CHAPTER -3

OVERVIEW OF BEST PRACTICES, INFORMATION TECHNOLOGY AND MODERNISATION OF LIBRARIES

3.0 INTRODUCTION

For a vibrant and dynamic knowledge – based society, data as well as information are the key resources. Optimal utilization of existing knowledge can certainly help in creating new knowledge and wealth of the nation which ultimately improve the quality of life and prosperity of the society. Library and information centres of higher educational institutions play a vital role in facilitating dissemination and creation of new knowledge in the society. Thus, the library and information centres in institutions of higher learning may identify a well-structured set of innovative practices to increase their processes and activities, optimal resource utilization and cater high quality, value based services to their users.

3.1 BEST PRACTICES IN MODERN LIBRARY AND INFORMATION CENTRES

Best practices in library and information centres are the practices which make the ways and means for augmenting new or already existing functions or activities which help in effective application or use of the process thereby leading to never ending enhancement as well as the overall performance of the library and information centres.

According to **Soundararaj & Madhukar** (2004), best practices are the quality enhancing academic/ administrative/infrastructural strategies adopted by highly accredited institutions higher learning in the present instance. While this is the general meaning, one has to describe the practice in terms of specific characteristics, which go to make it. These characteristics therefore, may be treated as criteria which determine the practice. The criteria are curricular best practices and they cover a wide range of activities which the institutions have found to be quality-supportive. The criteria used to define them fall into two categories: universal criteria and contextual criteria.

According to **Kumar, Manjunath & Vijayaraj** (2012), a best practice may be innovative and be a philosophy, policy, strategy, program, process or process or practice which is able to either solve problems or create new opportunities and positively impacts on the Institution . Organisational excellence is the aggregate of the best practices followed in different areas of activities. The use of technology and innovative ideas In general, lead to evolve best practices resulting library and information environment.

Kanoogo (2011) mentioned some of the characteristics of best library and information centres: reflection of the values, mission and the goals of the parent organization, provision of innumerable new information and learning technologies and the ways and means for accessibility and usability of information, the transitional central location of both the traditional and modern knowledge resources. New and emerging technologies can be combined with traditional knowledge resources, extension of class room with collaborative and interactive learning, user-oriented quality service to meet the present day challenges of learning, teaching and research, Provision of atmosphere for assimilation and creation of new knowledge with the application of Internet. Supports information gathering skills to acquire, access, evaluate and use of it whenever required in the life , enables technology for open and distance learning, users' participation in creation, evaluation and updating the services, fast changes and flexible enough to support and adjust the ever changing library resources, services and product as well as users demand, enables both virtual and physical space more interactive, collaborative and fulfill the needs of the community, topmost knowledge and learning resource centre for the intellectual community of the institution.

During the educational institutions accreditation process by NAAC, the libraries have to play a crucial role. As the heart of the institutions evaluation of libraries is an indispensable component during accreditation, there the collection, services as well as their outreaching capacity etc. is monitored. As such, the NAAC has provided some guidelines in the activities and services of libraries derived from understanding the state of the art in the global perspective and compiled some parameters accordingly to facilitate the quality enhancement and sustenance of the library to a greater extent. The guidelines identify the foremost factors which influence the enhancement and maintenance of college libraries services and collections. The guidelines are provided under the following headings: management of library and information services, collection and services provided to users, extent of the use of the services and best practices for college libraries.

The guidelines under the management of library and information services include besides the core objectives of the libraries to support the academic programme, aspects like designing a system of delivering its products and services to attract maximum users and to make the potential users to actual user. The libraries are also expected to answer the questions positively regarding the aspects like whether the library functions on Saturdays, Sundays and holidays, extension of library hours, role of library committee, library professionals qualifications and experiences as well as their participations in seminars/ workshops and refresher courses/orientation programmes, separate library with adequate infrastructure, ratio of the seating capacity of the users, provision of generator in the library, measures for overall maintenance and cleanliness of the library, computers and internet facility, status of automation, generation of funds other than library fee and grants, policy for collection development, stock verification , in- service training and promotion of the library staff etc.

The guidelines under the collection and services provided to users include variety of formats of library resources in quantity, both print and hard copy, electronic text or images, online and other media. For maintaining the quality of the resources, the library collection may answer the questions about the total collection of documents like books, text books, reference books, national and foreign journals, peer reviewed journals, back volumes of journals, magazines, e-information resources (CD'S/DVD's, databases, online journals), special collection (competitive examinations , braille materials, rare collection, audio-visual materials), book bank facility and the ratio of the library collection to total students enrollment. Through its rich collection, a library must offer a variety of state of the art services and ready to answer fundamental questions to ensure quality services to the academic community. The questions in this regards may be about whether the library provide basic services like circulation services, bibliographic compilation, reference/referral services, clipping services, user orientation / information literacy, information display and notification services, reprographic and printing services, Internet/

digital resource services, resource sharing/ inter library loan etc.

The guidelines under the extent of the use of services, to sustain and enhance the performance of the libraries, evaluation can be made at regular intervals. The library statistics found through the parameters and compilation of it help a lot in the evaluation process. It is expected to answer the questions related to assessment of the extent of use of library resources and services like number of average book issue and return, per capita per month wise number of services provided, month wise number of reference enquires, average number of library visitors per month etc. NAAC has also provided some of the best practices / quality indicators through which a library can ensure the quality environment and usability. The best practices are library automation using standard software, provision of publication regarding optimum information about the library in the college prospectus/website, compilation of category wise users attendance statistics and display it on notice board, newspaper clippings on continuous basis, career and employment oriented information services, Internet facilities all user categories, user orientation programmes, provision of suggestion box and its timely response, display of new arrivals and disseminate information about it through a list to the concerned departments, organize book exhibitions and book talks, competitions on different events, provision of annual best user award, collecting users feedback through survey at regular intervals and its timely response etc.

The criteria of best practices are nothing but the standards set by best practices. Best practices are ever changing and continuous process and are always the result of identification, reflection, feedback and innovation and experience oriented. The best practices of an institution are expected to be always agreeable to documentation, potential for replication, transparent, accountable, affordable and accessible to the stakeholders.

The role of a college library is to achieve the goals and objectives of the parent institution. All academic libraries are primarily concerned with the teaching and learning process. The college library act as a vehicle for dissemination of information through various resources /services and adopting best practices to maximize the resource utilization by its end users. Thus, the college libraries are expected to meet the genuine needs and demand of their user community viz. the students, teachers, staff, research scholars etc. The college libraries must play vital role in dissemination of information and knowledge to their bonafide user. Such libraries are expected to play a crucial role in the higher educational institutions to bridge the gap between the library and user community resulting optimum utilization of the library resources for the ultimate growth and development of the society. Adoption of the best practices through various user support services in the college library and information centres may bridge the gap between the library and user community and increase the reading habit amongst the user community.

3.2 MODERNISATION AND INFORMATION TECHNOLOGY APPLICATIONS

3.2.1 Concept of Modernisation

The term "modernization" is coined by **Denial Learner** meaning the process of transformation. He mentioned that modernisation includes a "disquieting positive spirit" touching "public institutions as well as private aspirations".

According to the Sociology Dictionary of Tata McGraw-Hill Publishing Company Limited, modernization theory is central to sociology of development. It explains economic growth and widespread social, political and cultural changes which are transforming the historical and traditional underdeveloped societies towards modern developed ones. Although modernization began in the west in late 19th century, it was in the 20th century that its real impact was felt. It started with the advent of industrialization and commercialization that led to widespread fundamental changes in the western world. In the economic sphere, it meant developing new technology, increasing the use of inanimate power for production, rising rate of trade and voyage, laissez faire economy, modern markets, modern banking and planned economy. Modernisation also includes important social and cultural changes like secularism and the growth of scientific world view as against the traditional world view, spread of education and so on. It has been defined as a blanket term that includes far reaching multifarious changes in the society. It is through this concept that the development of third world countries has been viewed. In this perspective, the traditional structures and institutions of such societies are seen as impediments to modernization.

Dube (1988) defined modernization as "It is essentially a process- a movement from traditional or quasi- traditional order to certain desired types of technology and associated form of social structure, value orientations and motivations and norms. It refers to a common behavioral system characterized by a rational and scientific word view, growth and ever increasing application of science and technology, together with continuous adaptation of the institution of society to the imperatives of the new world view and the emerging technological ethos."

Modernisation is also a multi-faceted process which involves at various levels: at the psychological level, modernization incorporates a change in the existing norms, values, attitudes etc. of the people; at the intellectual level, it encompasses a remarkable growth and development of human knowledge of their environment and scatters the knowledge all over the society, through education and other communication media; at the demographic level, modernization implies the enhancement of living standards resulting migration of people and rapid urbanization, At the social level, it tends to replace the individual's focus of loyalty to family and other primary groups to voluntarily organized secondary organisations, At the economic level, modernization links with growth and development of market agriculture, expansion in commerce, improvement of industrialization and broadening economic activities. There are various characteristics of modernisation like: It is a process of change, a global phenomenon, scope is universal, unavoidable and it is irresistible.

Modernisation causes social change resulting changes in the society for better quality life. Advent of science and technology, education and research etc. create new knowledge. New knowledge is one of the of the important aspects of modernization. It penetrates different parts of the globe sooner or later and would march on, though not in same intensity to all the places and cannot be resisted forever. No society can close its windows to the wind of modern thoughts and ideas permanently.

Thus, modernization is a comprehensive phenomenon which brings about drastic changes in the society especially in the field of economic development resulting industrialization, urbanisation and material advancement and changes in political and social system and also alterations in the nature and psychological domains of life. It necessarily results in modernity. Education is not exception to that.

3.2.2 Role of Library on Modernisation

Every society is subject to uninterrupted change and never static. Change is the law of nature. Social change, development, modernization and civilization are continuous process. Education has played significant role in transforming an agrarian society into an industrial society. Education play major role not only brining the social change but also act as instrumental in maintaining the status que and thus play double role in maintaining as well as changing a variety of aspects of the society.

Bhat (2013) mentioned that "It is only through the process of education new inventions and discoveries are possible. Education has modernized the entire world through the advancement of science and technologies. New machines have come and new challenges also occurred. Education has not only produced the skilled human resources but also developed human brain in such a way that now we are on mars".

As such, libraries being the central instrument of teaching learning process have to play a key role in modernizing the society to meet the present day challenges.

3.2.3 An Overview on Information Technology

3.2.3.1 Meaning of Information Technology

The term "Information Technology" (IT) is a combination of two separate words "Information" meaning processed data, product of human brain in action, which transmits meaning and the "Technology" meaning a combination of skills ,expertise, knowledge materials, tools and machines etc. used by the human being to covert or change the raw materials into value added products and services. IT is generic term used to denote all the activities connected with computer and communication technologies used to gather, process, store, retrieve manipulate and disseminate information whenever necessary.

Information technology is an electronic technology used to collect, store, process and disseminate information. IT is very closely associated with the organization or even a part of it. In almost every aspect of the human efforts is supported by or based on IT. Information Technology enabled services and product or remote processing etc. helps a lot especially the service oriented organisations. Library and Information Centres are not exception to that and IT has an extensive connotation for library and information professionals.

UNESCO defines IT as “The scientific, technological and engineering disciplines and the managerial techniques used in information handling and processing; their applications; computers and their interaction with men and machines and associated social, economic and cultural matters”.

ALA Glossary of Library and Information Science defines IT as “the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information”.

IT is concerned with the combination of computers and telecommunication for gathering, processing, storing, transmitting and producing output information in varied forms like voice, picture, text etc. The impact of IT is vast and worldwide in its magnitude, universal and usefulness. The application of IT to the library and information centres operation and services has enabled in satisfying the ever changing users diversified strong demands.

3.2.3.2 Objectives of Information Technology

The objective of information technology is to stimulate professional interactions in the field of their practices and research activities and enhancement of the exploration of concepts, methods tools, techniques as well as organisations information system and service oriented issues. Beside these, IT helps a lot in information management by reducing uncertainty, as an aid to monitoring and control, means of transmission and communication, memory supplementing, understanding and simplifying the problems and situations for better management.

3.2.3.3 *Components of Information Technology*

Information technology is a comprehensive term which incorporates a wide range of interconnected modern technologies and sub technologies used in the creation, conversion or replication of data or information. It amalgamates the computers, communication technologies and other related sub electronic technologies. Out of these technologies, the computer and telecommunication technologies play foremost role. Today, the convergence of computer and telecommunication is termed as ICT i.e. Information Communication Technology. Some of ICT tools which are extremely used in library and information science domain are discussed below:

3.2.3.3.1 Computer Technology

The term "Computer" has come from the word "compute" meaning "to calculate". The Oxford Advanced Learner's Dictionary defines computer as "An electronic machine that can store, organise and find information, do calculation and control other machines".

Computer is a powerful electronic device by which we can receive, store, process data based on a set of instructions usually termed a program. A computer by accepting input (data), process and store it and produces output (information) whenever necessary. A computer can perform a wide range of function such as arithmetic calculations, logical operations and processing, storing, retrieving and communicating information. The functions of a computer are thus:

- Getting the information : Input
- Storing the information : Storage
- Manipulating information : Processing
- Providing results : Output

The computer being the key component of modern information technology is the most powerful device, man has ever invented. The computer technology has changed the life and activities of the human being.

3.2.3.3.1.1 Characteristics of a Computer

The computers have become more powerful and extensively used electronic device which make our lives easier better faster and more comfortable. Computers have become indispensable instrument in our daily life today for their distinct following characteristics:

- *Automatic:* Computers can work itself without human assistance. These are automatic machines as once started on a job, they can carry out the job until it is finished without any human intervention. Being a machine, a computer can't start and go outside itself as well as find its own problems and solutions.

- *Fastness*: A computer is a very fast device and its speed has been increasing day by day exponentially. A computer is able to perform simple arithmetic operations several billion (10^9), even trillion (10^{12}) per second.
- *Accuracy:* Besides fastness computers are very accurate. Computers can perform every calculation with the same accuracy and intensity.
- *Diligence:* Computers are free form monotony, tiredness as well as lake of concentration. They can work for hours together without creating error and irritable.
- *Versatility:* Versatility is one of the most important characteristics of computers. Computers can perform wide range of multiple tasks simultaneously.
- *Power of Remembering:* Computers can store and recall any data and information for each secondary storage memory. A user can get his/her required data or information even after several years exactly the same data/information he/she had stored in the computer.
- *No Intelligence Quotient:* Computers possess no own intelligence and till now their intelligence quotient (IQ) is zero. So, computers can take own decisions and thus be instructed what to do and what not.
- *No Feelings:* Computers are machine and can't make any judgment based on feelings and instincts and lack of emotions.

3.2.3.3.1.2 *Technological evolution of Computers*

The history of calculation starts 1450 BC by the birth of abacus: the earliest calculating tool invented by a Chinese mathematician named Abacus .It helps simple arithmetic operations like addition, multiplication, division and subtraction. Abacus is made of wooden rack holding two horizontal wires with beads strung on them. Since then, though a number of developments in calculating device took place, there seem no remarkable land marks till latter part of the 18^{th}century. French mathematician Blaise Pascal invented pascaline: the first functional mechanical calculator in 1642 to perform arithmetical operations.

In the United States, keyboard machines were invented in 1880, which we use them even today. Charles Babbage a professor of Cambridge University, known as the father of modern digital programmable computers designed machines for computing logarithms in 1822 and analytical engine in 1833 to follow instructions from punched cards. The Turing Machine of Alan Turing as traced back to 1930, as the origin of the electronic calculator leads to the era of computers. Herman Hollerith and James Powers designed a data processing machine to process census data in the latter part of 19^{th} century. Hollerith developed codes for both alphabetical and numerical data processing. Howard Aiken designed the MARK-1machin at Harvard in the early 1940s. Dr. John V. Neumann introduced the concept of the "stored program" which helped in overcoming hard-wired program oriented problems through a sequence of instructions or data may be stored in memory of a computer. These distinct feature influenced in the development of modern digital computers which often refer to as stored program digital computer also.

3.2.3.3.1.3 *Generations of Computers*

Computer generation is a framework of the growth and development of key technologies i.e. hardware and software technologies. The five computer's generation known till today. Though each generation is having its distinguishable characteristic, there seems some overlapping between different generations.

- *First Generation* (1942 – 1955): The first generation computers were designed during late 1940's and early 1950 are where thousands of vacuum tubes were used. The other items used were: electronics circuits for the central processor, magnetic drams for memory, punched cards for input/output and machine language for man – machine interface. These computers are characterised by physically large, bulky, too expensive as well as complicated which consumed a lot of electricity, occupied large area, generated more heat and needed specialised operators. The ENIAC developed in 1946 by a group of scientist of the University of Pennsylvania; USA can be treated as origin of the first generation.
- *Second Generation* (1955 – 1964): This generation of computer was based on transistors and utilised magnetic core for internal memory. Comparing to first generation computes, these computers were found better for the transistors and characterised by fastness, compact more powerful, more reliable, less expensive, much smaller required less energy, produced less heat during operation than vacuum tubes and easier to maintain them. The IBM seven hundred series computers are second generation computers. High-level languages such as FORTRAN, COBOL were developed and man-machine interface language accordingly.
- *Third Generation* (1964 – 1975): The third generation computer replaced transistors with integrated circuits and semiconductor memory. Chips were less

- expensive, cooler and faster than transistors resulting increase the speed and efficiency of computers. Keyboards and monitors were used as input-output devices. IBM 360 family and DEC- PDP/8, CDC's CYBER-175, STAR-100, etc. belongs to this generation characterised by higher speed, larger storage capacity lower prices, smaller in size, consume less power, better reliability and performance, extensive use of higher level programing languages, use operating system, remote processing and time sharing through communication usability for online processing etc.
- *Fourth Generation* (1975 – 1989): The fourth generation computers use very large scale integration (VLSI) technics with microprocessor using thousands of integrated circuit provided onto a silicon chip. The fourth generation computers are known as microcomputer for using microprocessor. Companies for instance Intel, Apple, Sun, Compaq etc. developed their own microprocessor and microcomputers. IBM for the first in 1981 made home personal computer. The significant development of these computers enabled linked together to assist networks resulting emergence of internet. The personal computers are have become very popular for the use of work, music, games, videos and accessibility to the web. Both the local area networks and wide area become very popular. Software like MS-DOS, MS-Windows and Apple's propriety Msc OS etc. several new operating systems were developed in generation.The UNIX operating system became very popular for the use on large-scale system during generation. C programing languages, objects oriented programing and objects oriented software design were become very popular.

- *Fifth Generation* (1989 – Present): The present fifth generation computers are differ from the fourth generation because of the development of intelligent thinking machines to create a human like computers in contrast to the previous generations computers made to only handle numeric and data processing applications. The main characteristics of the computers of this generation are voice recognition speech synthesis and image processing, knowledge processing, robotics, parallel processing super conductor etc.

Now emergence of supercomputers with modern technological development is one of the most significant characteristic.

3.2.3.3.1.4 Categories of Computer

Computers of the present day are available in different sizes and types according to the requirements as well as designed for multiple purposes. A variety of computers are available today from personal laptop computer to super computer. Computers can be classified on the basis of physical size, application areas and performance into four major categories: microcomputer, mini computers, main frame computers and super computers such as:

- *Micro Computer:* A microcomputer uses microprocessor and is a small, widely used, high popularity and less expensive. Micro computers are also known as personal computer (PCs), designed to be used an individual at a time. These computers are more suitable for general purpose jobs like word processing, programming, Internet surfing, e-mailing, digital documentation and multimedia games etc. The microcomputers include PCs, Laptops, Desktops, Handheld/Palmtop, Tablet PCs, Personal Digital Assistant, Workstations etc.

- *Mini Computers:* A minicomputer is a multi-user digital computer enabled process and store data more than a microcomputer and less than a mainframe. These computers are widely used mainly in organisations and industries and characterized by smaller, less cost and less powerful than the mainframe computers. PDP11, IBM (6000 series) etc. belongs to mini computers.
- *Main frame Computers:* Main frame computers are comparatively large, high capacity, powerful multi user computer enabling support to work thousands of users simultaneously allow access to multiple users and provide support a large number of input/ output devices. These computers are usually used for centralized processing purposes by organisations for research, meteorological calculations, graphics, engineering works etc. IBM's ES 000, VAX8000 etc. are such computers.
- *Super Computers:* A super computer is a special purpose device characterized by highest processing speed, extremely fast expensive. The super computers can perform hundreds of millions of instruction per second and allow multiple types of input devices and support large number of output devices. They are best to use in a very large complex, scientific research, technical applications covering weather forecasting, engineering design, nuclear physics etc. CRAY-3, PARAM Padma etc. are example of super computer.

3.2.3.3.1.5 Main Components of a Computer

The main components of a computer are Central Processing Unit (CPU), Input Units and Output Units.

a. *Central Processing Unit:* The CPU is a microprocessor and acts as brain of a computer system which consists of three major units: Arithmetic and Logic Unit (ALU), Control Unit (CU) and Memory Unit (MU). The ALU performs all calculations and comparison operation during job processing. On the other hand, the MU stores data and instructions. The control unit acts as the central nervous system of a computer system and controls, co-ordinates and manages the entire operations of all other components of the system.

b. *Input Devices:* The input devices are used to feed data into the computer system. Some of the most common input devices are: key board, mouse, joystick, scanner, barcode reader etc.

c. *Output Devices*: The output devices act as reverse of the input device and provides information obtained from data processing to the user. Monitor, printer, plotter etc. are examples some of the main output devices.

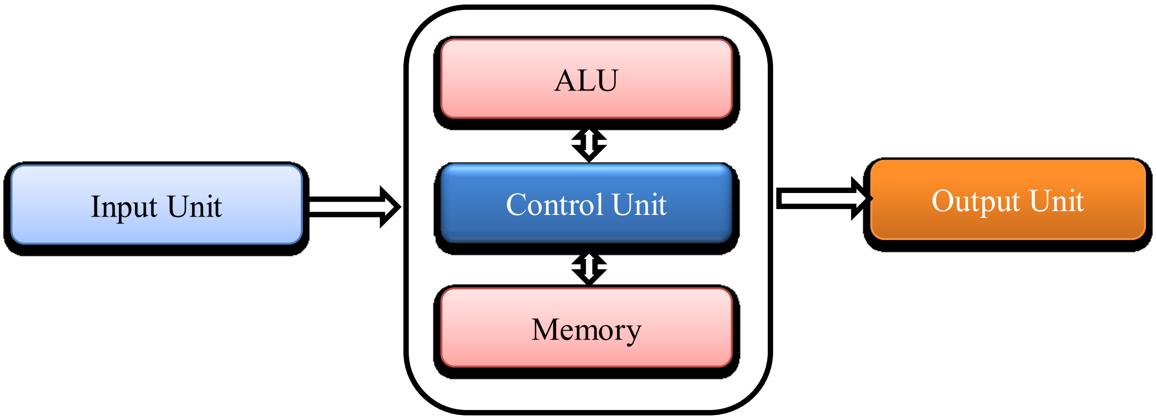

Figure 3. 1: Main Components of a Computer

3.2.3.3.1.6 Computer Software

The term computer software refers to the set of programs required for data processing. There are two major types of computer software: System software and application software. The system software controls and manages all the components of a computer system. Some examples of system software are: Operating System (OS), Device Driver, Assembler, Interpreter etc. The application software performs specific tasks or application like word processing, Desk Top Publishing (DTP), Spreadsheet, Database Management etc.

3.2.3.3.1.7 Database Management System (DBMS)

DBMS are software packages which are designed to maintain and to retrieve required information from databases. The function of a DBMS is: to store, organise, control access and to protect data. DBMS provides decision support in information analysis, transaction processing and decision making etc.The requirements of a well-designed DBMS are elimination of redundancy, Maintain consistency, data sharing, and security of the data, maintain integrity, data independence, reduced maintenance, provide a query language to access data, transaction processing, efficient data recovery system, data protection, ability to lock record etc.

DBMS uses three basic structures to organise data elements. i. Hierarchical Database Structure, ii. Network Database Structure and iii. Relational Database Structure. The Hierarchical Database organise data in a tree structure. The Network Database Structure consists of two data sets: a set of record and a set of links. The Relational database treated data as tables with rows and column.

3.2.3.3.2 Communication Technology

The communication technology basically deals with the means and methods required for transmission of information. By communication we mean the process of transferring a message from one location to another. The sender creates and send message from source, then the message is carries through medium to the receiver and the receiver (sink) the message (Figure 3.2). The basic elements of any communication system are: message sender/source/messenger, communication medium and receiver

Figure 3.2: Basic Elements of a Communication System.

It is not possible to incorporate all the aspects of the Communication Technology here; some of the related aspects are discussed.

***3.2.3.3.2.1** Networks*

Networking is a system of inter connected devices which can communicate each other for sharing programme, facilities, data, information and knowledge. The four basic types of computer networks are: Personal Area Network (PAN), Local Area Network (LAN), Metropolitan Area Network (MAN) and Wide Area Network (WAN)

The way in which the networking devices are connected is known as network topology. Though we get different types of network topologies, four major types are: star network topology, ring network topology, bus network topology and completely connected network topology.

a. *Star Network Topology:* In a star network multiple computers are connected to a centralized computer. The system is fully depends on the centralized computer. If it fails the whole network will not work at all.

b. *Ring Network Topology:* In this topology, multiple computers are connected to each other in a closed ring. A computer receives data from one of its adjacent device.

c. *Bus Network Topology:* In a bus network topology, all devices are connected through a single communication channel.

d. *Completely Connected Network Topology:* In a Completely Connected Network Topology, each device has a direct link with all other devices.

3.2.3.3.2.2 *Data Transmission Techniques*

Communication system transmits data by means of electrical signals, which may be analog signal or digital signal. Computer generated data are digital in nature on the other hand the normal telephone lines usually analog signals. For transmitting digital data over an analog facility, it must be converted from digital to analog by sender and the receiver should convert it from analog to digital mode. The process of converting the digital signal to analog is termed as modulation and the reverse process of converting analog signal to digital is termed as demodulation. To perform the modulation and demodulation, a special device named “Modem” derived from two separate terms “Modulator” and “Demodulator” is used by communication systems.

3.2.3.3.2.3 *Transmission Modes*

There are three modes for data transfer which are Simplex: where the data can be transmitted in one direction only, half duplex: where the data can be transmitted in both directions but in only one direction at a time, and full duplex : where the data can be transmitted in both directions simultaneously.

3.2.3.3.2.4 Data Transmission Media

There are several types of transmission media for data transmission. Some of them are: Twisted - Pair Wire , Coaxial Cable and Microwave System

The twisted pair consists of two copper wires twisted around each other. The coaxial cable on the other hand consists of copper wire surrounded by PVC insulation. The microwave system is being a wireless system, uses radio signal transmitted through air. The optical fiber cable is made of glass or silica and it can transmit data with very high speed and accuracy. The curvature of the earth, mountains, hills and other structures usually block the line-of-sight of microwave communication. The communication satellites, as relay stations in outer space overcome the burning question.

3.3 BEST PRACTICES AND USE OF INFORMATION TECHNOLOGY

Information technology is an electronic technology used to collect, locate, store, process, retrieve, disseminate and use information. IT is very closely associated with the organization or even a part of it. In almost every aspect of the human efforts is supported by or based on IT. The information technology enabled services and product or remote processing etc. help a lot especially the service oriented organisations. Library and Information Centres are not exception. IT has an extensive connotation for library and information professionals.

The information technology has a vast potential for enabling an extensive range of latest opportunities and offering better solutions to accomplish superior levels of efficiency, productivity and best quality services in the library and information centres.

Murthy & Cholin (2003) said that "The impact of IT on the library is quite obvious and has created new types of work, prompted redefinition of certain functions, influenced interpersonal relationships,transformed traditional organizational structures into new institutional entities. Resource sharing under this circumstance plays a pivotal role".

Arora (2014) mentioned that "Developments in IT, its products and their applications in libraries, have significantly impacted library's collections, services, profession and its delivery to the users. Libraries are increasingly committing larger proportion of their financial allocation for acquisition and access to electronic resources. Library and information centres in general an academic libraries in particular, are encountering a great deal of change in recent years. Users now have multiple options to meet their information requirement".

3.3.1 Global Scenario

The application of information technology in the academic libraries started with the advent of computer technology and its use for library products and services . The library and information centres have been applying technology in general and computers in particular to automate the libraries basic operations and information services since 1950s. In recent years, the IT has created drastic change in the library environment by playing crucial role in the library management system and services all over the world.

Yee (2012) studied the state of the art practices in the academic libraries in USA, Hong Kong and Singapore to establish New Zealand's and Australian academic libraries current practice of mobile technology .The study reveals that about 44% of Australian university libraries provide mobile friendly service to the users to check catalogues and the rest universities planned to implement this within five years for its most popularity. Some university libraries also provide mobile technology services for room booking and to book PCs. About 35% libraries planned to provide online reference help through mobile devices. Presently the University of Melbourne, Curtin University, University of Wollongong and University of Auckland provide the reference help through mobile technology. The researcher found from the study that the environment of telecommunication was very competitive, vibrant as well as very progressive with Wi-Fi connectivity everywhere for enabling services as “people on the go”. The libraries have been ever ready to provide quick services through mobile technology. In USA, libraries provide hand-held device, look and feel iPhone interface to the users. The commonly used mobile services have been listed as Ask a librarian/Text/Chat, library locations and hours, catalogue search, contents, maps-campus and library floors, courses, cards-ID/ access/accounts, news and events, full university websites, find groups/meetings, athletics/sports, photos/images, calendar , videos, room/PC reservation , places/location awareness etc.

Illangarathne, Amaraweera & Yingming (2015) studied the cloud initiative for special libraries in Sri Lanka found that, most of the libraries having personal computers and some have server for online activity,81% libraries having any type of network system, one library comprises WAN, all the libraries having internet connectivity, about 27% libraries sharing resources through OPAC and 20% with Web OPAC, 20% libraries handling e-books and e-journals and about 47% libraries accessed to online databases.

Groenewegen (2013) studied the library automation in Australia under different chronological order by providing headings like bringing home the message(1960-1965), getting your hands dirty (1966-1975), creating content (1970-1990) ,in- house system to integrated library management systems(1975-1985), from surrogates to full text (1975-1995), and from analog to digital library (from 1990 to date).

Pitman, Trahn, & Wilson (2013) found through the project entitled 'Best Practice for Australian University Libraries' of the Commonwealth Department of Education, Training and Youth Affairs Evaluations and Investigations Program . The project recognized some challenging areas in terms of performance measurement and benchmarking such as electronic library services, information literacy and reference and research services etc. The Australian Quality Council awarded recognition to two university libraries for the application and implementation of best practices and making leadership for others.

Shaw & Spink (2013) discusses the concepts of virtual reference service tools and service provision and other best practice, and examines the evaluation of the services in Australia. The email supported by a Frequently Asked Questions (FAQ) database is suggested as a preferred and more cost effective means of virtual reference service provision in the libraries.

Ugwu & Onyegiri (2012) studied the University of Nigeria's management problems of electronic information resources and found multidimensional problems. The ICT skills of library manpower and library budget were not optimum.

Kamba (2011) studied the ICT competency in Nigeria covering the themes like ICT and library and information science in higher education, the need for ICT competency framework for LIS schools, ICT competency framework and aimed at the need for model ICT based curriculum.

Ossai & Ugbah (2010) conducted a study on the impact of automated library services and usage on student's academic performance in Nigerian Universities. The study reveals that the students those use the automated library is better than the traditional library. The users prefer more the automated library to traditional library.

Asemi (2005) conducted a study on digital resources available in the academic libraries of Medical Science University of Isfahan, Iran and found that about one third of the respondents (31%) were familiar to digital resources via personal communication and most of the users (70%) familiar with digital resources. About 43% of the respondents feel that their information requirement is met at average level. The students of the study area (69%) use digital resources and more than half (54%) of the students use "CLBJ Database" by accessing through Central Library LAN or Central Library Homepage.

3.3.2 National Scenario

The process of computerization started through using punched cards in India during late 1950s and early 1960s.The Indian Statistical Institute (ISI), Calcutta install the first computer in our country in 1955.The INSDOC probably used computers in library activities for the first time in 1964 for creating author and subject indexes for "Indian Science Abstract". During 1970s many institutions/ organisations like DRTC (Bangalore), IIT (Madras), BARC, TIFR (Bombay), BHEL(R&) (Hyderabad) etc. used computers for information products and services. Since 1970s, the application of computers in library activities has been increasing at a faster rate. The Central and State Governments through their various wings have been taken initiatives and providing financial support and training in IT sector resulting various library networks like: CALIBNET, INFLIBNET, DELNET, PUNENET, ADINET, MYLIBNET etc. The establishment of the National Knowledge Network in March, 2010, for inter-connect all knowledge institutions all over the country with very high speed data communication network for encouraging resource sharing and creating collaborative research by approving budget of an outlay of ₹5990 crore with implementing agency NIC is also one of the a positive steps in the country.

However, the library and information centres of India have modernized applying ICT tremendously in recent years. The UGC has been taking major role for modernizing the libraries of higher educational institutions all over the country by providing directly grants to them or providing IT support and training through its INFLIBNET Centre.Based on the various study conducted on the country, the status of information technology application in academic library system is briefly discussed below:

From the outcome of the study conducted by **Sharma** (2015) reveals that, university libraries possess a hybrid collection of both print and e-resources through direct purchase or through consortia initiatives, the JNU central library has access to e- books, stepping towards digital library and lack of adequate funds.

Singh & Tyagi (2015) found that half of the engineering college libraries of Western Uttar Pradesh region, completely automated using SOUL,LIBSYS, LIBWARE and SIM software's, there are 87 % IT specialized staff available for automation and networking.

Singh & Sharma (2015) mentioned that the most of the students (95.4%) and faculty members (90%)of management institutes in Delhi and NCR using/browsing internet, More than half students(60.9%) and faculty members (68.3%) use library websites, 67.2% students and 58.3% faculty members use internet daily.

Chand, Arora, Naga & Pradhan (2008) highlighted the usage trends among the universities of North East India in accessing the e-journals through UGC Infonet Digital Library consortium that in the list of 100 universities there are three universities of the region among the 50 universities with highest usage uses of e-resources in last three years . The Gauhati University Library ranked top in terms of overall usage in the region till August 2008.

3.3.3 Reasons for Application of IT in Academic Libraries

There are various advantageous factors of IT application in libraries and it is indispensible part of the system today. Automation is one of the major portions of IT application in libraries, by which a traditional library can transform manual system to the application of computers and other modern techniques for effective library operations and services. Several people have put forwarded a variety of reasons contributing IT applications in library and information centres.

Venkataramana & Chandrasekhar (1998) mentioned that by effective use of IT in libraries provide benefits like: increase efficiency in operations, improve the quality and range of services, eliminates repetitive nature of works, increase moral and motivation of library manpower, facilitates easy and wider access to all kinds of information sources, facilitates cooperation and resource sharing, facilitate faster information communication, improves productivity and image of the library, save time, space and resources.

Lancaster & Sandore (1997) has given some better reasons of IT application to libraries as: to cope up with increasing demands, to provide new services, to reduce staff

,to allow more jobs to be performed by clerical staff, to improve existing services, to collect better data to aid overall management of the library etc.

Haravu (1995) has identified some reasons for both academic and special libraries seek the application of IT solutions are: to obtain increase operational efficiency, improve the quality of services, improve the management of their physical and financial resources, facilitate wider dissemination of their information products and services, enable rapid communication with other libraries and professional peers, relieve professional staff from clerical chores so that they are available for user oriented services, provide new services hither to not possible, facilitate wider access to information for their clients, enable their participation in resource sharing library networks.

Sarmah (2011) has mentioned that perhaps, there may not be any area of library operation or services where we can't apply IT to get benefits. As every subsystem of a library depends on one another, computers help to increase efficiency and improve every subsystem and the entire performance of the library. Library automation helps us to fulfill Ranganathan's Five Laws of Library Science by enabling right match between the reader and documents as well as saves the time of the reader and staff. He provided some reasons for IT application to library operations: to avoid duplication of effort and work in the library operation, to improve existing services and provide new information services, to cope up with increasing demands, to increase the speed of operation in the libraries, to allow more activities to be performed by the staff, to save space and store large quantities of non- conventional information, to improve cooperation and resource sharing among libraries, to produce and supply more accurate information, to improve library's image in the minds of people.

3.3.4 Use of Computers for House Keeping Operations

Computers are used today in almost every library operation including basic housekeeping operations. Some of the foremost areas of computer application in libraries are acquisition, cataloguing, circulation control, serial control and dissemination of information.

3.3.4.1 Acquisition

The acquisition system is primarily related to the collection development for the library. The prime objective of the acquisition system includes books/documents selection source identification, searching, selecting and procuring required sources of information and knowledge for the users as well as manages and control the funds allocated for the purpose. Computerised acquisition enables in selection, ordering, procuring books and other library relevant materials more easily, accurately, speedily and effectively.

According to **Ramana** (2013) Computerised acquisition system performs the following functions: book selection, pre- order checking of duplicate books, print purchase orders, send reminder/ cancellation letters, invoice processing, accessing reviewed items, update vendor file, print accession list/ registrar, send notification to the users, print fund utilization accounts, print vendor's performance report.

3.3.4.2 Cataloguing

Cataloguing is a process by which a library provides its collection of bibliographic documents arranged in a systematic way for enabling library users readily accessible to them. A computerised cataloguing system may perform following functions: input complete bibliographic records of newly received documents, perform functions like add, delete and modify records, reduce the clerical effort, stationery and unit cost of cataloguing , speed up the processing of documents into the collection, provide database search by various access points across libraries, report of works performed by a particular staff , integrate with other sub-systems of the library, generate bar codes, produce various lists like authors, titles, subjects, class numbers, publishers along with bibliographies, list of additions, indexes etc., generate output in various formats of catalogues like ISBD (M), AACR, MARC, CCF etc., enhance the value of catalogue by connecting virtually any digital file to a record, facilitate more effective resource sharing/inter library lending services through union catalogues etc.

Through computerised catalogue is the best tool for retrieving information about the document of a library effectively easily and very quickly. Using OPAC i.e. catalogue in computerised form and online, a user can search his/her requirement through different access points.

3.3.4.3 Circulation Control

Circulation is the process of lending of library documents to the maximum readers for effective utilisation. The traditional system of circulation is very lengthy which consumes more time of the staff in repetitive tasks. To save the valuable time both of the reader and staff, the circulation system must be very simple, fast and effective. An automated circulation system enables the following functions: fast charging and discharging of library documents , provide the information of the status of a document where the on loan, on reserve or location etc. renewal of loans, identify overdue items and notification about the defaulters, remainders sending for overdue items, calculation of fines, sending fine notices, printing fine receipts, memberships record maintenance, generate circulation statistics etc.

3.3.4.4 Serial Control

Serials include periodicals, journals, newspapers, annuals, memoirs, proceedings etc. The continuing/ongoing nature of serials creates problems in subscriptions and its management and thus, requires a separate control system. Computer application has been treated as most effective instrument for serial control in the libraries for performing functions like: ordering new journals and renewing or discontinuing existing journals, receiving and accessioning each individual issue, sending reminders for the issues not received by the library, preparing lists of journals received, cancelled and holdings with their status keeping track of the amount spent on serials subscriptions, serials binding etc.

3.3.4.5 Computer Application in Classification

Computerisation enables the classifier in selecting the isolate terms cluster and arranging them in a hierarchical order, synthesising the class numbers. Through a typical retrieval system the constructed class numbers can easily be applied as a query language. By computerization, we can improve accuracy, save time and increase speed in classification process.

3.3.4.6 Stock Verification

Stock verification or stock taking is the process of periodically checking and accounting about the books lost or misplaced of the documents acquired by a library. Manual stock verification is very time as well as labour consuming and interrupt in smooth running the library services of the users. The stock taking through computer application overcomes the problems and help in the library management properly.

3.3.5 IT in Storage and Retrieval of Information

Libraries in the past, documents were presented in a varied of types and forms like clay tablets, silk, metal and palm leaves etc. The fast growth and development of both the papers and printing technologies has positive impact on publication. Today, thousands of pages have been printing every second globally creating locate, storage and retrieval problems. The computer application is the ultimate solution to overcome this problem i.e. to transform the paper documents to electronic documents.The magnetic discs, optical discs and other digital media are extensively used to store enormous amount of information. In a computerised library, we find use of mostcommon storage media are: micro films, floppy discs, CD-ROMs, DVD-ROMs, Flash Drive/ Pen Drive/USB Drive, External Hard Discs etc. There seemed continuous improvements one upon another in the storage devices in terms of their decreasing cost, increase reliability, readability of large blocks of data, easy handling, data storage life and permanency storage etc.

3.3.6 Application of IT in Reference and Information Services

Library and information centres provide a variety of reference and information services to their end users both on demand and in anticipation. Libraries apply Information Technology tremendously to increase the efficiency and effectiveness of their reference and information services and to meet the present day challenges. An automated library may provide services like development of databases, reference service, online public access catalogue (OPAC), selective dissemination of information service(SDI),current awareness service(CAS),literature search service, bibliographic service, indexing CD-ROM/DVD-ROM service, online search service, internet service etc. Beside these, networking has created actual library resource sharing more effectively in recent years.

3.3.7 Hypertext and Hypermedia in Library Services

The term “Hypertext” was coined by Ted Nelson around 1965. It is a text which is able to perform any task beyond the constrained to be linear. It is a text enabling links to other texts. The source location is pointed by a text through another text is known as hypertext. By providing a structure of linked elements via the user can navigate, interactive multimedia becoming hypermedia. The World Wide Web (WWW) is a typical example of, on the other hand, a non-interactive movies is an example of standard multimedia, due to absence of hyperlinks.

Both the hypertext and hypermedia work extensively in the library services to satisfy the users diversified strong demands and treated as an indispensible aspect for rendering quality services as well as to meet the present day challenges. Internet is a common platform where we get both the hypertext and hypermedia.

3.3.8 Teleconferencing / Video Conferencing in Libraries

Teleconferencing / Video Conferencing are an integral part of communication as well as education system today. The telecommunication satellites facilitated efficient and effective conferencing. Through these, we may create and increase the reader – writer relationship.

Students and researches scholars can directly contact and interact with the teachers, experts etc. globally for problem solving from a distant place by overcoming the geographical barrier. Library and information centers can exercise such best practices for enhancing quality services.

3.3.9 Impact of IT on User and Library Staff

The successful and optimum utilization of any technology in a library completely depend on the human resources. The advent of IT and its application in libraries for better user support services has drastically changed the ways and means of library activities, services, products and impact on the staff and users. The attitudes, technological skill, training etc. of both the library staff and the user community are responsible for proper implementation of IT application.

Patra & Das (2012) found about half of the respondents (49.69%) collect their required information online, followed by audio-video(26.07%) and web resources(22.08%); prefer web enabled information services like list of current journal(76.99%),ILL service(65.64%),electronic news clipping services (64.11%), blogs and library portals (74.84%), Web OPAC (72.64%).

Choukhande (2008) found the information needs and information seeking behavior of faculty members and research scholars in Amravati University that about three fourth users (74.25%) agreed to have library networks; one fourth of the libraries provide internet services for research; about half of the respondent (42.91%) use internet facility for searching the desired information; most of the users (82%) do not find sufficient internet facility in their college libraries.

3.3.10 Building Digital Libraries

Building digital library is a present day challenge of the libraries which involve a wide range of technological, social and policy issues. Digital libraries are an electronic collection of real or virtual resources and facilitate elsewhere availability. The digital information collection may comprise of digital books, digital scanned images, textual and numeric data, graphics, digital movies. A hybrid library maintains its collection in computer readable form as an alternative, supplement or compliment to the traditional printed collection.

The IFLA / UNESCO Manifesto for Digital Libraries defined the digital library as an online collection of digital entities, of certain quality, that are created or collected and managed according to globally accepted principles for collection development and made accessible in a coherent and justifiable manner, supported by services necessary to allow users to retrieve and exploit the resources. A digital library forms a fundamental part of the services of a library, using new technology to provide access to digital collections. In a digital library, collections are created, managed and made accessible for readily and economically available for use. A digital library complements digital archives and initiatives for the preservation of information resources. Some of the features of digital libraries are as : Support multimedia component, enabling access to vast information collections, able to access by: any people, in any language, Any time, from any place of the globe etc., distributed and maintained globally, supports and provides interface for searching and retrieval ,easy to handle, search and manage, overcome any geographical barriers, deliver a powerful user-friendly interface for effective searching and retrieval etc.

The digital libraries are becoming very popular due to various advantageous factors like: absence of physical boundary, round the clock availability, multiple access, structural approach, conservation and preservation, information retrieval, quality of services, updated information, networking etc.

3.3.11 Multimedia Technology Application

The term multimedia is formed with two words “multi” meaning many and “media” meaning way of communication. Multimedia system conglomerates a wide variety of information sources into a multiplicity of applications. Libraries of today apply multimedia technology in libraries to fulfill the users’ strong demands. Multimedia databases attract the readers more because of its interactive nature on the lines of hypertext and hypermedia. The technology integrates the text, images/photographs, graphic art. video, sound, animation music medium etc.

3.3.12 Application of Electronic Surveillance System in Libraries

Libraries have been using electronic surveillance system for monitoring, security and purpose of preventing damage, misplaced, theft detection etc. of library documents. By applying these technologies, a library can reduce maintenance cost, manpower and increase accuracy efficiency as well as services to the users. Barcode, Closed Circuit Television (CCTV), Radio - Frequency Identification (RFID) etc. are commonly used electronic surveillance system in the libraries.

Barcode technology is essential for accurate, speedy, error free data entry in computerised libraries. It is an optical machine-readable self-contained messages with information encoded in it. Barcodes are generated with the help of barcode printers and can read only through barcode scanner.

The CCTV is also known as video surveillance which use video cameras for transmission signals to a specific place, on a restricted set of monitors. By applying CCTV, the whole library activities can be monitored at any time from a remote place for effective and efficient library management. The RFID apply electromagnetic fields for spontaneously ascertain and track tags attached to objects. The technology enables non line of sight empathy of items. Applying this system in library management enable activities like circulation, theft detection, re- shelving etc. The RFID is very efficient for its advantageous factors over the barcode technology. The application of this technology has become more popularity in the areas of library stock management, improved patron services, flexibility and modularity, security, less time needed for circulation, efficiency in inventory management, reduce repetitive works. These advantageous factors enable the patron of libraries in spending less time and effort in self-check in and check – out system.

3.3.13 Internet in the Academic Libraries

The advent of Internet and its application has brought a great revolution in global communication system. It is the largest global network of networks empowering computers to communicate and information and other resources across the globe. Internet is being extensively used in almost every human activities ranging from education, research, social, cultural, political, commercial and so on. Internet is one of the main sources of information in a library, being used for delivering wide variety of resources, products, tools and services for the end users. Internet connectivity is treated as pre- requisite for present day local, regional national and global resource sharing.

Singh & Sharma (2015) reported that the users of management institutions in Delhi and NCR use/ browse Internet extensively by most of the students (95.4%) followed by the faculty members (90%).the study also reveals that, the purpose of internet use by the students is study/research and e-mail chatting against faculty members use for study/ research and for finding relevant information regarding their area of interest. Both the students (67.2%) and faculty members (58.3%) use internet daily.

It is observed in the present study that , three fifth of the libraries (59.7%) provide free internet browsing facility to the users and about seven tenth users (67.80%) find Internet search facility in the libraries.

3.3.14 Application of IT in Resource Sharing and Library Networking

Due to the rapid development of printing technology and computer application, millions of pages have been printing every minute globally creating locating, collecting, storing and retrieving problems. There is no any library in the world, which can demand self-sufficient, it is neither possible nor feasible to acquire all the globally published materials for the library in one hand; the users diversified strong demand on the other hand. Resource sharing is the probable solution to overcome the issue.

In library resource sharing, a group of libraries come and join together to work in a co-operate manner. Users in a library now seek latest, exhaustive, authentic information. In a standalone library, it is very difficult and unable to satisfy users strong demand only with its collection or through traditional inter library loan. We have to share resources locally, regionally nationally and globally through establishing networks among the libraries.

Networking the libraries through WAN is the ultimate solution of it. Library and information centres now facilitate networking and resource sharing through IT application.

Arora 2005) mentioned some of the characteristics of a library and information networks and activities and services of library networks as follows: The main characteristics of a library and information networks are: equal access opportunity to all the member libraries, interdependent, use of standards and protocols, make collective decision, coordination and integration, centralised database and online data feeding and updation, more economic, extensive library services, global coverage and collaborative nature, provision of research and development of the products and services through taking feedback from member libraries etc. He mentioned activities and services of a library and information networks as :cooperative cataloguing, cooperative cataloguing of Internet resources: Subject Gateways, database services, document delivery services, inter library loan, shared electronic reference / real-time reference service, collective acquisition of resources, consortium purchase, joint archives and cooperative storage facilities, shared core collections, shared digital library project development, training of users and library staff, technology support to member institutions, communication services amongst members.

The library and information institutions of both national and international level have successfully practiced the resource sharing over the recent years. The consortium based access to electronic resources has eliminated the concept of information/document rich and poor libraries or libraries of developed or developing countries.

3.3.14.1 Library Networks - Indian Scenario

Though the library networks started in India in the mid 80's, the effective networking and resource sharing flourished in the present decade. The establishment of INFLIBNET Centre in 1988 facilitates nationwide effort to develop information access and transfer .The development of networks in India has depicted in chronological order in Table 3.1

Table 3.1: Development of Networks in India

Establishment	Network	Supported By	URL
1977	NICNET	NIC	http://www.nic.in
1986	CALIBNET, Kolkata	NISSAT	http://www.calibnet.org
1988	INFLIBNET, Gujarat	UGC	http://www.inflibnet.ac.in
1992	DELNET, Delhi	NISSAT	http://delnet.nic.in
1992	BONET, Delhi	NISSAT	http://www.bosla.org.in
1992	PUNENET	NISSAT,DSIR	http://punenet.ernet.in
1993	ADINET, Ahmedabad	NISSAT	http://www.alibnet.org
1993	MALIBNET, Chennai	INSDOC	www.malibnetonline.com
1994	MYLIBNET, Mysore	NISSAT	http://mylibnet.org
1995	BALNET, Bangalore	NISSAT	www.bangaloreuniversity.ac.in
2000	MANLIBNET, New Delhi	IIMA,AMA	http://manlibnet.in
2007	NODLIBNET, New Delhi	-	http://nodlibnet.blogspot.com

3.3.14.1.1 CALIBNET (Calcutta Library Network)

The CALIBINET was the first library network in the country. It enables libraries and their member's solutions effectively for their information requirements. The project was supported by NISSAT in 1986 and managed by the CALIBNET. The network was visualized as a metropolitan network by linking 38 libraries of Calcutta in 1993.The

CALIBNET provides services like software development (Sanjukta, Parapar),current content service (Confile service) ,document delivery service (Caliborder),Selective dissemination of information(Con Alert), institutional resource development services etc. It has been providing some services through website http://www.calibnet.org

3.3.14.1.2 DELNET (Developing Library Network)

DELNET was functional since 1988 and become a registered as a society in 1992. The center has been initially supported by the NISSAT and subsequently supported by Department of Scientific and Industrial Research, NIC, Department of Information Technology, Ministry of Communications and Information Technology and the Ministry of Culture, Government of India. Presently, DELNET has 5448 member libraries from India and 25 overseas members. DELNET has been providing value added services to its member libraries covering online database, inter library loan online, retro-conversion and creation and maintenance of bibliographic databases, conducting conferences/lectures/workshops/ training programmes, publishing DELNET Newsletter, developing in-house software, Internet, electronic mail and videoconferencing etc. The website of DELNET is http://www.delnet.nic.in

3.3.14.1.3 INFLIBNET

INFLIBNET is an autonomous Inter-University Centre of the UGC of India. This is a major national project initiated by the UGC in 1991, it became as an independent center in June, 1996. The centre is presently located at Gandhinagar near Infocity, Gujarat. INFLIBNET is the largest library network in India which has covered almost all the universities, colleges of the country and sharing value added resources through its consortium. The thrust of the centre is more in the areas of library networking, library automation and education and training programmes. The objectives of INFLIBNET are

- To establish and establish communication facilities for develop capability in information access and transfer for support to learning, scholarship, research and academic pursuit through mutual cooperation and agencies concerned involvement.
- To establish INFLIBNET for linking the library and information centres for avoiding duplication of efforts in the universities and colleges, UGC information centres, institutions of national importance and Research & Development institutions.
- The UGC has undertaken a major initiative "UGC- Infonet Digital Library Consortium" for the benefit of the academic community in the universities of the country under its purview through INFLIBNET and provides access to scholarly e-journals and databases in different disciplines. The centre has enabled access to those resources by extending the services to the UGC recognized colleges under the N-LIST project. Beside these the centre has been taking a variety of new initiatives for the assistance of academic community. Some of those are :
    - Shodhganga- a reservoir of Indian Theses and Dissertations,
    - Shodhgangotri-a repository of approved synopsis of Ph.D. Programme,
    - OJAS@INFLIBNET- an open access journal publishing platform,
    - Shibboleth based access management system,
    - Open source software and research and development,

- InfoPort-a comprehensive gateway to all Indian electronic scholarly content,
- e- PG Pathshala- e- Content for PG courses,
- Measuring research output of Indian Universities,
- IndCat- Online Union Catalogue of Indian Universities,
- SOUL 2.0- Integrated Library Management System etc.

The INFLIBNET Centre organizes two major conventions on alternate years namely International CALIBER and PLANNER, publish newsletters, proceedings of the conventions, organize seminar/workshops and training programmes regularly. At present, there are member universities, colleges participated in the N-List programme.

3.3.14.1.4 ADINET (Ahmedabad Library Network)

The Ahmedabad Library Network (ADINET) was registered as a society in 1994 with initial grants received from the NISSAT till 2003.The network covers all types of libraries from academic to special and public libraries. The major services of ADINET includes: Maintaining Database of over 5000 current periodicals received from more than 140 libraries of Ahmedabad, Creating content pages of library and information science journals, Document delivery and inter library loan, Supply photocopies from the journal published, Completion of backlog of any member library, manpower development programme, automation and digitization activities, retro conversion of data, organise seminars quarterly on current trends in libraries, celebration of librarians' day, providing directory of librarians on website etc. Presently (As on 12.03.2016), ADINET covers 2079 member libraries. Till now 28 newsletter published, 41 CUCO LIS published, 20 book and papers published, 28 publication and organized 31 events, 47 lectures,9 quarterly seminars and 27 seminars by the network. The website of the network is http://www.alibnet.org

3.3.14.1.5 MALIBNET (Madras Library Networks)

MALIBNET was established in 1993 with the financial support of Indian National Scientific Documentation Centre in Chennai. Presently there are nearly 83 libraries in Chennai contributing actively in the network and 37 major educational/ research institutions have participated as member library. The objective e of the MALIBNET reflects the aspects of faster growth in the ICT fields, undertake scientific research in LIS field, evolve an Indian network of libraries and information centres, enabling suitable links to national and international libraries and networks, free e- journals and facilitate resource sharing and dissemination of information through networks.

3.3.14.1.6 MYLIBNET (Mysore Library Networks)

The MYLIBNET was initiated in 1995 at the city of Mysore with financial support of NISSAT. The network is stationed in the Central Food Technology Research Institute (CFTRI), Mysore and effectively working for promoting information services in Mysore city. MYLIBNET has been organizing various programmes for the enhancing library and information professionals on regular basis in the fields of multimedia, barcode, internet and web publishing application in libraries database creation through CCF, Digital library, library management system band management etc. There are 27 member libraries contributing to this network and the facilities may be obtained through its website http://www.mylibnet.org

3.3.14.2 A View on Library Networks Abroad

The library and information organisations, institutions and associations of the world have been trying and practicing for effective resource sharing through library networking. Global programmes like UNISIST of UNESCO, Universal Availability of Publications (UAP), and Universal Access to Information (UAI) of IFLA etc. are some of the initiatives undertaken for the same. A view on some of the overseas Library Networks is mentioned below:

3.3.14.2.1 Online Computer Library Centre (OCLC)

The OCLC was founded in July 6, 1967 with the headquarters in Dublin, Ohio, United States. It is an international library cooperative enabling shared technologies, services, original research and community programmes for the library community. The motto of the OCLC for joining librarians, technologists, pioneers, leaders, researchers and learners coming together with thousands of member libraries covering more than 100 countries to make information more accessible and more useful without any barriers. The objectives and functions of the OCLC reflects the following aspects :

- To advance understanding and drive innovation through research, ensure application of new technologies for making a difference and shared services for information transfer ,
- To connect people for the information they need through shared WorldCat data, syndication programme and partnership through putting enabling world’s knowledge in hand,

- To move forward with the purpose as a network for addressing shared challenges at a scale , Public awareness through "Geek the Library" and online learning hub "Web Junction" for libraries,
- A breakthrough in community for better support local vibrancy and growth etc.

Through OCLC WorldCat the Library of the University of Alberta created a major milestone by 2,000,000,000 th holding records enabling answers to the information seekers regarding their needs and effective support other libraries for increasing their efficiency.

3.3.14.2.2 The Indonesian Digital Library Network (Indonesia DLN)

It is the first digital library network in Indonesia supported by the Knowledge Management Research Group, which was launched in June 2001 aiming at unlock the knowledge of the people of Indonesia locally, nationally and internationally. It covers the information and resources about the country, projects, theses, research reports, dissertations, disseminate and inviting contributions in a user friendly way. The network has witnessed growing fast and within two months of its inception 43 members have successfully connected to the network and started contribute and share e- collections through the URL http://idln.itb.ac.id.

3.3.14.2.3 Research Libraries and Information Network (RLIN)

The RLIN network was established at Stanford, California in 1974 with the more than 150 universities, archives, research libraries, museums, historical societies and other related institutions aiming at research and learning through open access to information. The Research Library Group has created a union catalogue of the RLIN covering more than one hundred million bibliographic records from more than 250 sources of information over 365 languages through collective efforts. The RLIN has about 5,000,00 records contribution received from museums ,libraries and historical societies of North America . The membership of the network has penetrated globally by extending membership to the countries like Canada, Italy, Russia, United Kingdom, Ireland, Netherland, Switzerland, Spain, etc. aiming at enabling international research support .

3.3.14.2.4 Western Library Network (WLN)

The WLN was established in 1972 at Olympia, Washington and provide effective support a broad range of high quality innovative, technical and database services to the user community through online computerised system to enhance resource sharing and automated library functions. Presently the online bibliographic network has fully-fledged in size. The WLN's union catalogue encompasses more than 11 million bibliographic records and with more than 22 million library holdings.

3.3.14.2.5 British Library National Bibliographic Service (NBS)

The British Library National Bibliographic Service provide the information of national imprint through the British National Bibliography (BNB) through online database apart from the print, The NBS facilitate online access to more than 17 million bibliographic records through 22 databases with the coverage of printed documents from all ages and all cultures applying international bibliographic standards.

3.3.14.2.6 Birmingham Libraries Co-operative Mechanisation Project (BLCMP)

The Birmingham Libraries Co-operative Mechanisation Project of Birmingham was started in 1969. Through this project over the years developed successfully over 17 million MARC-based records, integrated library management system development and enriching services like Electronic Data Interchange-for linking booksellers, UNITYWeb-for linking catalogues, TDNet-for electronic journal management etc.

3.3.14.2.7 London and South Eastern Library Region (LASER)

The London and South Eastern Library Region was the first in UK to set up a union catalogue system in 1971. It played vital role in formation of the Electronic Access to Resources in Libraries (EARL) consortium for networking the libraries in 1995. The Ask a Librarian and EuroGuide etc. are best example of services besides sharing of resources.

3.3.14.2.8 Joint Academic Network (JANET)

The JANET is a funded by the UK government enabling computer networks and other electronic based services to UK education and research via more than 20 MAN across the country and the network is linked to European and worldwide NRENs via GEANT and peers. It is widely used by most of the higher educational institutions for accessing to the web.

3.3.14.2.9 National Science Library (NSL)

The National Science Library was formerly known as CISTI (Canada Institute for Science and Technical Institute) located Ottawa, Ontario with most comprehensive published collection in the areas of science, technology, medicine and engineering etc. The library through National Research Council of Canada (NRC) and others extends novelty support , research activities , technical and scientific services to the end users with its value added collection of books, periodicals, technical reports and databases more than 50,000 serial titles 8,00,000 books and over 2 million technical reports (microfiche) etc. The archives can be search through archives@nrc-cnrc.gc.ca.

Apart from these, there are various libraries, information centres, data centres, library associations etc. all over the world, actively participating network programmes and sharing resources on consortium basis.

3.4 BEST PRACTICES, INFORMATION TECHNOLOGY AND MODERNISATION OF LIBRARIES

From the above discussion, we have come to know about the best practices, information technology and modernisation. There is a positive impact of application of information technology, modernisation of libraries on best practices in the libraries for quality services and product. Though the attitude of the librarian and library staff play major role, the college authority has to provide basic infrastructure and maximum number of professionally qualified staff in the libraries.

The best practices depend on the attitude of the library staff and the college authority, the role played by the stakeholders of the respective colleges, the library associations , the central and state governments and its various agencies and others also have to play positive steps in this regards.

3.4.1 Role of UGC

The University Grants Commission, the highest agency of higher education in India has been taking various steps since its inception to uplift the education system directly or through its agencies/centres. The growth and development of higher educational institutions and their functions, emerging challenging issues and its solution are related to the UGC. By monitoring and suggesting the educational institutions it should provide sufficient grants uniformly for the modernisation and IT application of the libraries.

3.4.2 Role of INFLIBNET

The Information and Library Network Centre (INFLIBNET) is an autonomous Inter-University Centre of UGC established in May 1996. It is located at Infocity of Gandhinagar, Ahmedabad. The thrust area of activity and services of the centre are geared towards modernizing the academic libraries and information centres, developments of information access and transfer, learning, academic pursuits and support scholarship. The centre has been acting as a nodal agency for networking among the libraries and information centres in universities, higher learning institutions and research and development (R&D) organisations of India. The centre has been plying major roles and initiatives for improving scholarly communication amongst the academicians and research community all over the country.

In the mission and vision of INFLIBNET Centre has reflected various issues of best practices like weightage on the latest technology, creating a virtual network of people and resources in academic institutions for effective and efficient access to information and knowledge through perseverance, innovation and collaboration, provision of continuous, reliable and global access to peer-reviewed scholarly e- resources for all the educational institutions aiming services and tools, processes and practices for its effective use and increase value , build and strengthen information communication technologies infrastructure with value-added services, improve tools, techniques and procedures etc. for securing convenient access management to access information in e- format from anytime and anywhere, provision of resource selection guides and online tutorials regarding how to delivery and usage of the resources, Facilitate creation of open access digital repositories in each educational institution for hosting educational and research content created by the institutions in the country. The aims and objectives of the INFLIBNET centre covers the themes like promotion and establish communication facilities to increase capability in information transfer and access and support to scholarship, learning, research and academic pursuits; Establishment of information and library network to link libraries and information centres and research and development institutions to avoid duplication of hard work; promote and countrywide implement computerization in the libraries and information centres with uniform standards; grow standards and even guidelines in tools ,techniques, methods, procedures, services and promote computer infrastructure in all libraries to facilitate optimal use of resources and facilities by pooling, sharing and exchange of data and information ,develop a national network by interconnecting libraries and information centres and progress in capability in information handling and services; offer reliable access to documents of libraries through forming on-line union catalogue of serials, theses / dissertations, books, monographs and non-book materials among the various libraries in the country; accessing bibliographic information sources with citations, abstracts, etc. through databases of the NISSAT, UGC Information Centres, City Networks etc.; accessing of national and international databases and international information networks and centres; archiving manuscripts and information documents in difference Indian languages through new methods and techniques in digital images ; maximizing information resource utilization with shared cataloguing, inter-library loan service, catalogue production, collection development and avoid duplication of works; facilitate users access to information to serials, theses/dissertation, books, monographic and non-book materials ; for providing online information services; creating databases of projects, institutions, specialists, etc. to encourage co-operation among libraries, documentation centres and information centres in the country; training for human resources in the field of library computerisation and networking to establish, manage and sustain the INFLIBNET centre; provision of academic communication among the scientists, engineers, social scientists, academicians, faculty, researchers and students through modern technologies like E-mail, file transfer, audio/video conferencing etc. modes. system designing and studies in communications, computer networking, information handling and data management etc. fields; launch systems for the communication network and organize maintenance through control and monitoring; collaborating with institutions, libraries, information centres and other organizations in the country and globally ; stimulate research and development increase facilities and to creation of technical positions , create revenue by providing consultancies and information services etc. The UGC- INFONET Digital Library Consortium has opened the windows of resource sharing activities among the university libraries of India. Presently (As on 25.02.2016) there are 433 members of the consortium covering 32 states (Table 3.2.).

Table 3.2: State wise Members of the UGC- INFONET DL Consortium

Sl. No.	State	Number of Members
1	Andhra Pradesh	12
2	Arunachal Pradesh	2
3	Assam	9
4	Bihar	12
5	Chandigarh	2
6	Chhattisgarh	7
7	Delhi	30
8	Goa	1
9	Gujarat	24
10	Haryana	17
11	Himachal Pradesh	8
12	Jammu & Kashmir	8
13	Jharkhand	8
14	Karnataka	31
15	Kerala	14
16	Madhya Pradesh	19
17	Maharashtra	45
18	Manipur	1
19	Meghalaya	2
20	Mizoram	1
21	Nagaland	1
22	Odisha	18
23	Pondicherry	1
24	Punjab	14
25	Rajasthan	22
26	Sikkim	1
27	Tamil Nadu	30
28	Telangana	18
29	Tripura	2
30	Uttar Pradesh	33
31	Uttarakhand	10
32	West Bengal	28

(Source: http:// www.inflibnet .ac.in. Accessed on 25.02.2016)

The ICT being one of the major driving forces in the present day education system, the Centre, on behalf of the UGC, has undertaken various positive steps to enhance the academia of the country. Some of the initiatives of the Centre are mainly:

- IndCat : A country wide unified online union catalogue of books, theses and Journals those are available in the university libraries .
- SOUL 2.0: The state –of- the- art integrated library management software.
- UGC-Infonet Digital Library Consortium: A consortium for promoting access to selected electronic scholarly journals and databases to the Indian Universities in almost all disciplines.
- N-LIST: The national library and information services infrastructure for scholarly content which extends access to electronic books and journals to the colleges.
- Shodhganga: It is an open access digital repository by country wide online submission of doctoral theses and dissertations of research scholars enhancing full text access of theses.
- Shodhgangotri: A repository of synopsis, for enabling research scholars to submitting their approved synopsis of research proposals submitted to their respective universities.
- Open Journals Access System: A platform of open access journal publishing platform enabling faculty and researchers of the Indian universities to launch on their open access journals to Open Journals Access System platform.
- Info Port: It is a complete subject gateway for Indian electronic scholarly resources.

- e-PG Pathshala: This project assigned to the UGC by NME-ICT. Through it e-contents are developed for postgraduate level covering 77 subjects.
- VIDWAN: A premier database of profiles of Indian scientists and faculty members serving and involving teaching and research in leading academic institutions and other research and development osganisations.
- e - Acharya : It is an integrated e-content portal – a web based portal consists of all the e- content funded and developed under NME-ICT.

3.4.3 Role of NAAC

NAAC stands for National Assessment and Accreditation Council, established in 1994 with its headquarters in Bangalore, by the UGC to assess and accredit institutions of higher education in India aiming at upholding the quality of higher education in the country. Besides accreditation, the organization also provides guidelines to the institutions for quality education and how to improve the quality through best practices in every units of the organization. NAAC also provide financial assistance to the institutions to hold workshops/seminars for quality education in the country.

Since its inception, NAAC has accredited most of the higher educational institutions in the country. As a library has enormous contribution towards the parent organisation's accreditation process by practicing best policies and functions laid by the NAAC. There is an opportunity of the parent organization that through modernizing the libraries by optimal computer application which is closely associated with best practices, can acquire/ increase weightage in the entire accreditation process.

3.4.4 Best Practices in the Colleges Libraries in India: A View

To know the best practices in the colleges libraries in India, we have to study each and every college of the country, which is neither possible nor feasible to the researcher for its vastness of the area and time constrain. A college through N-LIST membership can access a wide range of electronic resources including 6000+ e-journals and 97,000+ e-books. By taking the N-LIST membership (one of the key elements of best practices) as an indicator, we may get a bird's eye view of the status in the country.

3.4.4.1 Status of N-LIST Registration in India

The total number of N-LIST registration is 5048 and the user is 860961 (as on 25.02.2016). From the Table 3.3., we have come to know that 3408 number of 12(B) Colleges, 1184 number of Non-Aided Colleges having N-LIST membership. The membership has been increasing day by day at a faster rate.

Table 3.3: N-LIST Membership of India

N-List Members	Total
Total Numbers of Registration	5048
Number of 12(B) /2F Colleges	3408
Number of Non-Aided College	1184
Number of 12(B) and Non-Aided Colleges	4552
Number of Science College	2291

(Source: http:// www.inflibnet .ac.in. Accessed on 25.02.2016)

INFLIBNET has been provided a list of top ten member colleges users of NLIST in the country. Presently, the top ten college users of NLIST in the country are depicted in Table 3.4.

Table 3.4: Top Ten Member Colleges of NLIST in the Country

Top Ten Member Colleges of NLIST in the Country	
Name of the College	Location
St. Xavier's College	Mumbai, Maharashtra
Lady Shri Ram College for Women	New Delhi
HISLOP College	Nagpur , Maharashtra
St. Joseph's College	Bangalore, Karnataka
Stella Maris College	Chennai
PSG College of Arts & Science	Tamil Nadu
St. Xavier's College	Kolkatta, West Bengal
ILS Law College	Pune, Maharashtra
DAV College	Abohar, Punjab
Banwarilal B College	Asansol, West Bengal
Basanti Devi College	Kolkatta, West Bengal

(Source: http:// www.inflibnet .ac.in. Accessed on 25.02.2016)

It has observed from the website of the INFLIBNET, that state wise registered membership is not uniform. By observing the Table 3.5., we have come to know that, Maharashtra has the highest membership (909 nos.) in one hand, and on the other hand, 16 states (45.7%) have below 50 numbers of memberships. Only 9 states (22.86%) have above 100 memberships (as on 25.02.2016).

Table 3.5: State wise N LIST Membership of India

Sl. No.	State	Access Enabled No. of Membership
1	Andaman & Nicobar Island	2
2	Andhra Pradesh	155
3	Arunachal Pradesh	7
4	Assam	169
5	Bihar	45
6	Chandigarh	16
7	Chhattisgarh	89
8	Dadra & Nagar Haveli	1
9	Daman and Diu	1
10	Delhi	55
11	Goa	29
12	Gujarat	475
13	Haryana	68
14	Himachal Pradesh	61
15	Jammu & Kashmir	50
16	Jharkhand	17
17	Karnataka	546
18	Kerala	287
19	Madhya Pradesh	134
20	Maharashtra	909
21	Manipur	38
22	Meghalaya	28
23	Mizoram	14
24	Nagaland	19
25	Odisha	56

Contd…

Table 3.5: State wise N LIST Membership of India

Sl. No.	State	Access Enabled No. of Membership
26	Pondicherry	45
27	Panjab	125
28	Rajasthan	215
29	Sikkim	4
29	Tamil Nadu	327
30	Telangana	88
31	Tripura	22
32	Uttar Pradesh	166
33	Uttarakhand	13
35	West Bengal	268

(Source: http:// www.inflibnet .ac.in. Accessed on 25.02.2016)

3.4.4.2 Status of N-LIST Registration in North East India

It is found very positive that all the states of North- East India have participated in the N-LIST programme. The N-LIST membership of colleges from North East India is found to be not satisfactory. There are only 304 colleges from the entire region who have taken part in the programme. From the Table 3.6. we have seen that the membership from Assam is the highest (169 Colleges), followed by Manipur (38 Colleges), Meghalaya (28 Colleges), Tripura (24 Colleges), Nagaland (20 Colleges), Arunachal Pradesh (7 Colleges), Mizoram (14 Colleges) and Sikkim (4 Colleges).

Table 3.6: N-LIST Membership in North East India

Sl.No.	North – East States	Status of Membership
1	Arunachal Pradesh	7
2	Assam	169
3	Manipur	38
4	Meghalaya	28
5	Mizoram	14
6	Nagaland	20
7	Sikkim	4
8	Tripura	24
Total		304

(Source: http://www.inflibnet.ac.in. Accessed on 25.02.20)

3.4.4.3 Status of N-LIST Members in Assam

The state Assam has the highest (55.59%) membership in entire N-E-India. There are 169 Colleges participating in the N-LIST programme of INFLIBNET Centre. Majority of the member i.e., 92 colleges are from the Gauhati University , followed by 60 colleges under Dibrugarh University and 15 colleges under Assam University (8.88%).

Table 3.7. Status of University wise N-LIST Membership in Assam

Sl. No.	University	N-LIST Membership
1	Assam University, Silchar	15
2	Dibrugarh University, Dibrugarh	60
3	Gauhati University, Guwahati	92
Total		167

(Source: http://www.inflibnet.ac.in. Accessed on 25.02.2016)

There are only 15 colleges participating in the programme under Assam University.

Table 3.8 : Colleges having N-LIST Membership under Assam University

Sl.No.	NLIST Membership	Sl.No.	NLIST Membership
1	Cachar College	9	Rabindra S Girls College
2	Gurucharan College	10	Radhamadhab College
3	Halflong College	11	Satya Ranjan College
4	Janata College	12	Silchar M College & Hospital
5	Karimganj College	13	Srikishan Sarda College
6	Lala Rural College	14	Vivekananda C of Education
7	MHCM Sc. College	15	Women's College, Silchar
8	Nabinchandra College		

(Source: http://www.inflibnet.ac.in. Accessed on 25.02.2016)

Most of the participating colleges of Assam in the NLIST programme are under Gauhati University which is depicted in Table 3.9. Out of total 176 affiliated colleges under this university, only 52.3 % colleges are having NLIST membership till 25.02.2016.

Table 3.9: N-LIST Membership under Gauhati University

Sl.No.	Name of the Colleges	Sl. No.	Name of the Colleges
1	Abhayapuri College	27	Dakhin Kamrup College
2	ADP College	28	Darrang College
3	Arya Vidyapeeth College	29	Dhing College
4	Assam Engineering College	30	Dispur College
5	B Barooah College	31	Dr.B K B College
6	BH College	32	Dudhnoi College
7	BHB College	33	GL Choudhury College
8	Bajali College	34	Guwahati Comm. College
9	BBK College	35	G CI of M Technology
10	Bapuji College	36	Girls College, Kokrajhar
11	Barama College	37	Goalpara College
12	Barbhag College	38	Gossaigaon College
13	Barnagar College	39	Govt. B C of T Education
14	Beltola College	40	Guwahati College
15	Bengtol College	41	Haji A A College
16	Bholanath College	42	Handique Girls College
17	Bijni College	43	Hojai College
18	Bikali College	44	J B Law College
19	BPC College	45	Jagiroad College
20	Birjhara Mahavidyalaya	46	Janata College
21	Biswanath College	47	Jawaharlal N College
22	Bongaigaon College	48	KRB Girls College
23	Chaiduar College	49	K C Das Comm. College
24	Chaygaon College	50	Kaliabar College
25	Comm. College, Kokrajhar	51	K H Saikia College
26	Cotton College	52	Kharupetia College

Contd…

Table 3.9: N-LIST Membership under Gauhati University

Sl.No.	Name of the Colleges	Sl. No.	Name of the Colleges
53	Khairabari College	73	Puthimari College
54	Kokrajhar Govt College	74	R G Baruah College
55	Lanka Mahavidyalaya	75	Raha College
56	LCB College	76	Rangapara College
57	LOKD College	77	Rangian College
58	Lumding College	78	Regional C of H E,Dispur
59	MC College	79	Rupahi College
60	Mairabari College	80	S B Deorah College
61	Marigaon College	81	Salbari College
62	Nabajyoti College	82	Sapatgram College
63	Nalbari College	83	Saraighat College
64	Nalbari Commerce College	84	Science College, Kokrajhar
65	North Guwahati College	85	Sipajhar College
66	Nowgong College	86	Sonapur College
67	Nowgaon Girls College	87	Sualkuchi BMS College
68	PB College	88	Suren Das College
69	Pandu College	89	Tezpur College
70	Pachim G Mahavidyalaya	90	Tihu College
71	Pragjyotish College	91	THB College,Tezpur
72	Pub kamrup College	92	Udalguri College

(Source: http://www.inflibnet.ac.in. Accessed on 25.02.2016)

There are 60 number colleges having NLIST membership under Dibrugarh University. It is observed that, most of the affiliated colleges of this university are having NLIST membership with 81% and ranked first among the universities in the state.

Table 3.10: Colleges having N-LIST Membership under Dibrugarh University

Sl.No.	Name of the Colleges	Sl.No.	Name of the Colleges
1	Amguri College	25	J B College
2	Bihpuria College	26	Jengraimukh College
3	Bordoloni Central College	27	Jhanji H N College
4	CKB Commerce College	28	Jogananda DSG College
5	CKB College, Teok	29	Jorhat College
6	DCB Girls College	30	Jorhat K Mahavidyalaya
7	Demow College	31	Joya Gogoi College
8	DHSK College	32	Kakajan College
9	DHSK Commerce College	33	Kamargaon College
10	DR College	34	Lakhimpur Comm. College
11	DKD College	35	Lakhimpur Girls College
12	Dhakuakhana College	36	Lakhim. K Mahavidyalaya
13	Dhemaji College	37	Lakhimpur PGT College
14	Dhemaji Com College	38	Ledo College
15	Dibru College	39	Majuli College
16	Digboi College	40	Margherita College
17	Digboi M. Mahavidyalaya	41	Mariyani College
18	Doomdooma College	42	MDK Girls College
19	Duliajan College	43	Moran College
20	Duliajan Girls College	44	Moridhal College
21	Furkating College	45	Murkong Selek College
22	HCDG College	46	Naharkatia College
23	HPB Girls College	47	Namrup College
24	JDSG College	48	NN Saikia College

Contd…

Table 3.10: Colleges having N-LIST Membership under Dibrugarh University

Sl.No.	Name of the Colleges	Sl.No.	Name of the Colleges
49	Nazira College	55	SMD College
50	North Lakhimpur College	56	The Gargaon College
51	Sarupathar College	57	Sibsagar College
52	Sibsagar Commerce College	58	Tinsukia College
53	Sibsagar Girls College	59	Tinsukia Commerce College
54	Silapathar College	60	Womens' College ,Dibrugarh

(Source: http://www.inflibnet.ac.in. Accessed on 25.02.2016)

3.5 CONCLUSION

The information communication technologies (ICT) and its application in library and information science have tremendous impact on the products, services, facilities and functions today. By optimum utilization of ICT, a remote rural library can also provide global access to information and knowledge and consortium based quality services to the user community.