CHAPTER 4
INFLUENCE OF INFORMATION TECHNOLOGY ON LIBRARY AUTOMATION AND NETWORKING
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4.1 Introduction

The developmental changes in information technology appeared in material and techniques used for recording, storing, processing and communication. The automation and modernization of a library can be effectively done with the help of information technology. It is because today libraries are not only store-houses of documents but they also actively carry out the function of dissemination of information. Information technology is now being used also for information retrieval, database management system activities, networking and management information system. Information technology involves acquisition, storage, processing and dissemination of information. It has proved to be highly beneficial to the user community.

This chapter includes the discussion on history of library automation, steps and areas of automation, internet application in college libraries as well as the development of library network in India. It also deals with the application of recent technologies like Wi-Fi and RFID, the changes observed in library services and administration after the advent of information technology. The chapter tackles the issue of empowerment of library staff and users.

4.2 History and Purpose of Library Automation

The term “library automation” implies use of computers in library work including various services. The development of library automation started in 1930 when Herman Hollerith of U.S. Census bureau invented punch card technology and it was implemented in library circulation and
acquisition. Dr. Ralph H. Parkar in 1935 created a circulation control system at the university of Texas at Austin. He used Hollerith punch card or IBM punch card equipments. In 1950, the library of congress created a book catalogue using punched cards. In the same decade, Dr. H.P. Luhn had organized computerized indexes. The first trend of library automation was observed in 1960 in US for creating bibliographic databases as library catalogues. The American Chemical Society published its "Chemical Titles" with the help of computers in April 1960. Online computer library centre (OCLC) was started in 1967.

Library of Congress between 1966 to 1968 began MARC I project followed by MARC II. During 1970 Research Libraries Information Network (RLIN) and Washington Library Network (WLN) was started. In 1974 National Information Standards Organizations accepted the MARC II format. There are two similar projects intended to produce machine readable catalogues viz; MEDLARS (Medical Literature Analysis and Retrieval System) and INTREX (Information Transfer Experiment). The rapid advancement in computerisation was observed in 1980 due to low cost microcomputers and its easy availability in library. In this decade a range of library automation packages also came in the market. In the late 1980 CD-ROM, have changed the way of library operations. Availability of databases, software and information on CD-ROM made the access of information easy and fast. In 1990, due to rise of computer networking libraries also started internet and World Wide Web on a large scale to access library and information services. In the same period hardware, specific automation packages with Web interface also came into market. In the new millennium every library has either planed or implemented automation in its activities and services.
Computerised or OPAC catalogue, link to computer network provided efficient and exhaustive information services. The latest technology like bar code technology and RFID technology security are also pertaining their application in library systems.

In Indian scenario, the use of computer was observed in 1950’s. The Indian Statistical Institute, Kolkatta firstly installed a computer system in 1955. The application of computer for library work was done by “Indian Science Abstract” in 1965. The INSDOC brought out the first Union Catalogue with the help of computers. In 1970’s most of the libraries in India started preparing computerized databases. Due to reduction in the prices of computer hardware and software, it was popularly used in Indian libraries.

The library automation is important in order to provide the right information to right person in right manner at right time. Library is not an economic entity; therefore the benefit of library automation should be looked in a different perspective. From user point of view, searching any field, fast retrieval and printing the required information can easily be done if library cataloguing system is automated using MARC standard format. By minimising the intervention of human activities and maximising the use of latest technology, time, stationery and space can be saved. The efficiency and productivity of library staff can be increased with the advent of automation. Long term management of library and control on library resources is possible by automising the regular house-keeping operations. The efficiency of inventory projects can significantly be increased by using new and innovative bar code technology and RFID technology. The access to external information through internet via TCP/IP based telecommunication network is also possible.
4.3 Steps in Library Automation

Since automation is used as a means to achieve overall better patron service, every library automation project must have a systematic and scientific approach. Every library automation project will be certainly sustainable if it follows the stepwise procedure. The broad steps in library automation are planning, implementation and evaluation.

4.3.1 Planning

It is a first and foremost important step in designing a new library system. Before starting designing of new library system it is necessary to study the existing system. On studying the existing system in detail one will get the idea about repetitive process requiring large amount of staff time, the difficulties in managing and retrieving the information, the services placing the biggest load on staff etc. For each of the above issues one must determine current work flow patterns and procedures, requirement of space and equipment, volume of activity, cost, current problems and need, priority of services, requirement of hardware, software and telecommunication, startup and recurring cost of automation as well as budget for automation. On the basis of above study it is possible to have knowledge about technical, operational and economical feasibility. The feasibility of automation depends upon the size of the library. If automation system is big enough then it is suggested to hire a consultant. The help and service of consultant will be useful in planning the process for defining the problem which is to be addressed through automation, assessment of existing system, determining the need of staff, idea about financial resources, to prepare project budget, technical assistance, system evaluation, negotiation and contract with vendor.
The collaborative venture with consultant will lead to the up to date development of bibliographic database. This development will cover acquisition and method of acquisition, inventory collection, arrangement of title, uniform standardise cataloguing practice, selection of vendor, monthly circulation and acquisition rate, number of patron and type of patron. The planning of automation system also covers time line or duration. Duration should be further break up in to the activities like system selection, retrospective conversion, weeding of collection, acquisition of computer hardware and installation. After successful installation system the library staff member should be made comfortable with new system by providing complete and upto date technical and operational training.

After successful installation of the system and well trained staff, system is ready for implementation in the external environment.

4.3.2 Implementation

Implementation of a new system is a challenging task, which varies from library planning, priority and the nature of library software and hardware. While implementation due consideration should be given to transition process. The process of changing from old system to new is referred as “transition process”. There are various methods for transition. Complete conversion of old library system to a new system within a short period is called direct conversion. This conversion method is risky because there are no alternative to resolve the serious problems if occurred. The best and safest alternative is parallel conversion in which both existing and new system are operated parallel. It is a costly affair. Many times, due to cost consideration it is not possible to install the system at once. In such a situation phase wise conversion or automation
is recommended. In general to reduce the cost and safeguard the system pilot conversion is preferred. There are three basic elements to be considered for successful transition. These are creating database of books in MARC format, creating patron database and training of staff.

The library responsibility during implementation steps includes provision of staff with proper qualification, site preparation, bench mark test, performance test and check-up of the system being installed, getting testing report, choice of conversion procedure and validation of database. During planning as well as implementation step reliability of vendor should be judged for the successful regular operation and life of the system. Time to time maintenance is very important and therefore reliability of vendor be judged in term of hardware software quality and after sales service.

4.3.3 Evaluation

Every library automation system must be evaluated in following sub system:

1. Cataloguing

Evaluation should ensure that the product is as per the specification complaining, formatting and cataloguing rule. In system provision should be for batch adding, editing, and deleting of record of MARC 21 format, provision for unlimited number of circulation types, proper authority control, online guide and validation, detection of cataloguing errors, provision of rebuilt indexes and full password protection.

2. Bar code

Bar codes are series of black and white bar arranged in a predefined form to represent known coded information these codes can be
read by a machine and processed by a computer without the risk of human error. Bar code uses symbology i.e. language use to represent the code in machine readable form. The spaces of varying width is called bar code symbol.

The major benefit acquired from bar code are improved efficiency in handling the records, reducing error in circulation, unique identification, updation and online inventory management. The objective of excellence through machine is very well satisfied by bar code. It also helps to satisfy the need for economy in the present time of shrinking budget and reducing manpower.

3. OPAC

It must clearly distinguish and describe the fields that can add and can not be index. OPAC should be accessible to audio, graphic and video information stored in local environment.

4. Search and Display

System should be simple and advanced and it should be supported with boolean and phrase search. Capability of hyper search on subject, notes and other fields is the essential feature of the system. Truncation and wild card searching should be possible. Date, language or document type search may be limited to storage of search result.

5. Web OPAC

System should have context sensitive online help, truncation, MARC display, shelf list browse, previous search execution, title holdings, hyperlink to author, subject and keywords.
6. Circulation

Shelf checkout facility to user, circulation software must be integrated with OPAC authorisation check, ability to set number of renewal and creation of borrower card.

7. Reports

Reports may be exported to word processor for necessary edition, report of patron notice for overdue, report of monthly uses statistic, reports on books on order and printing of due date slip.

8. Inventory

The system should be able to manage inventory on the whole collection or part of the collection. The system should be operational even though inventory is on-going, automatic reset of inventory marker to initialise the inventory process, ability to finalise inventory automatically and set all uncounted items to a states of missing with detailed data.

4.4 Library House-keeping Operations

The functions or activities that are to be performed in the library so that library may fulfill its goal of services to the users community are called house-keeping operations viz; selection of books, order of books and reception of the books which enable a library to add useful books in the collection. The various house-keeping operations are grouped into six categories; namely acquisition, classification, cataloguing, circulation, serial control and stock verification. This section deals with the details of these house-keeping operations.
4.4.1 Acquisition

Acquisition is the most important function in the quantitative and qualitative development of any library. During the process of acquisition librarian come across different type of books, thereby it is easier and feasible to a librarian to provide reference service. In the past the rate of publishing of books was very low but due to information explosion it is highly increased. Therefore, burden has been exerted in order to select books, evaluate and purchase them. Due to heavy influx of books, the process of acquisition has also become less effective. Thus a great need has been realised to study analytically the acquisition process, to delete unnecessary and repeated task, divide acquisition process into parts and use computer to enhance the efficiency of acquisition process.

The ordering and acquisition module of the house-keeping function includes to more activities, selection of materials and checking and forward the bills to the account section for final payment. These are the routine job in the library and requires repetitive operations with the advent of computer this repetitive operations can be very well done with efficiency.

The first and fore most important duty of a librarian is to collect the advance information about books and disseminate it to users. Many time publishers and book sellers also make available the books to the reader for their approval. After having the information about various publications teachers, scientists and other users can submit their opinion and suggestion about the purchase of books. Now-a-days, e-mail facility has been commonly used for such a purpose. The database available through such as e-mail provides the necessary guide-line to the librarian which facilitates the decision making process of selection.
The process of acquisition is divided into suggestion processing, approval, ordering, bill processing and payment, use and update databases and acquisition information service.

1. Suggestion Processing

In this step the opinion and suggestion received from users about books is processed properly. Here the different suggestions are expected to classify on different basis. After such a classification the necessary action can be carried out. Many times in the administration process these suggestions can be viewed in different perspective, but every time classification of suggestion received becomes tedious and time consuming. Due to application of computer these suggestions can be given various codes and any query can be sorted out with the help of these codes.

2. Approval

On considering the need of libraries booksellers or publishers may approach to them along with copies of books. These copies of books are distributed among experts for contemplation. After receiving the opinion of these experts and approval books are ordered. Many times for large consignment approval schedule may be given to readers as well as book sellers. Use of computer facilities to prepare approval challen and approval schedule.

Sometimes the distributors of foreign publishers are not available in the country but there are some rare collection or books that are expected to be purchased. In such a case along with the order form the cost of a book in either of the bill of exchange is sent to the foreign publishers. This cost should also include postage and handling charges.
Many times discount may not be given on these rare collections. Even after receiving the advance payment of books one has to keep a follow up till to receive the books.

Often readers and citizens express their courtesy by donating the books to the library. While accepting these donations the feasibility of uses of the books must be accessed. In this process the involved activities are to check the books, entry of the books, to give the receipt with vote of thanks, and return of the books of less or no use. The use of computer in all these activities increases the efficiency of library administration.

3. Ordering

The physical collection of books can be done by either ordering of a book, direct purchase of books from foreign publishers or donated books. While ordering a book the answers to the following questions should be analysed and then the process of ordering should be activated.

i. Whether similar type of books are not available in the library?

ii. Whether the order of these books is already given?

iii. Whether the suggestion for these books is received?

After analysing the answers to these questions it is better to order the books. At the same time the database of publishers and book sellers should be properly studied and the relevant order of books should be given to the proper publishers or book sellers. If in this process computer system is applied then control on various activities is possible. Also computer can be useful to draft the purchase order, to send the reminder, to cancel and reorder of books. Use of e-mail in ordering process save lot of time, labour and cost. While ordering a book uniform standard order format may be used in general.
4. Bill Processing and Payment

Book sellers supply the books as per the order and also submit the bill along with the consignment. Supplied books are checked as per the order and the details of the bill are entered in the computer. With the help of computer it is easier to generate accession number as a code of a book. Computer is also used to verify the bill submitted by the book seller, on verification the bill is directed to final payment. Since every year certain budget is assigned to library and expenditure on various heads in library is being continuously incurred, with the help of computer it is quite easy to keep a control on available budget and expenditure.

5. Use and update Databases

Library administration is required to handle various files and databases. These files and databases may undergo addition, deletion and changes in the records. For the sake of better administration these files must be updated as and when required. These various files are as follows:

i. File of publishers and book sellers

ii. Budget file

iii. Suggestion file and order file

iv. Section or department wise file

v. Exchange rate file

6. Acquisition Information Service

Acquisition system is expected to provide various types of information to the readers as well as to the other department of college. Generally query system is available in the computer software to answer various questions. The various query may include the information about
demand letter, details about bill and payments, code number of users, status reports of books, details about suggestion of books and various reports.

Advantages of automated acquisition system are reduction in time, control on voluminous data, feedback and follow up, systematic networking of information, increasing efficiency of library administration, enhancing quality of contemplation and approval of books, updated information on budget, balance sheet and other reports.

4.4.2 Classification

Libraries have collection and storage of books and documents of various types. This large collection of material demands systematic arrangement. The emerging growth of reading material in library gave birth to the term, “library classification”. According to W. Sayers, library classification is defined as “The systematic arrangement of by subject of books and other material on shelves or of catalogue and index entries in the manner which is most useful to those who read or who seek a definite piece of information” (Maltby, 1975). The importance of library classification is immense. It has a number of dimensions viz; shelf arrangement, re-arranging of returned books, fulfill subject wise approaches of the users, preparation of catalogue and bibliographies and for collecting statistical data.

Since 1876, efforts have been made to develop various library classification schemes at national and international level. These schemes are as follows:

1. Dewey Decimal Classification (DDC) by Melvil Dewey, 1876

2. Expansive Classification (EC) by C. A. Cutter, 1879
3. Library of Congress Classification (LC) by LC, 1902
4. Universal Decimal Classification (UDC) by FID, 1905
5. Subject Classification (SC) J.D. Brown, 1906
6. Colon Classification (CC) by S.R. Ranganathan, 1933
7. Bibliographic Classification (BC) by H. E. Bliss, 1935
8. International Classification (IC) by F. Rider, 1961

Out of these eight classification schemes DDC and CC have found a large number of applications.

Classification is a highly technical procedure and largely depends upon the intellectual scheme of an individual. The mode of classification may change from person to person; also it is a tedious job and is largely affected by memorizing efforts. Therefore, for proper uniform and up to date classification electronic media including computer softwares are used for classification. Computer can be used to store the master files related to guideline for classification, to search classification code, and to create classification code with the help of subject.

4.4.3 Cataloguing

The library catalogue is the most basic and important tool to ascertain the resources available within the library on a specific topic. According to C.A. Cutter, “A library catalogue is a list of books which is arranged on some definite plan. As distinguished from a bibliography it is a list of books in some library or collection”. (Kumar and Riaz, 1999).

The usability, availability, completeness on an up to date basis, ability to personalise, current and future size, format and productivity
of the catalogue are some of the factors which affect the use of catalogue. There are four options of cataloguing are as follows:

1. Online access to catalogue and its database.

2. Card catalogue which may be produce manually or prepared with the help of computer.


In most of the Indian library card cataloguing method and in some of the college libraries printed book catalogue were used. However these are not updated in time. Unit record equipment were the first use as mechanised method for cataloguing purpose in 1940. The catalogue data were key punched and the punched card were filled in relevant sequence. Many punch card catalogues were produced and printed in 1950. Saffady reports that pre-computer equipment such as card sorters and paper tape typewriter were in use in 1940 in United state. The computer were first applied in early 1960 to produce catalogue card and book catalogue. After the use of computer in cataloguing traditional methods have been aborted and for the sake of uniformity and standardisation international standards have been established. Many institutes including International Federation of Library Association (IFLA), Library of Congress (LC), British National Bibliography (BNB) and United Nations Educational Scientific and Cultural Organization (UNESCO) contributed in this standardisation process.

In 18th century the emphasis was given to formulate and develop the rules for cataloguing. These rules are now referred as code for cataloguing. Since then a number of cataloguing codes have been evolved

4.4.3.1 Machine Readable Cataloguing (MARC)

MARC is an acronym derived from Machine Readable Cataloguing. There are two version of MARC. The project of MARC I with 16 libraries began in April 1966. Its purpose was the automation of cataloguing, indexing, searching and retrieval function. By the end of 1968 the library of congress had distributed over 15,000 english language monograph records which today crossed the limit of 2.5 million records. Later on British National Bibliography showed the interest in MARC pilot project. US, UK and other country wanted a machine-readable catalogue format that would be a common one for exchange of cataloguing and bibliographic data, which was designed as MARC II. Officially MARC II began in March 1968.

MARC tapes are being used to distribute centrally prepared catalogues to other libraries. Due to this there is an increase in acquisition, updation of cataloguing without increasing additional staff, less production cost, produced conventional card catalogue, book catalogue, computerised SDI service and resource sharing.

4.4.3.2 Common Communication Format (CCF)

It is the another structure format to create bibliographical records and for exchange of records between group of information agency and libraries. In 1972, UNESCO sponsored an international symposium on bibliographic exchange format in which an adhoc group for the establishment of the common communication format was set up. CCF
published first edition in 1984, have second edition in 1988 with two volumes namely CCF/B and CCF/F. By using exchange format CCF and information system convert the data in its processing format into common format for export and each system is designed to enable the conversion of data from the common format for import, into its processing format. Thus each system has to design only one conversion between its format and the CCF.

The most popular computerised cataloguing technique used recently is Online Public Access Catalogue (OPAC). Using OPAC it is possible to search from a remote terminal. The important reason for creation of OPAC is that books that content information on a particular topic may be shelved in several different areas of the library or in special collections or even in different library together, books are shelves in the library in call number order. So one has to be very familiar with the classification scheme used in the library to find the small area devoted to topic.

In OPAC one can search the information by subject, author, title and key words. Logical operator AND or OR are also used either to narrow or broaden the search. OPAC is designed for end user it can be easily used by any user for any type of query. Many facilities like menu, online user helps and online indexes are also available in OPAC. OPAC database includes the entire collection of library and hence its coverage is on a wide variety of discipline and subject area.

Computerisation of catalogue have a great impact on library and information center. It provides ample opportunities to users to search for document using different access point. It also saves the time of user.
4.4.4 Circulation System

Circulation is a primary and fundamental service in the library. The activity of circulation is to maximise the availability of all material of the users and maximise the use of library material. These activities are not technical complicated but repetitive highly labour intensive and time consuming. Manual circulation system required considerable amount of record keeping of issues and returns, due date, overdue etc. However, manual systems are error prone during peak period. The various results or output of the circulation system are useful for expansion and development of library. For instance utilisation of library as indicated by total number of readers. Dynamism of library has indicated by total number of transaction per day. Number of transactions on a specific subject proves the importance of that subject in the library. The transaction per area and total number of collection in that area gives the utility ratio and thus enables the librarian to take the decision for budgetary control.

The principle benefits of automated circulation control system are as follows:

1. Increasing speed and efficiency of service to readers.

2. Efficient maintenance of user records.

3. Accurate and timely updation of loan transaction data.

4. Accurate and timely updation of financial records related to circulation including overdue and fines.

5. Reduction in staff time devoted to circulation function.

6. Consistent convenient access to data above library material by users.
7. Provision of accurate, reliable and timely statistical data for reporting, management and so on.

8. Evaluation of library material on the basis of usage.


Now-a-days use of computers in circulation systems at a cheaper cost also have the following main features:

1. Capacity of a system to determine quickly and easily the title available in the library.

2. Rapid and accurate capacity of issuing and returning the material.

3. Capacity to check the eligibility of the borrower.

4. Capacity to prepare the overdue and recall notice.

5. To detect problems of borrowers at the point of issue

6. To calculate necessary fines and dues at the point of return.

7. To facilitate the circulation of statistics about the system as a whole.

8. Reliability and economy.

Now-a-days, advancement in electronic technology viz; bar code reader and scanner has made revolutionary change in the library administration. Using bar code technology it is possible to assign bar code to each book and it further facilitates the fastening of book transaction process. The storage of photocopies of reader becomes easier due to scanner.
4.4.5 Serial Control

Serial means publication issued at regular intervals and intended to be continued forever. Journals, annual reports, proceeding of learned bodies, monographic series, newspaper etc are included in serials. The system of serial control for the administration of periodicals department is a setup of policies, procedure and operations for the management of acquisition functions. The system of serial control is a complex and different system from regular simple book ordering system. Many times either name of the serial get changed or it is divided into two or three separate publications, sometimes serials may be published but not received, possible changes of publishers, special issues, supplements, indexes also appear, specially in research libraries serials are gifted or exchange, physical problems of storing, circulating individual issues and binding of volumes when all are received.

The common objectives of computerisation in serial control are as follows:

1. To manage and control the receipt of serial issues.
2. To prevent gaps in library holding of serials.
3. To increase the accuracy and timely ness in the processing.
4. To increase the availability of serial to library users.

To achieve the above said objectives the computerised serial control system should be designed to handle new subscription, recording of receipt of journal issues, sending reminders, claim for missing issues, renewal of subscription, invoice processing, binding control and periodical listing.
Historically it is seen that in 1960 for the first time computers were used for serial control. In 1970 few libraries in USA developed online real time systems. Slowly use of computer in serial control has been propagated due to advance microcomputer system. In 1971 UNISIST, the organization under UNESCO developed international serial data systems (ISDS) which is located in Paris. The major functions of this center are as follows:

1. To create and update an international file of serial publication.

2. To assign and ISSN to each new serial.

3. To launch an international communication network, co-operative with the international center in Paris.

In 1974 Library of congress, the National Agricultural Library, the National Library of Medicine, the National Library of Canada started a project namely CONSER (conversion of serials records). The database of this project contains a quarter of million titles and is accessible via OCLC network. Northern University Library also developed an integrated serial control system, notice covering nearly 15,000 current and retrospective serial titles. Ulrich plus is a CD-ROM published by R.R. Bowker which contains information about one lakh regularly and irregularly published serials from sixty five thousand sources in more than 180 countries.

Automation of serial control system brings authenticity, economy and timeliness to the work procedure and makes it more efficient in satisfying the library and user requirements.

Due to increasing subscription as well as inflation, many libraries do not afford the subscription of many serials. The internet technology has made revolutionary change in publication of serials. Serials are
available in hard copy and soft copy form. Through internet soft copy of these serials made quickly available. E-journals are less costly and available in two form abstracts or full text form. The automated serial control system also deals with various activities involves in e-journals holdings. In India AICTE moved the availability of e-journals to all Engineering college libraries.

4.4.6 Stock Verification

Stock verification is a concept similar to preparation of inventories of objects in most of the store departments. In some of the college libraries the traditional stock verification method the issuing and all transaction in the library are suspended because it causing inconvenience to library users. Most of the times final result of stock verification is unreliable leading to unnecessary harassment and punishment to the library staff.

With the help of computer, range of softwares of library automation with provision of stock verification are available. In this software one can either enter the list of presently available books on shelves manually or scan with data capturing unit. The programme then automatically matches accession number from this list along with issued books number and gives a comprehensive list of missing books. Thus automatic stock verification is faster and accurate.
4.5 Development of Library Network in India

Network is a form of arrangement or link between two or more computers or group of individuals or organizations who have agreed to co-operate each other and share resources. The network resources shared are generally CD-ROM, exchange of file or electronic communication. The common dictionary meaning is physical connection between two or more devices or nodes connected to each other and intended to communicate each other. The modern networks have expanded the geographical area, number of connections and scope of applications. Now-a-days a network of thousands of computing devices have crossed national and international boundaries.

4.5.1 Different types of Library and Information Sharing Networks

The growth of civilization in India has resulted in the increase in number of publications and emergence of subject specialization which force the libraries and information centres to bring the resource sharing technology namely library network. Library network is attempted to receive to access the desired information at low cost or increased the information at optimal cost.

Participation in library and information networking and by accepting the principle of mutual sharing, manifold benefits can be achieved, which are as follows:

1. Resource utilisation and service level.
2. Access to national and international databases.
3. Possibility of inter library loan and document delivery service.
4. Exchange of duplicate publication.
5. Use of electronic database at affordable cost.

6. Co-ordination among regional, national and international libraries and information centers.

7. Staff motivation.

Library and information networks can be divided into four groups viz; general data library networks, metropolitan area library networks, country-wide library networks and international library networks.

Group wise classification of different library networks is given in the following table.
Table 4.1 Classification of library networks

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th><strong>International</strong></th>
<th><strong>Metropolitan</strong></th>
<th><strong>Countrywide</strong></th>
<th><strong>General</strong></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Online Computer Library center</td>
<td>Developing Library Network</td>
<td>Information and Library Network</td>
<td>NICNET (Planning Commission – 1977)</td>
</tr>
<tr>
<td>3</td>
<td>European Academic Research Network (EARN)</td>
<td>Madras Library Networks</td>
<td></td>
<td>ERNET (Department of Electronics–1986)</td>
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<td></td>
<td></td>
<td>(MALIBNET–1993)</td>
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<td>4</td>
<td>Joint Academic Network (JANET –1984)</td>
<td>Bombay Library Network</td>
<td></td>
<td>SIRNET (Scientific and Industrial Research Network)</td>
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<tr>
<td></td>
<td></td>
<td>(BONET–1992)</td>
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<tr>
<td>7</td>
<td>London and South Eastern Region (LASER)</td>
<td>Mysore Library Network</td>
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<td></td>
<td></td>
<td>(MYLIBNET–1994)</td>
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<td>8</td>
<td>Birmingham Libraries Co-operative Mechanisation Project (BLCMP)</td>
<td>Bangalore Library Network (BALNET-1995)</td>
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<tr>
<td>9</td>
<td>British Library Document Supply Centre (BLDSC)</td>
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</table>
In general most of the library networks are described for the major services of catalogue sharing, online reference, circulation sharing and interlibrary loan.

4.5.2 Impact of Network and Resource Sharing

It is clear that resource sharing is a co-operative activity to provide resources of one library to other libraries on demand, as and when requested. It is executed on satisfying the prerequisite such as agreement among library authorities, union catalogue, computerised library network. Scheme of the system resource sharing can be conveniently implemented in the areas like acquisition, cataloguing, printed catalogue card service, co-operative storage, sharing of equipments, interlibrary loan and staff exchange. A large number of local, regional, national and international networks along with various sectoral networks over-comes the hurdles raised due to tremendous growth in the number of documents, increasing cost of documents, large number of users, lack of money and insufficient space.

4.6 Internet Application in College Libraries

The most surprising and dreamful invention at the dawn of 21st century is the potentially most revolutionary invention due to Johann Gutenberg is that of internet. The widely acceptable definition of internet is “A global system of public and private computer networks that allow desktop computers to exchange data, messages and files with any of the millions of other computers with the connections to the internet” (Vyas, 2005). The internet is also known as Net or Web or World Wide Web (www). For the wide utility of internet in communication, research and publishing, the institutions like internet architecture board, internet
registration service, internet engineering task force, internet assigned number authority, internet engineering steering group and internet research task force contribute a lot.

The services and facilities offered by internet can be summerised as e-mail, list service, usenet / newsgroup, file transfer, telnet, gopher, wide area information server (WAIS) and world wide web. The information available on WWW may be divided in to following domains:

.com – Commercial sites
.org – Non profit organization site
.net – Networking site
.edu- Educational sites
.gov- Government sites
.mil – Military sites

Internet provides a wide range of websites including search engines. Some of the commonly used websites / search engines are as follows:

www.yahoo.com
www.altavista.com
www.webhelp.com
www.google.com
www.amazon.com
www.indiatimes.com
www.expressindia.com
www.pubnet2000.org
www.rediffmail.com
The internet has logically broken the geographical limits and converted libraries into virtual libraries and digital libraries. The internet connection in any library can add huge collection of information resources, provide domain for publishing their information, means to determine the quality of various information resources, to deliver documents, collection of full text documents and information. It also achieve the infinite expansion of information holding and information users. The use of internet in library have raised the degree of efficiency in services from acquisition to the retrieval of information. The coverage of applications of internet in library can be divided as follows:

1. Acquisition
2. Collection development
3. Technical processing
4. OPAC
5. Bibliographic services
6. Reference and information services
7. Electronic mail
8. Telnet
9. File transfer protocol
10. In library administration
11. In library management
4.6.1 Metadata

Recently due to huge amount of information and network resources on the web of internet, there are several problems in browsing and navigating the relevant information, the new term ‘Metadata’ has been coined. Metadata means information about information or data about data. Metadata is a integrating tool which integrates the data in heterogeneous format or geographical scatter. Metadata describes the characteristic and contents of an original document and describes resource. Dublin core is being developed by OCLC as a generic metadata standard for the use by libraries, archives, government and other publishers of online information.

Due to the advantage of internet in libraries like inexpensive, increased efficiency, flexibility, versatility, security it has created great impact on libraries. Leadership opportunities to libraries, cost savings, time savings, question answering services, inter library loans, document delivery service, online transactions, government information, information sharing are some of the important dimension experiencing the impact of internet.

4.7 Electronic Mail and its Usage in College Libraries

Electronic mail popularly known as e-mail, refers to the transmission of a message through electrical signals. The message can be addressed to an individual or to a selected group of individuals. The organization viz; academic, research, library who are part of the information network have started using this facility to a greater extent. Some of the major areas where e-mail could be used as an effective media are inter-library loan, ordering books, journals and other reading
materials, documents delivery, professional communication and reference services.

In developed countries e-mail has become an effective communication channel among the libraries. The Joint Academic Network (JANET) setup in 1984, is a wide area network linking large number of computers and users in British Libraries. Library Association (UK) has also launched its E-mail system i.e. LA-NET. Some of the major database owners in USA and UK have their own e-mail systems. American Library Association has setup its own network namely ALANET in order to provide e-mail service. In India some of the networks like ERNET, NICNET, INFLIBNET, DELNET, CALIBNET etc. have E-mails to carry out their main functions.

4.8 Future of Wi-Fi and RFID Technology on College Library

Wi-Fi and RFID Technology plays a vital role in college libraries. The details of these technologies are as under:

4.8.1 Wi-Fi Technology

Wi-Fi is a tread of wi-fi alliance formerly wireless ethernet, compatibility alliance. wi-fi (Wireless Fidelity) is wireless local area networking that connects the computers to one another or to the internet using radio links. It uses an unlicensed part of radio spectrum of frequency 2.4 GHz. There are number of benefits of using wi-fi technology such as:

1. In many countries wi-fi technology has less regularity control because it uses an unlicensed bit of the broadcast spectrum.

2. The wi-fi technology offers faster and cheaper net connection.
3. More dynamic networks are possible since network devices become free from cables.

4. No time constraints to contact.

5. Fast downloading.

6. Permanent saving of data on individual devices.

7. Due to its flexibility, wi-fi technology provides consistent network connection.

In many countries including India, sincere efforts are being taken to create wi-fi zones in libraries, research laboratories and reputed institutions of higher education. Due to wi-fi library users can access the library when it is open as well as close. Also library users need not have to go in the library physically as they can access the library services according to their convenience. It is expected to propagate geometrically use of wi-fi in library in couple of years. In foreign countries to search Wi-Fi zones various websites are also available viz; www.wi-fi zones.org.

4.8.2 Radio Frequency Identification (RFID) Technology

It is a twin technology combining radio frequency and micro chip technology. RFID is a form of automatic identification. This is an emerging effective, convenient and cost efficient technology in library automation and security. The use of this technology in libraries began in the late 1990. Many libraries especially from US, Canada and Singapur are using this technology for library functions. RFID is a observed alternative to bar code technology and it can identify several object simultaneously. A comprehensive RFID system has important components like RFID Tag, Reader or Sensors, Antenna and Server.
Technical difference between bar code and RFID is that bar code is an optical technology, whereas RFID is a radio technology.

RFID in libraries can be implemented to tagging station, staff circulation station, self check-out station, book return and inventory control.

To increase the efficiency of library services, RFID can be used in stock verification, self rectification etc. It is also used for tracing of book within the library and to improve the security in the libraries. The efficiency of circulation and inventory control can be improved by using RFID.

In modernising the present form of library RFID can be useful in many ways, like simultaneous issue and return of many books. Stock verification becomes very easy and in a short period of time simply by moving scanner on shelf. Misplaced books can also be identified through navigator. Reader wise summery may also be possible by this technology.

4.9 Use of Information Technology in Library Services and Administration

Information technology is an integral part of all aspects of libraries. IT has greatly affected library operations, information resources, services, staff skill requirements and user expectations. With extending virtually unlimited potential of useful applications in library information technology there is an improvement in quality, productivity, efficiency, resource sharing and effective services to the users. With the advent of information technology library becomes “one stop information shopping”.

Recently National Assessment and Accreditation Council for quality and excellence in higher education circulated the guidelines to
university and college libraries for expanding the scope of information
technology in library services. By and large, many university and college
libraries have tried their best to incorporate information technology in
library applications. Yet NAAC emphasised large number of applications,
which must be given an attention. The list has circulated by NAAC is as
follows:

1. Digital access to all internal documents.
2. Digital repositories.
3. Digitisation of manuscripts.
4. Multilingual, integrated, web enabled database with complete
   automation of in-house services.
5. Using self developed integrated library software.
6. Database creation using international standards formats.
7. Electronic surveillance system.
8. Online information retrieval.
11. Library home page for information dissemination.
12. Dynamic library websites.
13. User feedback through the library homepage.
14. Web OPAC.
15. Information retrieval through web OPAC.
16. Campus- wide local area network facility.
17. 24X7 access to e-resources.

18. Group concessional night services offer for outside students and scholars in accessing e-resources.

19. Access to digital repository through the library web sites.

20. CD Mirror server facility.

21. CD NET server facility.

Along with initiation and upgradation of above listed services NAAC has also given the due consideration to increase the use of library services. For which NAAC has recommended following programmes:

1. User education.

2. User orientation.

3. Initiation to freshers.

4. Preparatory course for students projects.

5. Library use statistics.

6. User feedback practice through different formats.

7. User feedback practice through suggestion box.

A wide range of library softwares are available for the library administration. To begin with in many libraries current, regular and general purpose manual library services are under computerisation. These services are listing, book ordering and acquisition, circulation control and issue, catalogue and bibliographies, serial control, information and bibliographical retrieval, resource sharing, stock verification, accounting and management information.
In every library parallel to house-keeping and routine operations, number of administrative and general activities need to be carried out. These administrative and general activities can also be computerised and it also ensures the increase in efficiency in library services. Possibility of computerisation in administrative and general activities can be realised in:

2. Database creation for employees.
3. Maintaining records about leave, discipline and attendance and library committee.
4. Human resource management and development.
5. Notification of library rules and services.
6. Marketing of policies for library services.
7. Maintaining proper co-ordination among the various sections of the library.

4.10 Library Staff and User Empowerment in Libraries

The fifth law of library science states that “Library is a growing organism”. Since last few decades academic libraries have undergone rapid and dynamic changes. These changes are due to increase in demand for processing of data and quick retrieval of information, at the same time print and non print medias also undergone revolutionary changes. In this changing scenario the success of library mainly depends upon the skill and competency of professional staff and proper co-operation from users. Therefore, it requires an attention to execute human resource planning process for professional developments. Before beginning the human
resource planning process it is customary to study users, their need and services.

Shridhar (2004) discussed knowledge, skill and will is the intensive requirement of library professional to accept the challenges in electronic environment of 21st century. He also mentioned three basic skills viz;

1. Technical skill relating to analysis, synthesize assimilate, disseminate, interpret and reformulate the information access and retrieve.

2. IT skill includes information literacy and computer literacy. These are the skill required to apply IT for service management in general and information processing, search and retrieval in particulars.

3. Managerial skill are the leadership as well as fellowship skills which required for information management in teams. In other words it is a skill to work in team environment and on collaborative basis viz; library network and resource sharing.

Saraswat Morei (2003) and Gupt and Sharma (2003) also focused the issues in marketing of library services. According to Jaiswal (2003), user education is necessary to promote the use of library services. Considering the significant impact of information technology on library services. Mange Ram and Burman (2003) elaborated the need of user education in efficient working of library specially through OPAC. Potdar (2004) pointed out the differences between traditional and modern concept of teaching learning process, which compiled the students to use the library resources and their by for effective library utilisation user education become essential in University libraries. He also discussed
motivation, activity, understanding and feedback are four main factors that affects learning in practical situation.

Paramasivam and Rajnikanth (2009) stresses that library and information science professional must develop themselves in various categories. They expects that competencies for library professionals should be in administrative and communication skills, creativity, leadership, knowledge base, IT skills and personnel qualities.

Owing to the urgent need of professional up gradation and user empowerment the top priority agenda points of NAAC are as follows:

1. **User Education**

   It is orientation programme for newly enrolled library users regarding the availability of facility and services in library. This programme also attempts to provide guidance on accessing electronic databases and optional usage of library.

2. **Initiation to Freshers**

   The aim of this programme is that new student must be aware of the services and resources available in the library. Also trained the students to exploit the information resources available in the library. To supplement their learning process to support classroom teaching.

3. **Preparatory Course for Students Projects**

   This is a special programme to develop awareness about library resources and exploit them for the preparation for the assignments, term paper, project paper etc.
4. **User Orientation Programme**

To create awareness about library resources, facilities and services among new users and thus to ensure their optimum use.

5. **Information Aids**

The aim of this programme is to maximise user environment, information access and to inculcate interest on new products and services.

6. **Course Module on Library and Information Science**

To provide training to the library users so as to make them competent to gather information from the library and web through formal curriculum.

7. **Library use Statistics**

To collect feedback on the use of facilities and services. It will enable the administrators and library professional to enhance the quality of services delivered by the library.