUL is using SOUL which is comparatively cheaper, developed and marketed by INFLIBENT and CUSATL uses ADLIB a foreign costly commercial software received as part of the foreign aid to the University. CUSATL only have a web-enabled software.

26. For word processing, spreadsheets and presentation purposes all the University Libraries under study are using Microsoft products.

27. Application of open source software in the University Libraries under study is limited to the use of Linux Operating System in CUL and KUL and Mozilla as well as Netscape Navigator as Internet Browsers in CUL.

28. Digital Library Software is available only in KUL and CUSATL.

29. None of the University Library has Optical Character Recognition software that is needed for conversion of the digitized texts and images.

5.1.9. Manpower

30. Presently CUSATL only have a University Librarian. In other libraries the senior most professional is put in charge of the University Librarian.

31. Only CUSATL and CUL filled the post of Information Scientist sanctioned by UGC. Therefore KUL and MGUL have no qualified persons to look after the computerised activities and Assistant Librarians without any qualification in Computer Science/Application are put in charge of the Computer Sections.

32. University Libraries in Kerala in general are not equipped with adequate number of qualified staff to handle the computerised activities. In KUL, one each of the Assistant Librarian, Reference Assistant and Library Assistant with MA, MLib.Sc. qualifications, one Technical Assistant with MA, MLib.Sc. and Diploma in Computer Applications are working in the Computer Section. In MGUL two Assistant Librarians with MLISc and two Reference Assistants one with MLISc and another with BLISc and PGDCA qualifications are working in the Computer Section. In CUSATL one Information Scientist with M Tech. and in CUL one Information Scientist with MA MLib.Sc, PGDCA and PGDLAN and two Professional Assistants, one with MA BLISc and the other with MLISc are working in the Computer Section.

33. The persons in charge of Computer Sections in KUL, MGUL and CUL have obtained training on various aspects of library computerisation where as the person in charge of Computerisation in CUSATL has not obtained training on any aspects of library computerisation and has not attended any workshop/seminar related with library computerisation.

5.1.10. Areas of Applications of Computers

34. None of the University Library studied is totally computerised. They are yet to computerise some of their operations or services. KUL has not applied computers in Circulation procedure, Digitization of documents, Reference Service, Intra Library communications, Stock Verification, and Financial management. MGUL has not applied computer in Serials Control, Digitization of documents, Reference Service, Intra Library Communications, Stock Verification, and Financial Management. CUSATL has not applied computers in Stock Verification and Financial management and CUL has not applied in Digitization of documents, Reference Service, Intra Library Communications and Financial management.

35. Computerised CAS, SDI and User Education services are provided by MGUL and CUSATL only. Computer assisted Circulation of Accession List, Online database and Full text services and Internet services are provided by all the University Libraries. Multimedia services and CD/DVD based services are provided by all the libraries except CUL. None of the libraries provide Content Page Service. None of the libraries is using Smart Card for member identification, microchips for document identification, totally automated check-in/check-out systems and electronic theft detection systems.

36. Only CUL have computerised stock verification system and using barcodes for feeding the data of documents during stock verification.

37. Most of the modern applications of computers are totally absent in the University Libraries studied.

5.1.11. User Awareness about Computerised Services and its Availability

38. User awareness about various computerised library and information services was found to be very poor.

39. All the computerised services, except the Internet service are not reaching the target users properly. This handicap was reflected in the general awareness about the services also. It means that majority of the computerised services are not properly interpreted to the users. Though MGUL and CUSATL provided user education services, it is revealed that only 22.78 per cent got any orientation in the use of services provided by them. In case of the other two libraries no user education programmes are conducted and there is an urgent need for bringing the services to the notice of the users. But none of the libraries under study possess an LCD Projector. Without such a facility no university library in this era can properly educate the larger community of users about the use of various computerised services provided by them.

5.1.11.1. Current Awareness Service

40. An overall 51.9 per cent of users are aware about CAS. In KUL 50.23 percent, in MGUL 57.21 percent, in CUSATL 59.75 percent and in CUL 41.58 per cent are aware about the service.

41. Majority of the users (51.05%) are not getting the Current Awareness Service where it is provided and KUL and CUL are not providing this service. In MGUL 45.27 per cent and in CUSATL 52.83 per cent only are getting the service.

5.1.11.2. Selective Dissemination of Information

42. Overall 25.36 per cent of awareness was found about this specialized service. In KUL it is 28.37 per cent, in MGUL 27.86 per cent in CUSATL 23.27 per cent and in CUL 21.05 per cent of users only are aware about the service.

43. The service is available to only 18.82 per cent of the users with 19.4 per cent in MGUL and 18.24 per cent in CUSATL

5.1.11.3. Circulation of New Additions List

44. Overall 34.77 per cent of users are aware about the service. In KUL 28.37 per cent, in MGUL 44.28 percent, in CUSATL 38.36 per cent and in CUL 28.95 per cent are aware about the service.

45. Overall availability of the service is 26.93 per cent only. In KUL 19.07 per cent, in MGUL 33.83 per cent, in CUSATL 32.08 per cent and in CUL 24.21 per cent are getting this service.

5.1.11.4. Online Database Service

46. Overall 41.7 per cent of users are aware about Online Database Service. In KUL 41.86 per cent, in MGUL 46.27 per cent, in CUSATL 54.72 per cent and in CUL 25.79 per cent are aware about this service

47. Overall 30.72 per cent of the users are getting the service. In KUL 30.7 per cent, in MGUL 38.81 per cent, in CUSATL 43.40 per cent and in CUL only 11.58 per cent are getting online database services.

5.1.11.5. Online Full Text Services

48. An overall 53.07 per cent of the users are found to be aware about full text services. In KUL 51.63 per cent, in MGUL 69.65 per cent, in CUSATL 55.97 per cent and in CUL 34.74 per cent are aware about the service.

49. Overall availability of the service is 40.39 per cent only with 34.88 per cent in KUL, 61.69 per cent in MGUL, 42.77 per cent in CUSATL and only 22.11 per cent in CUL.

5.1.11.6. CD/DVD Based Services

50. An overall 41.83 per cent awareness about the CD/DVD based service is found among the users. In KUL 42.33 per cent, in MGUL 59.7 per cent, in

CUSATL 43.4 per cent and in CUL 21.05 per cent are aware about this service.

51. The service is reaching only to an overall 33.04 per cent of the users in case of the libraries where it is provided with 20 per cent in KUL, 51.74 percent in MGUL, and 27.04 per cent in CUSATL.

5.1.11.7. Internet Services

52. High rate of awareness of 93.2 per cent were found among the users with 88.84 per cent in KUL, 97.51 per cent in MGUL, 96.23 per cent in CUSATL and 91.05 per cent in CUL.

53. Overall 85.62 per cent of users are found really getting Internet services with 85.58 per cent in KUL, 94.53 per cent in MGUL, 93.08 per cent in CUSATL and 70 per cent in CUL.

5.1.11.8. User Education Services

54. Awareness about User Education services is found as 26.98 per cent in KUL, 31.84 per cent in MGUL, 37.74 per cent in CUSATL and 16.84 per cent in CUL

55. Only 19.9 per cent in MGUL and 26.42 per cent in CUSATL are getting this service.

5.1.12 Computer Application in Various Operations and Services

5.1.12.1 Database Creation

56. All the University Libraries have completed the retrospective conversion of their bibliographical records. Transliteration method is used for records other than in English language. Record structure adheres to ISO 2709 standard.

57. Different standards are used for Classification, Cataloguing and Subject descriptors by the University Libraries studied.

58. The University Libraries studied have taken adequate measures for securing the valuable data by taking backup of the data regularly using reliable medium for data storage.

5.1.12.2. Acquisition Procedures

59. MGUL and CUL have applied computers in almost all the aspects of Acquisition procedures. CUSATL is not using it for Invoice processing and for Budget handling and KUL is not using for Budget handling.

5.1.12.3 Circulation Procedures

60. KUL has not computerised the circulation procedures. All other three University Libraries are using computer for almost all circulation procedures except that CUSATL is not using for overdue calculation.

61. User awareness about the circulation services provided found to be varying among University Libraries. In CUSATL awareness among users about computerised circulation services is low (76.73%) while in CUL it is high (92.11%).

62. All the services that are to be provided under the circulation module such as Issue/Return/Renewal, Reservation, Fine collection and Enquiry are reaching to a minority of 10.28 per cent only. In CUSATL only 7.38 per cent claimed to be getting all the circulation services provided by the library and in MGUL it is 18.82 per cent and in CUL 4.57 per cent only.

63. It is found that majority (44.11%) of the users are getting the Issue/Return/Renewal of documents only under the circulation module.

64. Even after maintaining the traditional practices of circulation procedures as a security measure, users rated the computerised circulation procedure time saving. In MGUL 95.29 per cent, in CUSATL 84.43 per cent and in CUL

91.43 per cent found the present system time saving. A slightly lower rate is recorded in CUSATL due to the fact that the overdue collection is done in CUSATL manually.

65. It was found that the large majority of the users are satisfied with the existing circulation system and they do not want any more addition to this service. In MGUL 6.47 per cent, in CUSATL 13.11 per cent and in CUL 10.29 per cent only responded that they need other computerised circulation services. But a very few, were able to specify what other services are needed by them.

5.1.12.4 Serials Control

66. None of the University Library is found making total utilization of computers in the Serials Control System.

67. In KUL and MGUL the applications in Serials module are too limited. KUL is making use of the module for article indexing only while MGUL is using it for Ordering and making entry of the receipt of the journal. CUSATL is making use of the system for Ordering, making receipt of the journal issue, sending reminders, budget handling, invoice processing, accessioning and Current Awareness Service. CUL is using computers for Ordering, making receipt of the journal issue, sending reminders, budget handling, invoice processing, accessioning, sending for bindery and article indexing. CUSATL is not making use of the system for Routing of periodicals, sending for bindery, article indexing, SDI and check in/check out. CUL is not using Routing, CAS, SDI, and check in/check out. In a nutshell, KUL and MGUL do not make use of the Serials module up to any considerable extent while CUSATL and CUL use it for limited operations.

68. Use of computers in the Serials module in the University Libraries under study is more confined to the housekeeping operations and its use in the

provisions of services to the clientele is found very limited.

5.1.12.5 OPAC

69. It was observed that apart from OPAC, libraries are maintaining the traditional card catalogue also.

70. All the libraries provide access to Books database and MGUL, CUSATL and CUL provide access to Journals and Theses database also. CUSATL provides access to Audio Visual Material database also.

71. All the libraries found providing access points such as Author, Title, Subject and Words in title. Except CUSATL, all others are providing access through class number and publisher. Access through Place of publication is given by CUSATL and CUL only. Access through Series is given by MGUL only. Access through Year of publication is given by CUSATL only. All the libraries provide Boolean search facility and truncation facility. Word proximity search is permitted by only KUL and CUL.

72. No University Library studied entertains reservation of issued out document through OPAC. All the library OPACs entertain knowing the status of the document.

73. OPAC of KUL only permits suggestion of new titles for procurement.

74. Only in CUSATL the OPAC is available over the campus LAN and Internet.

75. KUL has provided a single OPAC terminal to the users while MGUL and CUL have two each and CUSATL has 4 terminals.

76. In MGUL, CUSATL and CUL higher level of awareness about OPAC is found among the users while in KUL the awareness among users about OPAC is 72.09 per cent only.

77. Users from Science subjects are more aware about OPAC than those from Social Science subjects. Teachers are more aware about OPAC compared to Students and Research Scholars.

78. It was found that OPAC is being made use by an overall 82.88 per cent of the users. CUL has the highest rate of OPAC users with 93.68 per cent using it while KUL has the lowest rate of OPAC use with only 61.86 per cent.

79. Compared to Social Science subjects, users from Science subjects are found to be making more use of OPAC.

80. Among the users Teachers are making more use of OPAC followed by the Students and the Research Scholars.

81. It was found that the mostly used access point is the name of the Author and is followed by Title and Subject. Words in title was also found to be made use by many users while the usage of other points are very limited. In general the access points used are not different from that of the traditional card catalogue.

82. None from Researchers found to be using Truncation and Word Proximity Searches. Teachers are also not found to be using Truncation Search.

83. The access points used by Students, Research Scholars and Teachers are almost the same and it was observed that in the traditional catalogue almost the same access points are found used.

84. The peculiar features of electronic catalogue such as Boolean Search, Truncation Search, Word Proximity Search have not been made use by any groups of users to any considerable extent.

85. Users from all the libraries irrespective of subject background and status found to be highly satisfied over the access points provided in the OPAC.

86. It was found that some users only got orientation in the use of OPAC. In MGUL the highest percentage (45.36%) got the orientation while in CUL the lowest percentage (24.16%) got orientation in the use of OPAC.

87. Trial and error method and learning from friends found to be the favourite methods adopted by the users for learning use of OPAC.

88. There are shortages of adequate number of terminals to browse OPAC in the University Libraries studied. In CUL 69.66 per cent, in MGUL 66.67 per cent and in KUL 58.65 per cent and in CUSATL 45.71 per cent of users expressed that they had to wait for their turn to use the OPAC.

5.1.13. INFLIBNET Support

89. All the University Libraries received financial aid from INFLIBNET according to its priorities. KUL, being an old university, got 52 Lakhs Rupees while the other three University Libraries received Rs. 6.5 Lakh each.

90. CUSATL and CUL only have utilized the support provided to appoint Information Scientist.

91. INFLIBNET provided manpower training for library computerisation to all the University Libraries studied.

92. All the libraries have got the UGC Infonet facility with 1 Mbps bandwidth connection and E-Resources are made available to the libraries through this. CUL is yet to make proper utilization of the facility due to shortage of adequate infrastructure.

5.1.13 .1. Participation in INFLIBNET Activities

93. All the University Libraries have contributed their records to the INFLIBNET union catalogue database. Yet a good amount of records are still to be sent by these libraries.

94. All the University Libraries except CUSATL conducted the IRTPLA programme helping library professionals from universities and affiliated colleges to gain knowledge in computerisation and the use of SOUL software.

5.1.14. Network Infrastructure

95. All the University Libraries have a LAN within the library. But only CUSATL and KUL have a campus LAN and the library LAN of CUSATL only is accessible through campus LAN as well as Internet. LANs connected to Internet are protected through Firewall.

96. All the libraries participate in the INFLIBNET while MGUL and CUSATL participate in the DELNET also. MGUL has membership in AIRC (American Information Resource Centre) network also.

97. CUSATL and CUL have Router installed in the library and the library network is protected through firewall implementation.

5.1.15. Internet

98. All the libraries have Internet connection with 1 Mbps bandwidth and are providing Internet services to the academic community.

99. The University Libraries impart training to the users in the use of Internet Services.

100. Provision of terminals for using Internet in the University Libraries is very meager. KUL and CUSATL provide only 12 computer nodes each and

MGUL and CUL provide only 10 computer nodes each to the users of the entire University community. This numbers are too less to meet the demand from users.

101. MGUL, CUSATL and CUL are providing Internet services to Students, Research Scholars and Teachers while KUL provides to the public also.

102. KUL charges fee from users of Internet on hourly basis where as CUL charges on yearly basis. The fee charged by CUL is very high. MGUL and CUSATL do not charge any fee from Internet users.

103. MGUL has got the highest rate (89.05 % of users) of Internet usage followed by CUSATL (84.91%) and KUL (75.81%). CUL has the lowest (53.16%) rate of Internet usage.

104. The users with Science background are found making more use of Internet than those with Social Science background.

105. Almost similar level of usage habit is found among various categories of users and Teachers use Internet services more followed by Research Scholars and Students.

106. In the use of Internet, Browsing, Communication and obtaining E-Resources are found to be the priority of the majority of the users.

107. Users from Science subjects found to be using Internet for serious purposes than those from Social Science subjects.

108. Study and Research were found to be the main purposes of Internet usage among the users of Internet in the University Libraries of Kerala. The majority of Students used Internet for Study purpose and the majority of Research Scholars and Teachers used Internet for Research purpose.

109. Training in the use of Internet services is received by 30 per cent of the users only. Highest percentage of trained users was found in MGUL and the lowest percentage is in CUSATL.
110. Among different status groups of users Research Scholars got the highest rate of training followed by Students and Teachers.
111. The majority of the users are using Internet services without any training in the use of the service.
112. Users from all the Universities have almost same level of satisfaction over getting information from Internet. In KUL 82.82 per cent, in MGUL 87.71 per cent, in CUSATL 84.44 per cent and in CUL 81.19 per cent claimed that they are getting the required information from Internet.
113. Internet users from Science subjects are more satisfied on getting required information from Internet than those from Social Science subjects.
114. Research Scholars are more satisfied with the information they are getting followed by the Students and the Teachers have the least satisfaction.
115. Majority of the users from all the Universities is not satisfied with the speed of the Internet connection.
116. Teachers found to be the most dissatisfied about the speed of the connection followed by Research Scholars and Students.
117. Users from MGUL have the highest satisfaction over the Internet services provided followed by KUL and CUSATL. The users of CUL have the least satisfaction.
118. Satisfaction over the existing Internet facility is more among Social Science people compared to those from Science background.

119. Students are more satisfied with the existing Internet facilities in the University Libraries while Teachers are least satisfied

120. Majority of the users from all the University Libraries demanded adequate number of machines for their use.

121. Science users demanded more E-Resources than the Social Sciences users.

122. The proportion of Teachers who ask for adequate machines are much higher compared to other category of users.

5.1.16 Digitization

123. None of the University Library has seriously started digitization though these libraries have good collection of Theses and Dissertations.

5.1.17. University Websites

124. All the University Libraries studied, except MGUL have their website as part of the University website and only CUSATL have the web OPAC.

125. Websites of the University Libraries are not providing many of the services needed by the users like online renewal of documents borrowed as their computerised systems are not web enabled.

126. University Libraries studied have not taken seriously the need for providing information services through their websites. None of the library provides general services like Reference Service and specialized service like CAS, SDI through Internet.

5.2. Tenability of the Hypotheses

The hypotheses formulated are tested here to verify whether they are proved or not.

Hypothesis 1

“The University Libraries in Kerala have overlooked the need for development of the E-Resources collections”.

This hypothesis has been proved by the findings of the study.

Finding number 1 discloses that the document collections in the University Libraries in Kerala are print oriented and the available digital collection are negligible with only 1.03 per cent, 0.4 per cent, 0.21 per cent and 0.15 per cent in KUL, MGUL, CUSATL and CUL respectively of their total collection of documents. The finding number 4 has revealed that subscription to online database by the University Libraries in Kerala is awfully low and KUL and MGUL have subscribed to only two online databases each while CUSATL and CUL have not subscribed any.

Hypothesis 2

“Computerisation of the University Libraries in Kerala is not being fairly supported in terms of finance”.

This hypothesis has been partially proved.

As per the finding 10 and 11 INFLIBNET provided a financial support of Rs. 6.5 Lakhs each to MGUL, CUSATL and CUL and 52 Lakhs to KUL and CUSATL received an amount of Rs. 2 Crores from abroad for library computerisation. KUL got Rs. 8 Lakhs while MGUL got Rs. 33 Lakhs and CUL Rs. 10 Lakhs and CUSATL got nil as financial assistance from the State Government Annual Plan Fund for Computerisation purpose. In the case of MGUL and CUL in comparison to KUL and CUSATL sufficient fund was not available for computerisation. As per findings 12 and 13 it can also be seen that in the budget of the University Libraries large amounts were set apart for staff salary and purchase of books. Findings 14 to 16 reveals that expenditure on computerisation related aspects are over looked in the university budgets of all the University Libraries.

Hypothesis 3

“University Libraries in Kerala are not adequately equipped with latest hardware and software to provide modern computerised services to their clientele”

This hypothesis has been confirmed.

Findings numbers 18 through 24 have proved that most of the computer nodes available in the University Libraries in Kerala are very old and the models are outdated. All the essential hardware like Web Camera, Over Head Scanners, Laptop Computers, LCD, CD Servers etc. are not available in all the university libraries studied. Finding numbered 37 disclosed that most of the modern applications of computers are totally absent in the University Libraries. Adding to these, finding number 120 has revealed that majority of the users from all the libraries demanded adequate number of machines in working conditions as their requirement with the Internet services. Findings numbers 28 and 29 revealed that Digital Library Software is available only in KUL and CUSATL and none of the University Library under study has Optical Character Recognition software that is needed for digitization purpose.

Hypothesis 4

“University Libraries in Kerala do not have adequate number of qualified and skilled personnel to shoulder the computerisation processes”.

This hypothesis has been confirmed in the light of various findings.

Findings 31 through 33 proved that CUSATL and CUL only have appointed the Information Scientist, the post sanctioned by INFLIBNET to manage the computerisation processes. KUL and MGUL have no qualified persons to manage the computerised activities. Generally the University Libraries in Kerala lack adequate number of qualified staff to handle the computerised

activities. The person in charge of computer sections in CUSATL has not attended any Workshops/Seminars related to the library computerisation.

Hypothesis 5

“University Libraries in Kerala are yet to make computerisation in some of the basic and potential areas including services and operations”.

This hypothesis has been confirmed by the findings of the study.

The findings 34 through 36 have listed the areas where the University Libraries in Kerala have not made use of the computers. Findings 59 and 60 have revealed the areas in the Acquisition procedures and Circulation procedures that are not computerised by University Libraries under study. Findings numbers 66 and 67 have revealed the areas where computers are not used in the Serials control. Finding number 72 has revealed the essential service that is not provided to the users through OPAC. Finding number 123 has revealed that none of the libraries have started digitization of documents and findings numbers 125 and 126 list the shortcomings of the web based services.

Hypothesis 6

“Lack of proper User Education in the University Libraries in Kerala makes the available computerised services under utilized”.

This hypothesis has been proved by the findings.

The finding number 35 establishes that MGUL and CUSATL only are providing user education services. Even in these two universities, as per the finding number 55, only 19.9 per cent in MGUL and 26.42 per cent in CUSATL only have obtained the User Education service. Findings 38 through 51 have revealed that the majority of the users are not getting the service provided by the University Libraries and generally the awareness of users on various modern library and information services are very poor. This is

mainly due to lack of proper user education programmes in the university libraries studied.

Hypothesis 7

“The users of the University Libraries in Kerala are making best use of the OPACs utilizing the full provisions made in the OPACs”.

This hypothesis has been rejected by the findings of the study.

Findings numbers 76 through 81 have revealed that the users are highly aware about the OPAC and are actively using it to locate the required documents from the libraries and according to finding 85 the users are highly satisfied over the access points provided in the OPAC. But the findings 81 to 84 have established that the users are not making use of the special access points provided by the OPAC, they are still making use of the traditional access points. The special features of electronic catalogues such as Boolean search, Truncation Search and Word Proximity searches are not utilized by the users. And many of the users often have to wait for their turn to use the OPAC due to the shortage of terminals. Thus though users are well aware about OPAC and are actively making use of the OPAC, it is not fruitfully utilized in the best manner.

Hypothesis 8

“University Libraries in Kerala lack good computer network infrastructure to extend the services beyond the library premises and the libraries have not utilized Internet to provide modern library and information services”

This hypothesis has been proved by the findings of the study.

Finding number 95 revealed that CUSATL and KUL only have a campus LAN. And the Library LAN of CUSATL is accessible through campus LAN as well as Internet. Findings 124 through 126 revealed that out of the libraries studied only CUSATL have a web OPAC. Even the CUSATL is not providing

general services like Reference Service and specialized services like CAS, SDI through Internet to their clientele.

Hypothesis 9

“The academic community in the universities of the state considers the ‘Internet’ as an important source of information but the University Libraries have not reckon with this and are not supporting them properly”.

In the light of various findings of the study the hypothesis has been proved.

Findings 52 and 53 established that the awareness about Internet services among the academic community is very high and majority of them are fruitfully making use of Internet services provided by the libraries. Findings numbered 103 through 108 proved that majority of the academic community are serious users and using the Internet services mainly for the academic purposes.

Finding number 100 has shown that the provision of terminals for using Internet in the University Libraries is quite inadequate Finding numbered 120 revealed that most of the users from all the libraries demand adequate number of latest machines for the use of Internet. Finding numbered 102 has shown that the fee charged for use of Internet in CUL is very high. Finding number 109 unveiled that training in the use of Internet services is obtained only by 30 per cent of the users. Findings 115 and 116 shown that majority of users, especially Teachers are dissatisfied with the speed of the Internet connection provided by the libraries. All these shows that the University Libraries studied have not properly reacted against the users requirements.

Hypothesis 10

“University Libraries in Kerala have not begun digitization though there are unique and valuable collections that are prone to deterioration”.

This hypothesis has been confirmed by various findings made by the study.

The first finding has revealed that KUL has a good collection of Theses and Dissertations that are very valuable and accumulated through several years while MGUL has collection of 428 Theses and Dissertations and CUSATL and CUL have a Theses and Dissertations collection of 573 and 3005 respectively. Theses and Dissertations are unique sources of information for which the copyright lies with the respective university. Finding number 23 revealed that none of the libraries have Over Head Scanners and finding number 29 revealed that no University Library studied has OCR software that are needed for digitization. Finding number 123 revealed that none of the University Libraries studied here has seriously started digitization though these libraries have good collection of Theses and Dissertations.

5.3. Suggestions for improving the computerised University Library System

On the basis of the findings unveiled by the study certain suggestions are put forwarded here for the improvement of the computerisation process of the University Libraries in Kerala.

1. Collections of the University Libraries should be developed in a balanced manner giving due share to digital resources also. KUL should properly record the collection clearly distinguishing the type of various materials.
2. All the University Libraries should make subscriptions to online journals and databases after ascertaining the requirements of the user community.
3. All the University Libraries in Kerala should follow uniform international standards for the technical processing of the collection as well as for their database creation.
4. Adequate funds should be made available to the University Libraries for procuring necessary hardware and software from time to time and sufficient budgetary provisions on regular basis should be made to

maintain the computerised system.

5. Sufficient number of latest computers should be procured for the use in various Sections as well as for the users to make use of OPAC and Internet. Necessary hardware like LCD, Web Camera, CD Server, Laptop Computers etc. should be procured by all the University Libraries.
6. There should be adequate equipments and tools available for conducting video conferencing among the University Libraries in the state for creating an effective communication channel between the libraries in higher education in the state and a Virtual Private Network should be established through the existing 1 Mbps Leased Line Asianet Internet connection for Resource Sharing among the University Libraries in Kerala.
7. All the University Libraries should procure software capable of meeting the library as well as user requirements. It was observed that all the libraries are facing one or the other problem related with the software they are using. Since all the libraries have almost similar requirements, a cooperative venture should be initiated to develop software for the use of all the University Libraries in the state. Open sources should be utilized to the maximum possible extent.
8. KUL and MGUL should take steps to appoint qualified professionals to manage the computerised library system and adequate training on periodic basis should be imparted to the staff of all the universities working in the computer section so that they are able to cope with the tremendous changes taking place in the field of Information Technology. Library services are becoming more net based now days and library professionals should be trained in the development and use of net-based services and digital library applications.
9. All the University Libraries should provide computerised User Education Programmes, Current Awareness Service, Selective

Dissemination of Information, Reference Service, Content Page Service, Multi Media Service and CD/DVD based service.

10. All the University Libraries should make computer application in all the areas in Acquisition procedures, Technical processing, Serials Control, Circulation procedures and Stock verification to the maximum possible extent.
11. All the library and information services should be re evaluated so as to automate them properly so that users are able to get the service without much staff intervention. Totally automated systems like self check-in/check-out should be introduced.
12. User Education on regular basis should be conducted with the help of computers to properly interpret the IT based services to the users. Adequate facilities like an air-conditioned hall with sufficient seating capacity and sound and light arrangements should be provided for presentation purposes. The equipments should include multimedia computers, LCD Projectors and library network as well as Internet connections. Proper user education programmes have to be chalked out, presentation packages with multimedia support should be prepared and demonstrated to the users and comprehensive brochures and hand outs should be given to the users at the time of membership registration in the library and at the time of conducting user education programmes. The graphical user interface features may enable the users of Internet to navigate through many areas in the net. But to fetch the appropriate information the Internet user need to be familiar with various tools and techniques and they need to know the pattern adopted by different leading websites in storing their valuable information. So Database and E Journal vendors should be invited to interpret the usage of their respective products properly to the users.
13. All the University Libraries in the state should make available their complete bibliographical records to the Union Database hosted by

INFLIBENT. The University Libraries should promote information services provided by INFLIBNET like Document Delivery Service.

14. MGUL and CUL should take initiative to establish a campus LAN in the respective university campuses and all the University Libraries should make their information services available over the Intranet and Internet and their computerised library system should be made web enabled so as to enable the users to make online renewal, reservation of documents etc.
15. The University Library websites should provide information services like CAS and SDI to the users. Similarly old question papers and syllabi of various courses conducted by the respective university should be made available through the websites.
16. All the University Libraries should procure necessary hardware and software like Over Head Scanner and OCR software for digitizing their potential collection.
17. A consortia of the University Libraries in the state should be formed so as to mutually benefit in the collection development, provision of information, manpower development etc.

5.4 Suggestions of Areas for Further Research

While conducting the study on the present state of computerisation of University Libraries in Kerala, the investigator could identify certain areas for further detailed study. They are briefly elaborated as following:

1. This work has made an attempt to map the computerisation scenario of the University Libraries in the state in a wider canvass and has not gone to the depth of many aspects. In-depth studies should be conducted on various aspects like user requirements and the available infrastructure like hardware, software and physical facilities. Infrastructure should be in tune with the user as well as library requirements. Similarly the user perceptions about various services

need to be examined in the light of the latest technological changes. Special requirements of disabled users may be studied in relation with the facilities and services available to them.

2. The potential areas of application of Open Sources Software in tune with the user and library requirements should be identified and implemented. This has greater relevance in the academic libraries like School, College and University libraries of the state where large amounts are not available for buying proprietary software and for their annual maintenance.
3. Manpower requirements of the profession in the changing IT environment need to be studied properly and concrete suggestions need to be put forwarded for improvement of the existing curricula of Schools of Library and Information Science so as to create a new breed of Information Professionals capable of shouldering the challenging professional requirements of the new era.

5.5 Conclusion

It is hoped that the present study has provided for understanding the computerisation scenario in the University Libraries in Kerala, with respect to its coverage and limitations. Any automated system has a life cycle and it is to be re analysed after the system has been put in to use for certain period and if any short comings are found they are to be rectified and the system is to be redesigned to solve the lacunas in it. It is believed that the assessment made here, a little earlier though, on the level of reach of various computerised services to the targeted users will enable the University Libraries in the state to review the process and re design it in to a form that is more user oriented and contributory to the widening of the horizon of the knowledge.

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APPENDICES

Appendix I

QUESTIONNAIRE

(To the Person in charge of the Library)

This questionnaire is intended to collect data regarding the computerisation of University Libraries in Kerala in connection with a research undertaken by me under the guidance of Prof. M Bavakutty. I seek your valuable co-operation and help in obtaining necessary information. I request you to kindly fill up the questionnaire with care and accuracy.

MUHAMMED SALIH T.K.
CHMK LIBRARY
UNIVERSITY OF CALICUT

PART I

A. General

1. Name of the University:
2. Year of establishment of the University:
3. Address of the University:
4. URL of the University:
5. Name of the University Library:
6. URL of the University Library, if any:
7. Year of establishment of the University Library:
8. Name of the Person holding charge of the University Library:
9. Designation:

B. Library Collections (Please specify the collections as on 31/3/2004)

Type of document	Number	Type of document	Number
Books/Monographs		Audio Cassettes	
Bound Vol. of Journals		Video Cassettes	
Theses		Microfiches	
Dissertations		CDs	
Reports		DVDs	
Patents		Any other (please specify)	
Standards			

Number of Journals subscribed:		Journals received as Gift :	
Foreign Journals		Indian Journals	
Online databases subscribed			

C. Membership (Please specify categories of membership and the total numbers)

Category	Number	Category	Number
Under graduates		Public	
Post Graduates		Others (please specify)	
Researchers			
Teachers			
Non teaching staff		Total	

D. Technical Processing of documents

1. Classification Scheme used (with Edition) a). CC b).UDC
 c). DDC d). Any other (specify)

Are you satisfied with the Classification Scheme followed? Yes/No
 If no, what standard would you prefer instead:

2. Cataloguing Rules (with Edition) followed: a). CCC
 b).AACR c). Any other (please specify):

Are you satisfied with the existing Cataloguing Rules followed? Yes/No
 If no, what standard would you prefer instead:

3. Standard used for assigning Keywords:
 a). Chain Procedure b). Sear's List c). LC Subject Headings
 d). Any other (please specify):

Are you satisfied with the existing standard for keywords? Yes/No
 If no, what standard would you prefer instead:

E. Library and Information Services

Please ✓ mark the Library and Information services provided by your library

Book Lending	Y	N	Inter Library Loan	Y	N
Reprographic Services	Y	N	Reference service	Y	N
Selective Dissemination of Information	Y	N	Current Awareness Service	Y	N
Circuiation of Accession List	Y	N	Routing of Periodicals	Y	N
Content page service	Y	N	User Education	Y	N
Compilation of Bibliographies	Y	N	Translation Services	Y	N
Local abstracting/indexing service	Y	N	Other (Specify)	Y	

F. Staff Strength

1. Professional

Designation	No. of persons	Designation	No. of persons
Deputy Librarian		Junior Librarian	
Asst Librarian Sr Scale		Reference Assistant	
Asst Librarian Sel Grade		Professional Assistant Gr	
Asst Librarian		Professional Assistant Gr	
Assistant Librarian Gr I		Technical Assistant	
Assistant Librarian Gr II		Library Assistant	

2. Non Professionals

Designation	No. of persons	Designation	No. of persons
Library Assistant		Peons	
Attender			

PART II

A. General

- Please specify the status of computerisation of your library:
 a). Fully computerized b). Partially computerised c). Not computerized
- How long you have been using computers in your library? :.....yearsmonths
- What are the application softwares used in your library? (Please specify along with the platform on which it is used)

Items	Name of the Software	Platform
Housekeeping operation		
Word Processing		
Spreadsheets		
Presentation Softwares		
DTP		
Digital Library software		
OCR (Optical Character Recognition)		
Any Other		

- Is Your computerised library system web enabled? Yes/No
- Please specify the areas of application of computer in your library (Please ✓ mark)

a). Database creation	<input type="checkbox"/>	b). Information Retrieval	<input type="checkbox"/>
c). Circulation Procedures	<input type="checkbox"/>	d). Acquisition Procedures	<input type="checkbox"/>
e). Serials Control	<input type="checkbox"/>	f). Cataloguing	<input type="checkbox"/>
g). OPAC	<input type="checkbox"/>	h). Digitization of documents	<input type="checkbox"/>
i). Reference services	<input type="checkbox"/>	j). Inter Office communication	<input type="checkbox"/>
k) Intra Library Communication	<input type="checkbox"/>	l). Financial Management	<input type="checkbox"/>
m) Office file works	<input type="checkbox"/>	n) Stock Verification	<input type="checkbox"/>
o). Other (Please specify):			
- Did your library conduct a formal system analysis prior to the computerisation? Yes/No

7. Do you get support from INFLIBNET for computerisation? Yes/No
 8. Does the library professionals from your library got training from INFLIBNET? Yes/No
 If yes, How many persons were trained by INFLIBNET? Please give the number:

Type of training received (please specify the name of the training programme and its period)

Name of training programme	No. of persons	Duration

- 9). Please provide the number of bibliographical records sent to the INFLIBNET database
 a). Books: b). Serials: c). Theses:
 d). Any Other (please specify):
- 10). Do you come under the UGC Infonet Project? Yes/No
 If Yes, please ✓ mark the mode of connectivity?
 a). SCPC VSAT Link b). Radio Link c). Leased Line
 d). Any Other (Please specify)
- 11). Which is the service providing agency? Please ✓ mark
 a). ERNET b). Asianet c). Others specify:
- 12). What is the bandwidth of the connection?
- 13). How many machines are provided to access the Infonet in the Library?
- 14). Have you extended the Infonet connection to outside the library? Yes/No
- 15). Please specify the category of users getting the Infonet service?
 a). Student b). Research Scholar c). Teacher
 d). Non-teaching staff e). Others (please specify):
- 16). Do you charge any fee from the users for the use of Infonet
 If yes kindly give the fee structure:

Category	Amount	Duration
Teachers		
Research Scholars		
Students		
Others(Please specify)		

B. Database Creation

- 1). Have you done retrospective conversion of the bibliographic items in your library? Yes/No
- 2). Number of records converted so far:
- 3). Please ✓ mark the appropriate data source used for conversion
 a). Accession Register b). Catalogue Cards
 c). Data input sheets d). From databases in CDs
 e). Databases of other institutions f). Direct from document
 g). Any other (Please specify)
- 4). Please ✓ mark the nature of database creation
 a). In-house b). By external agency
- 5). If in-house, by whom the database is created? (Please ✓ mark)
 a). Staff members b). Data entry operators

- 6). Please specify the number of persons engaged in the database creation:
- 7). What method you have adopted for data entry of documents in languages other than English?
- a). Transliteration b). Using GIST cards
- c). Any other method (Please specify) :.....
- 8). Please ✓ mark the duration taken for database creation
- a). Up to six months b). 6 months to one year
- c). One year to two years d). More than two years
- 9). Have you taken in to consideration any national or international standards in database creation? Yes/No
- If yes, specify the standard:
- a). ISO 2709 b). CCF c). UNIMARC
- d). Any other (specify).....
- 10). Classification Scheme followed in the database:
- a). DDC b). CC c). UDC
- d). LC e). Any other (Please Specify)
- 11). Cataloguing Rules followed in the database:
- a). AACR I b). AACR II c). CCC
- d). Any other (Please specify)
- 12). Standard used for assigning key words in the database
- a). LC Subject Headings b). Sear's List c). Chain Indexing
- d). Any other (Please specify)
- 13). How often you take the back up of your database? :
- a). Daily b). Once in two days c). Weekly
- d). Fortnightly e). Any other (Specify)
- 14). What is the medium used for taking backup?
- a). Cartridge b). DAT Drive c). CD
- d). Harddisc e). Any other (Please Specify):.....
- 15). Do you have any automatic backup mechanism like mirroring of hard disc? Yes/No
- If yes, Please specify:
- 16). Do you have a standby Server to use during emergency? Yes/No

C. Acquisition Module

Please ✓ mark areas of application

- a). Duplication Checking b). Ordering c). Receipt of Document
- d). Accessioning e). Invoice Processing f). Budget Handling
- g). Any other areas (Please specify)

- 1). Do you use Internet as an aid in your Acquisition work

D. Circulation Module

Please ✓ mark areas of application

- a). Membership Management b). Check out/Check in
- c). Renewal d). Reservation of documents
- e). Renewal f). Fine collection
- g). Sending reminders

- 1). Do you use barcode facility for check in/check out operations? Yes/No

E. Serials Control

Please ✓ mark areas of application

- | | | | |
|--|--------------------------|-------------------------------|--------------------------|
| a). Ordering | <input type="checkbox"/> | b). Receipt | <input type="checkbox"/> |
| c). Reminders | <input type="checkbox"/> | d). Budget Handling | <input type="checkbox"/> |
| e). Invoice Processing | <input type="checkbox"/> | f). Routing | <input type="checkbox"/> |
| g). Sending for Bindery | <input type="checkbox"/> | h). Accessioning | <input type="checkbox"/> |
| i). Article Indexing | <input type="checkbox"/> | j). Current Awareness Service | <input type="checkbox"/> |
| k). Selective Dissemination of Information | <input type="checkbox"/> | l). Check in/Check out | <input type="checkbox"/> |
- 1). Do you use Internet as an aid in your Serials Control work

F. OPAC (Online Public Access Catalogue)

1). Please specify the number of terminals provided for users to browse OPAC:

2). Access points provided in the OPAC (Please ✓ mark)

- | | | | | | |
|----------------|--------------------------|--------------------|--------------------------|--------------------------------------|--------------------------|
| a). Author | <input type="checkbox"/> | b). Title | <input type="checkbox"/> | c). Words in Title | <input type="checkbox"/> |
| d). Subject | <input type="checkbox"/> | e). Class Number | <input type="checkbox"/> | f). Place | <input type="checkbox"/> |
| g). Publisher | <input type="checkbox"/> | h). Series | <input type="checkbox"/> | i). Boolean search | <input type="checkbox"/> |
| j). Truncation | <input type="checkbox"/> | k). Word Proximity | <input type="checkbox"/> | l). Any other (Please specify) | |

3. Have you given the provision for members to suggest new titles for procurement through OPAC? Yes/No
4. Is there a provision in OPAC to know the status (like on the shelf, issued out, in bindery etc.) of a particular document? Yes/No
5. Is the OPAC accessible over the campus LAN? Yes/No
6. Is the OPAC accessible over Internet (webOPAC)? Yes/No

G). Other Services and Operations Using Computers

Please ✓ mark your option regarding services provided and operations carried out using computers

Services	
Current Awareness Services	Yes/No
SDI Service	Yes/No
Circulation of New Additions List	Yes/No
Content Page Service	Yes/No
Multimedia Service	Yes/No
Internet Services	Yes/No
CDROM/DVD Based Service	Yes/No
Online Full Text Service	Yes/No
Online database services	Yes/No
User Education programmes	Yes/No
Operations	
Computerised stock verification	Yes/No
Bar code for stock verification	Yes/No
Smart Card for member identification	Yes/No
Microchips for document identification	Yes/No
Totally automated check in/Check out	Yes/No
Electronic theft detection systems	Yes/No

H). Networks

- 1). Do you have a Local Area Network in your library? Yes/No
If yes what is the physical medium of transmission
 a) UTP Cable b) Coaxial cable c) OFC d) Wireless e) Other specify
- Please specify the baud rate of the medium of transmission
- 2). Do you have a Campus LAN in your University? Yes/No
- 3). Do you have link with any regional, national or international networks? Yes/No
If yes, please specify the names of the network you participate
 a). INFLIBNET b). DELNET c). OTHER (Please specify):
- 4). Do you use email facility for communication between various sections? Yes/No
- 5). Do you use email facility for communication with other offices and libraries? Yes/No
- 6). Do you have Router? Yes/No
If yes, have you configured it to protect your database? Yes/No
- 7). Have you implemented Firewall for protection of your databases Yes/No
If yes, how you have implemented it?
- a). Through hardware b). Through software

I Internet Facility

1). Please ✓ mark the type of Internet connectivity you have and specify the bandwidth

ISP	PSTN Dial up	ISDN Dial up	VSAT	Leased Line	Radio Link	Bandwidth
BSNL						
ERNET						
NICNET						
Dishnet						
Asianet						
Satyam onl						
Others Pl. specify						

- 2). How many terminals are provided for the users? Specify the number :.....
- 3). Please ✓ mark the type of services provided?
 a). Browsing b). Email only c). Database Access
 d). Full text access e). Other (Please specify)
- 4). Please specify the category of members who are given the facility
 a). Students b). Research Scholars c). Teachers
 d). Others (Please specify)
- 5). Do you charge any fee from the users of Internet? Yes/No
If yes, Kindly give the present fee structure for various category of users:

30

J. Digitization of Documents

- 1). Have you identified the collection for digitization? Yes/No
 If yes, please ✓ mark the collections you have selected for digitization

Theses		Manuscripts		Books	
Dissertations		Pamphlets		Reports	
Question Papers		Syllabus			

- 2). Have you digitized any of the library collection? Yes/No
 If yes, Please specify the number of various collections you have digitized so far

Collection	Number	Collection	Number	Collection	Number
Theses		Manuscripts		Books	
Dissertations		Pamphlets		Reports	
Question Papers		Syllabus		Other (specify)	

K. Sources of Finance

- 1). Sources of Finance for the Library (Please ✓ mark)
 a). Govt. b). UGC c). Endowment d). Any other (Specify).....
- 2). Please specify the sources of finance received for Computerisation of the Library

Name of the Agency	Amount	Year
INFLIBNET, UGC		
State Govt.		
Endowment		
Any other (Specify)		

- 3). Please specify the amount allocated for various purposes in the Library budget for the last three financial years (2001-02, 2002-03, 2003-04)

Purpose	2002-03	2003-04	2004-05
Total amount allotted for the library			
Staff Salary			
Books and Journals			
Online subscription (journals, databases etc.)			
Procurement of Computer Hardware and Software			
Recurring charges like Internet subscription			
AMC charges for Hardware			
AMC charges for software			

- 4). Do you find the funds available sufficient for the computerisation process Yes/No.

L. Personnel Engaged in the Library Computerisation

Designation	Qualifications (General)	Qualification in Computer Science

M. Hardware Available (Please provide the number of computers and other equipments available in your library in the space provided below. Please use a separate sheet if necessary)

Item	No.	Item	No.
Server Class machines		Flat Bed Scanners	
Laptop Computers		Over Head Scanners	
Pentium I		Barcode Scanners	
Pentium II		Modems	
Pentium III		Hubs	
Pentium IV		Switches	
Celron		Router	
Dot Matrix Printers		LCD Projector	
Inkjet Printers		Web Camera	
Laser Printers		UPS	
Heavy Duty Network Printer		Other items specify	
CD Server			
CD ROM Tower			
Systems with DVD Drives			
Barcode Printer			

Date:

Signature:

Appendix II

QUESTIONNAIRE

(To the Person in charge of the Computer Section of the Library)

This questionnaire is intended to collect data regarding the computerisation of University Libraries in Kerala in connection with a research undertaken by me under the guidance of Prof. M Bavakutty. I seek your valuable co-operation and help in obtaining necessary information. I request you to kindly fill up the questionnaire with care and accuracy.

MUHAMMED SALIH T.K.
CHMK LIBRARY
UNIVERSITY OF CALICUT

- 1). Name of the Person:
- 2). Designation:
- 3). Qualifications in general:
- 4). Qualifications in Computer Science:
- 5). Date of joining the service:
- 6). Scale of Pay:
- 7). Training obtained in Computer Applications in Libraries

Training Programme	Agency	Duration	Course content

- 8). Do you get guidance from your superior(s) regarding your work Yes/No
- 9). Do you get enough encouragement from your superior officers Yes/No
- 10). Do you get assistance from your colleagues in your work Yes/No
- 11). Do you communicate with your counterparts in other Universities Yes/No
- 12). Do you share your problems with other people in the profession elsewhere Yes/No
- 13). Do you attend any Conference/Seminar/Workshop/User group meet? Yes/No

If yes specify the events you have attended:

Event	Topic	Place	Year

- 14). Do you get any valuable information/suggestions in improving your work through such participation Yes/No
- 15). Do you have enough systems and peripherals to support your work? Yes/No
- 16). Do you have enough manuals and reference sources to support your work? Yes/No
- 17). Do you get immediate attention from vendors or service contractors? Yes/No
- 18). Do you have enough freedom to incorporate your own ideas in to your work? Yes/No
- 19). Are you provided with enough physical facility to work? Yes/No

If no, please mention further facilities required:

.....

20). Please ✓ mark your duties and responsibilities as the chief person in the Computer Section

Over all Management of the Section		Communicating with Vendors	
Database Administration		Planning future Programmes/Services	
Training the Library Staff		File Works	
Training the Users		Hardware Maintenance	
Software Development		Software Maintenance	
Providing Services to Users		Network Management	
Any Other (specify)			

Date:

Signature

Appendix III

QUESTIONNAIRE (To the users of the Library)

This questionnaire is intended to collect data regarding the computerisation of University Libraries in Kerala in connection with a research undertaken by me under the guidance of Prof. M Bavakutty. I seek your valuable co-operation and help in obtaining necessary information. I request you to kindly fill up the questionnaire with care and accuracy.

MUHAMMED SALIH T.K.
CHMK LIBRARY
UNIVERSITY OF CALICUT

SECTION A

- 1). Name:
- 2). Type of membership you have in library (Please ✓ mark):

a). Student	<input type="checkbox"/>	b). Research Scholar	<input type="checkbox"/>	c). Teacher	<input type="checkbox"/>
-------------	--------------------------	----------------------	--------------------------	-------------	--------------------------
- 3). Faculty of Study/Teaching:

a). Science	<input type="checkbox"/>	b). Social Science	<input type="checkbox"/>
-------------	--------------------------	--------------------	--------------------------
- 4). Purpose of Library use (Please ✓ mark):

a). Study	<input type="checkbox"/>	b). Research	<input type="checkbox"/>	c). Official	<input type="checkbox"/>
d). Recreational	<input type="checkbox"/>	e). Any Other (Please specify):.....			
- 5). Frequency of library visit (Please ✓ mark):

a). Daily	<input type="checkbox"/>	b). Alternative days	<input type="checkbox"/>	c). Once in three days	<input type="checkbox"/>
d). Once in a week	<input type="checkbox"/>	e). Rarely	<input type="checkbox"/>		
- 6). Average time spent in the library on a visit (Please ✓ mark):

a). Less than 30 minutes	<input type="checkbox"/>	b). Between 30 minutes and 2 hours	<input type="checkbox"/>
c). Between 2 and 5 hours	<input type="checkbox"/>	d). More than 5 hours	<input type="checkbox"/>

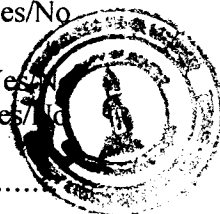
SECTION B

Are you aware of the following **Computer aided Library and Information Services** and please ✓ mark to indicate whether you get this service from your library or not.

Computer aided Services	Are you aware about this service?	Do you get this Service?
Current Awareness Service	Yes/No	Yes/No
Selective Dissemination of Information	Yes/No	Yes/No
Circulation of New Additions List	Yes/No	Yes/No
Online Database Services	Yes/No	Yes/No
Online Full Text (E – Journals)	Yes/No	Yes/No
CD ROM / DVD based Services	Yes/No	Yes/No
Internet Services	Yes/No	Yes/No
User Education	Yes/No	Yes/No

SECTION C

- 1). Do you have a online catalogue in your library? Yes/No
If yes, What are the access points through which you search?
a). Author b). Title c). Words in Title d). Subject
e). Class Number f). Place g). Publisher h). Series
i). Boolean search j). Truncation k). Word Proximity
l). Any other (Please specify)
- 2). Do you find the access points provided sufficient? Yes/No
If no, what other access points you need? Please specify:
- 3). Did you get any orientation in the use of Online catalogue? Yes/No
If no, how did you come to know about searching techniques/strategies in the online catalogue (Please mark)
a). Through trail and error b). By observing others browse the catalogue
c). From your friends d). Any other (Please specify):
- 4). Do you spend time waiting (while some one is making search) for searching the online catalogue? Yes/No
- 5). Do you get computerized book circulation facilities? Yes/No
If yes, what are services available?(please mark)
a). Issue/Return b). Document Reservation
c). Fine Collection d). Enquiry
e). Any other (Please specify):
- 6). Do you find the computer based circulation procedure time saving ? Yes/No
- 7). Do you feel the need for any other computer based circulation services? Yes/No
If yes, Please specify
- 8). Do you use Internet facility in your library? Yes/No
If yes, Please indicate the services you use in Internet
a). Web browsing b). Email c). Chatting
d). Newsgroups e). Discussion Groups f). Searching Databases
g). Accessing E Journals h). Accessing Reference sources
i). To access the Catalogues and databases of other libraries
j). Other purposes Please specify:
- 9). Please specify the purposes of your Internet usage
a). Study b). Research c). To collect general information
d). Recreational e). Communication
f). Any Other (please specify):.....
- 10). Have you got any formal training in the use of Internet facility? Yes/No
- 11). Do you receive required information through Internet? Yes/No
- 12). Do you find the speed of the Internet connection sufficient to meet your requirements? Yes/No
- 13). Do you find the Internet services provided by the library sufficient? Yes/No
If no, what else you expect with regard to Internet facility? Please specify:
.....
.....
.....
.....



Date:

Signature

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