4.1 Introduction

The advent of information technology and the advancement of science and technology have accelerated the massive production of literature in all subject fields which resulted in the exponential growth of knowledge. The knowledge production and dissemination in the world have found a sea change in this information era. There have been many reasons for this change; firstly, the globalization of education and multi directional research output result, disappeared the borders between different disciplines; secondly, technological innovations influencing the global connectivity through information technology and the concept of virtual library gaining momentum. The emergent internet based world wide web, as a new media/platform of information delivery, triggered proliferation of web based resources. The increased use of internet and phenomenal increase of web-based resources has stimulated the web based potential library service that enforces the transformation of print media into electronic media. Thirdly, the recent economic and political crisis threatens the society and finally the increase in price, is a serious concern.

Most of the review committee and study commissions have emphasized the importance of libraries in higher education. To mention a few, the Hunter Commission(1882), the University Commission(1902), the Sadler Commission (1917), the Radhakrishan Commission (1948), the Kothari Education Commission (1964-66), have vouched for the development of the library at educational institutions and also have given guidelines for providing minimum infrastructure facilities in the libraries in higher educational institutions. The U.G.C. Library Committee (1957), recommended that a University/College should provide Rs. 15.00 per student and Rs. 200.00 per teacher for acquiring reading materials for its library. The Kothari Educational Commission (1964-66), recommended as a norm, that a University/College should spend in each year about Rs.25.00 for each student and Rs.300.00 per teacher. Dr.S.R.Ranganathan suggested that, the per-capita expenditure on University/College libraries should be Rs.20.00 per student and 300.00 per teacher or Rs.50.00 per student. All these committees and Commissions emphasized that, the library is the focal point for the students and teachers.
The libraries in higher technical education institutions have developed largerly along with various institutions. These libraries are becoming knowledge centers. The libraries in these institutions are a distinct lot among special libraries as they serve the needs of specialized users and their nature is an indicator of an academic library as it supports and supplements academic programs. Hence, they come in the category of special academic libraries. Such kind of library is an important resource of the academic community and helps its members in their self-development, fulfillment of curriculum requirements and for promotion of study and research.

Libraries are a vital component of higher technical education institutes and need to be equipped with infrastructure. Namely, proper space and furniture to accommodate the users; trained staff to provide services to the users for making use of the collections; the optimum and appropriate collection to satisfy most of the needs of all the users; the essential technological devices to help in speedy and efficient provision of services and so on.

4.2 The nature and characteristics of technical libraries

A library of technical/engineering college or polytechnic can be termed as a special library. In the age of science and technology, the information service to students and teaching faculty is the backbone of technical college library. The reference service in special library must go beyond the state of informal personal aid, to provide advanced information to persons engaged in technical education and research. The modern special library is definitely a creation of the twentieth century, when the need was greatly felt for separate libraries catering to the specialized needs of individuals and groups. Many private and industrial organizations such as business firms, manufacturing, engineering and specialized enterprises feel to have information facilities to cater to their specialized interest. In recent years, to ensure the use of indigenous technical developments and in view of country’s economic viability, the government has also realized the importance of technical libraries.

The library in a progressive technical college must seek to fulfill the following functions: (a) to provide a comprehensive selection of literature, covering the
requirement of the college syllabus, together with a selection from the humanities to help a student to broaden his reading beyond his particular course. (b) to enable students to be trained in seeking, collecting and applying information for them. (c) to provide for the teaching staff, a substantial nucleus of the more advanced and specialized works, together with the periodicals necessary to enable them to keep abreast of the latest developments in their subjects. (d) to provide reference services as well as information services to students and staff, to assist them in their studies and research activities. (g) to cater to the needs of any post-graduate research that is being done in the college, besides the above functions, the library should make available indexing and abstracting services in sciences and technology to the users. Apart from the usual library work of lending and reading room services, the technical college library should also provide inter-library loans and prepare documentation lists. After the two world wars, there has been a phenomenal growth in research and publication of reports, books and journals pertaining to engineering and technology. This has caused a big literature explosion and often repetitions of information. To cope with the problem of scientific communication, the technical libraries with specialized stock of information, the trained personnel and sophisticated machinery and gadgets have been created.

4.3 ICT and modernization of libraries

The invention of printing press by gutenberg was a great milestone in the history of libraries. It has led to the conventional libraries or traditional libraries. The conventional libraries used to store printed books, journals, patents, standards, research reports, theses, dissertations, etc., and started to issue the same for use. During this phase, the idea of library was completely modernized by dr. S.r. Ranganathan. Until this recent time, the libraries were deemed store houses for the safe custody for keeping documents. However, the five laws of library science stated by dr. Ranganathan, have emphasized the use of documents.

Depending on the development and transformation, there are certain stages through which, the libraries were developed until now. They are private library, church library, and conventional library, electronic library, digital library, hybrid
library and virtual library. During ancient times, the kings used to keep their collection of documents such as manuscripts, papyrus and inscriptions for their private use. These collections were formed into a private library. Later, the poets, saints and ancient writers started depositing their collections in churches as safe custody and these were known as church libraries.

The libraries are the major sources of information, which are providing different kinds of knowledge sources such as books, journals, conference proceedings, pamphlets, standards and patents etc. The libraries are working with printed documents of these forms. Nevertheless, due to the development of applications in information and communication technology, the libraries were transformed into electronic libraries, digital libraries, and virtual libraries, which store information in electronic forms and communicate, share and disseminate the information through networks.

The electronic library is a library that has widespread use of computers and such other activities as online databases and automated record keeping and computer based decision-making. Digital libraries are libraries, in which all information exists in digital format. The information itself may however reside on different storage media such as electronic memory magnetic or optical disks, but the user will not necessarily perceive any difference between them. The virtual libraries use the technology of virtual reality (VR). This known as telepresence it simplest form. In a virtual environment, one would be able to browse without having to physically to go for it. By using virtual reality equipment and facilities, one would be able to enter the virtual library, browse around its rooms and shelves, use index or catalogue, and select a book by pointing to it and touching it. The term virtual reality refers to an environment or object simulated by computer hardware and software, in such a way that, the viewer experiences the environment or objects as though it were real. The hybrid library is the combination of all the libraries. It is neither a full traditional library nor a full advanced library. Presently, most of the libraries in India are of this nature only and accommodating all types of information formats for the users. These contain information in floppies, audio-visual materials, compact disks, print documents, electronic databases etc.
4.3.1 The electronic and digital information storage

Due to the development in ICT the storage formats of the information have developed. Now the libraries are retrieving, storing and disseminating the information electronically and digitally. In this way, the e-resources were developed. The e-resources or electronic resources are non-documentary and non-paper resources of information. These include electronic media such as computers, floppy disks, compact disks, digital versatile disks (DVD’S), computer files, online databases of information. Such documents can be browse easily and quickly through computer systems and communicated through the networks. These documents can embed text, static images, sound animation, motion pictures, music scores, printed document format, and various tactile modes of communication. These can easily be transformed and processed by the computer. The major advantage of these sources is the portability. These documents need lesser space for storage and each of these sources has high capacity of information storage. Further, searching and browsing of the information from these sources was made faster and easy. To store the document, through electronic media software formats such as HTML, PDF, XML, TEXT, VIDEO, multimedia and images formats are used.

4.3.2 The electronic information communication and dissemination

Through the networks and especially the internet, the electronic information can communicate and disseminated throughout the world. The Internet provides certain services of the internet include Electronic Mail (e-mail), Search Engines, File Transfer Protocol (FTP), Bulletin Board Service (BBS), World Wide Web (WWW), Video Conferencing, Browsing, Consortia, and Open Source Initiatives etc. Through these services, the communication and sharing of information made faster and easy. Due to these developments, the conventional libraries have been transformed into digital libraries.

The information explosion, development of technology, increase in the number of users, and their varied information needs have made the libraries to apply modern technology. As a result, the digital information is developed. Now, it is essential for the libraries to collect, retrieve, store, disseminate, communicate and
store the information electronically. Hence, these changes transformed the libraries, into digital libraries, learning resource centers and information systems.

4.3.3 Digital Libraries

The digital libraries may be defined as the new way of carrying out the functions of libraries, encompassing new type of information resources, new approaches to acquisition; new methods of storage and preservations; new approaches to classification and cataloging; intensive use of electronic systems and networks; and dramatic shifts in intellectual, organizational and electronic practice. The digital libraries are electronic libraries, where the information is acquired, stored and retrieved in digital form. The digital libraries are the group-interlinked workstations, connected to high-speed networks. In the context of digital imaging, the librarians face greater challenges in capturing, storing, formatting, retrieval and reproduction of non-textual materials.

In digital libraries, the e-resources were mounted on the servers located at remote places and the member libraries using user login and password on yearly subscription basis may access the information. The digital collection resources may be e-journals, bibliographic and full text databases, e-books, e-prints etc. Called e-resources that may be shown in the digital collection and catalogue of the member libraries for a particular period. The member libraries can access the resources simultaneously at a time or at different time. Therefore, many libraries may use the digital collection available at one site at the same time without any problems over the internet through dial up, DSL, lease line or VSAT connectivity. Therefore, the digital libraries are libraries without wall and it is also known as virtual library in broader sense. The library collection in digital form can be shared, exchanged and accessed by the members of the library and information network libraries as per their agreements or requirements. An important feature of the digital object is that, it can be stored, processed, and played backing using a computer system, computer network and internet. It allows us to search for any keywords of phrase or subject descriptor in the entire collection. It also occupies less space; that require less work force to run and manage the digital library, therefore it is very much cost effective.

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The digital libraries are a set of electronic resources and are associated with technical capabilities for creating, searching and using information. In this sense, they are an extension and enhancement of information storage and retrieval systems that manipulate digital data in any medium: text, images, and sounds, static or dynamic images and exist in distributed network. The content of digital libraries includes data, metadata that describes various aspects of the data (e.g. Representation, creator, owner, reproduction rights), and metadata that consists of links or relationship to other data or metadata, whether internal or external to the digital library.

The digital library is a system, providing a community of users with coherent access to a large, organized repository of information and knowledge. The digital library is not just one entity, but multiple sources seamlessly integrated. The digital libraries endow with a structural and planned entrance to information, stuffing in a dispersed environment and assist users in searching, evaluating and utilizing resources, irrespective of their format. Improved information retrieval and enhanced document delivery capabilities have widely acclaimed the strength of digital library in a networked environment through internet in library and information centre.

4.3.4 Open Source

The concept of open source began with the open source software or free software, which was founded in 1998 by John Maddog Hall, Larry Augustine, Eric S. Raymond, Bruce Perens, and others. In basic terms, the goal of the open access movement is to make scholarly articles freely available in digital form worldwide, with minimal restrictions on their use (e.g. Proper attribution of authorship). In reality, it is more complex than this because of differences of opinion about what open access should or should not try to achieve. Some advocates say that, free access to scholarly articles is enough; minimal restrictions are not needed. Others say that, the basic goal is correct, but permanent archiving is also required. Still others say, why stop at scholarly articles; make all types of scholarly literature freely available in digital form. Such doctrinal differences are normal and healthy, in such an important and dynamic movement.

As outlined in the Budapest open access initiative, there are two basic strategies used to achieve the open access:
(1) self-archiving (making electronic preprints and post prints available on author home pages or depositing them in digital archives and repositories); and
(2) open access journals.

The twenty first century is the digital era and the storage and communication of information in various digital formats was started. As such, the information and communication technology today, playing a very important role in collection, storage, sharing and communicating of the information through digital forms. Now, the web is providing more free resources for the information needs of the research communities. The open source movement is a revolutionary change since the last 2-3 years, which is providing an open access e-books and journals, information, open source software, open archives searching etc.

A number of developments in the last two decades have threatened to defeat the very purpose, for which the scientific community invented the scholarly communication system. A limited number of large commercial publishing houses control a substantial proportion of the scholarly periodicals being published today (including those, which are published on behalf of societies and professional bodies); a few conglomerations control the publishing industry. The publishing industry has witnessed some major mergers, take-over, etc. Since the 1990s. A direct consequence of all this has been a sharp increase in the cost of subscription to journals. In the last two decades this combined with the growth in the number of periodicals, the falling purchase power of currencies of developing countries has resulted in a crisis, in which, the academic and research institutions can no longer afford access to the full range of required periodicals. The institutions have been forced to cancel subscriptions, divert book budgets for purchase of periodicals, etc. Due to such situation, the open source initiatives were started which provide many open source information, software, journals, e-books etc. Freely available to certain conditions.

4.3.5 The institutional repositories/Digital repositories

The increasing open access movement is opening alternative channels for the dissemination of scholarly work and feeding the growth of institutional repositories (IRs). Many academicians still prefer to publish their research in books and journals;
they are disseminating their unpublished work more frequently through open-access and digital outlets. This work, often called grey literature, includes conference presentations, technical reports, and preprints as well as datasets, supplements to published work, and electronic theses and dissertations. The ‘institutional repositories are digital collections, which capture and preserve the intellectual output of a single or multi-university community, with the aim of increasing competition and collectively reducing the monopoly power of journals, thus bringing economic relief and heightened relevance to the institutions and libraries that support them’.

According to mark ware, an institutional repository (IR) is defined as a web-based database (repository) of the scholarly material, which is institutionally defined as (opposed to a subject-based repository) cumulative and perpetual (a collection of record) open and interoperable (e.g. Using OAI-compliant software) and thus collects, stores and disseminates (is part of the process of scholarly communication). In addition, most would include long-term preservation of digital materials, as a key function of IRs.

Lynch defined an institutional repository as, a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. According to him, it is most essentially an organizational commitment to stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution.

An institutional repository consists of formally organized and managed collections of digital content generated by faculty, staff, and students at institution. The content of these repositories can be made available for integration with on-campus library and course management systems. It can also make available to colleagues and students at other institutions, as well as to the public. When one uses the term repositories today, it is nothing but speaking about one of many different technologies that support the storage and distribution of digital content. They are:

- Collection-based digital repositories;
- managed by library professionals, either stand-alone or aggregated method;
Course management systems and associated file stores;
Collections of research data and reports managed by academic departments;
Student academic portfolio systems;
Institutional file storage systems;
Digital asset management workflow systems; or
Web content management systems used by institutions or departments to store and stage Web content.

To build and establish an institutional repository, many softwares for instance, Dspace, Koha, Archimede, CDSware, Content-dm, e-prints, Greenstone and Fedora are available in the web.

4.3.6 The digital and electronic information sources

The exponential growth in the volume of published information, difficulty in retrieving information from libraries due to the literature seepage and scattering. There is a need to control and provide access to ever-increasing volume of information. The faster rate of increased in the costs of raw materials are used in the publishing. Leading to escalation of manufacturing costs of books and journals, the need to reduce the time required in conventional publishing and the realization of the potential and unique features of electronic media are some of the basic reasons which resulted in the shift of emphasis from conventional publishing to electronic publishing.

The electronic publishing can be defined as the publication process, where the manuscripts are submitted in electronic format, edited, printed even distributed to the users by employing computers and electronic media. An electronic publication refers to any information source published in electronic (machine-readable) form. The electronic publication is the fusion of electronic, computer, digital and communication technologies for publishing. These include sources distributed on magnetic tape, optical disks (such as compact disk, DVD) and such other means.
4.3.7 Electronic books (e-books)

An electronic book is a book-length publication in digital form, consisting of text, images, or both, produced on, published through, and readable on computers or other electronic devices. Sometimes the equivalent of a conventional printed book, e-books can also be born digital. The *Oxford Dictionary of English* defines the e-book as an electronic version of a printed book, but e-books can and do exist without any printed equivalent. E-books usually read on dedicated e-book readers. Personal computers and some mobile phones can be also used to read e-books.

The Electronic books are digital in form and many of them are available online now. Earlier, the electronic books were publishing in Compact Disc (CD) form. It is noted that the first electronic book was published in 1985 in Germany. Now-a-days, e-books are popularly used in information sources all over the world, many of which are available through some of the printed journals such as PC Quest, IT (Magazine), Dataquest, etc. The electronic books may be in many forms like conventional books such as Dictionaries, Encyclopedias, Textbooks, Directories, Gazetteers, Yearbooks, Almanacs, etc. Like conventional publishers, there are also publishers for electronic books. They instruct the authors about the terms and conditions for electronic publishing of the books. For instance, ASTM E-books: [http://enterprise.astm.org](http://enterprise.astm.org), McGraw-Hill Access Engineering: [http://2.accessengineeringlibrary.com](http://2.accessengineeringlibrary.com), [http://www.powells.com](http://www.powells.com), [http://www.peanutpress.com](http://www.peanutpress.com), [http://www.virtualvolumes.com](http://www.virtualvolumes.com), Springer, IET, Taylor and Francis etc., are leading publishers of electronic books. The e-books may be published using different software, such as MS-Word, Adobe Reader, etc. Many of the electronic books published at present are in PDF (Printed Document Format) and are readable through Adobe Reader.

4.3.8 Electronic journals (e-journals)

The concept of e-journals has emerged from 1980s onwards, which were initially made available in CD-ROM formats and then the advent of WWW and Internet has accelerated the publication of electronic version of print journals, whose
number has been increasing rapidly. According to the statistics published in the seventh edition of the Directory of Electronic Journals, Newsletter and Academic Discussion lists in 1997, 1049 e-journals were enlisted, which rose to 3,915 in its 2000 edition. Now, the numbers would have crossed 100000 plus. Due to the convenient access, cost effective publication and distribution, most of publishers have started publishing e-version of their print journals. The term Electronic Journal (e-journal) refers to a journal, which is available online and may or may not be associated with traditional printed journal. E-Journals offer the opportunity of providing information with different dimensions in a cost-effective way and enable the information to reach to a wider range of users at a faster pace, than paper-based print journals.

David Pulling and Brain Sehkel (1990) defined e-journals as, one whose text input may be entered directly by a computer or by other file transfer mechanisms in a machine readable form, whose editorial processing is facilitated by a computer and those articles are thus made available in electronic form to readers. Lancaster (1995), opined that an electronic journal is created for the electronic medium and is available only in this medium. In general, the e-journal can be defined as ‘a journal that is available in electronic form through an online host called e-journal.

The electronic journals available online can further be classified into

1. Free online: These journals can be accessed without any subscription charges.
2. Subscription base: Access to these journals requires subscription charges.
3. Free access with print subscription: If the library subscribes to print versions, free access is made available.
4. With some additional charges: Some electronic versions of printed journals are available with additional charges.

4.3.9 Library web portals and web pages

A Web portal is used to describe a site created to function as a single point of access to information on the web, internally and externally. Portals present information from diverse sources in a unified way. The popular portals were MSN, Yahoo, and perhaps AOL. Beside from the search engine standard, the web portals
offer other services such as news, stock prices, infotainment and various other features. They cluttered with advertisements. Still, some nameless people, most likely salespeople, suggest that they provide an excellent way for enterprises to provide a consistent look and feel with access control and procedures for multiple applications, which otherwise would have been different entities altogether. However, they have since fallen out of style. Everyone simply uses Google now, which can consider as an enhanced web portal with many useful features.

4.3.10 Electronic databases/Online databases

An online database is a database accessible via a network, now generally the internet. It differs from a local database, held in an individual computer or its attached storage, such as a CD accessible through LAN. A bibliographic or library database is a database of bibliographic information. It may be a database containing information about books and other materials held in a library (e.g. an online library catalogue or OPAC) or, as the term is more often used, an electronic index to journal or magazine articles, containing citations, abstracts--and often either the full text of the articles indexed, or links to the full text. Many scientific databases are bibliographic databases, but some are not. Within Chemical Abstracts, for example, there are databases of chemical structures, within Entrees there are databases of sequences. Outside of science, the same holds: there are databases of citations to articles in art history journals, and there are databases of images. Some of the databases in CD formats include Sociological Abstracts, INSPEC, Library and Information Science Abstracts (LISA), LISTA, ERIC, etc. They can also be accessed online.

4.3.11 The library book databases

These databases are intended to employ by college and university students to identify and locate books for class work and research. The books are obtained through the catalogue of the specific library, or via Inter-library loan. This very widely used database, known as World Cat has inputs from almost all US academic and large public libraries, and from many in other countries. It is available online to libraries that subscribes to the service. The catalogues of the largest libraries, especially the major national libraries, can be used for general purpose bibliographic searching; they
can be assumed to include all significant titles, and information then used to search more specific library catalogues.

The catalogues of individual libraries can be used for finding books in those particular libraries. ISBNdb.com is a website that attempts to build a free database of books by querying various libraries across the world for book data. The results indexed by a variety of parameters (authors, publishers, subjects, similarity, etc.) and are presented on the website in an organized format. Original MARC records are available for download as well. The ISBNdb.com website also offers book price comparisons for the availability and pricing in many online stores, including both general dealers such as Amazon and large used book dealers (Abe books, Alibris, etc). ISBNdb.com displays the pricing information immediately, in parallel to normal book browsing.

4.3.12 Web logs

Web logs (blogs) are a relatively recent internet based phenomena, started in the 1991. Scott defined a blog or web log as a web page containing brief chronologically arranged items of information. A web log may be in the form of a news item, diary, a collection of links to other web sites, book reviews, personal experiences recorded, reports of a project, journal, report, a photographic record of an event or activity or any one of a number of other forms i.e. The usefulness of blogs in the libraries.

1) Promote library events: create a blog that promotes library events and programs. Reach out beyond the visitors to your regular web site. Set up an rss (rich side summary) feed for your blog and alert everyone your community that they can include your head lines on their sites or can use an rss newsreader to see what’s up at the library. E- Commerce sites try to turn each visitor into a repeat customer.

2) Support the dedicated users: an obvious hit with most library visitors is finding out what new books, videos, cds, or dvds have been added to the collection.

3) Engage user community: post new book reviews and book award lists. Invite comments and suggestions. Create an online book discussion area by asking readers to recommend books to others.
4) **Support user community:** librarians are always looking for ways to offer value-added services. Can you offer a special service with the blog and reach a new audience? A local election news blog that posts announcements about candidate websites, nominations, and meetings might be a natural project for libraries that mandated to make local council minutes and agendas available to the public.

5) **Building new ties:** are you trying to reach a new area of your community. What about the blogs which offer in another language to provide short entry on upcoming programs and new resources? Perhaps you are trying to reach out to teachers in order to market library services and to make sure that school visits work effectively for the library and the schools. What about starting a blog-style newsletter that is just for teachers. You can focus on special services for teachers programs for schools, new research resources, books lists, and seasonal web sites of interest. Some blogs allow you to have extended entries and include feature articles.

4.3.13 **Information security**

The twenty first century witnessed a rapid growth and advancement in information processing, storage and communication technology. It revolutionized the role of the librarians and libraries in disseminating information service to the users all over the world. Due to the development in technology, library and information systems have re-organized their collection and services, in order to satisfy the user needs. As a result, the libraries are facing new computers, new requirements, new expectations and new security challenges. The security here implies the security against theft, mutilation and destruction of the printed documents and security of the library systems and networks.

Today, it is essential for every library, information centre or information system connects to the internet. Further, there is a need for digital collection accessible through online. There is a necessity of providing information services through the web in the digital era. Consequently, there is a threat from unseen enemies connected to the global computer network. Any form of information that stored digitally may be seriously perforated.
4.3.14 Information security in libraries

Mutilating library materials is a crime under state and municipal statutes in almost all communities, today, global libraries use network security policies to ensure the implementation of their security model in maintaining network security, protection of information loss, alteration unavailability and the safeguarding of the organization’s network from internal and external threats. The growth of networking presents new opportunity for unauthorized access to computer systems and the trend to distributed computing, reduces the scope of central, specialist control of it facilities. As organizations link to the internet or to the IT networks of business partners, (including libraries) central control over their it systems and users and thus information security is lost.

The development and management of digital information stored in computers and networks, is the difficult task for digital libraries, because of information warfare. The term information warfare conjures up a vision of unseen enemies, armed only with laptop personal computers connected to the global computer network, launching untraceable electronic attacks. The digital information that constitutes the national treasury is lost electronically; telephones stop ringing and emergency services become unresponsive. The info-war and computer security contain everything from newspaper stories to official reports.

Both conventional libraries and digital libraries are facing security challenges now. However, the digital libraries are more affected as there is security threat from the local network and the internet. Based on anticipated risks and possible attacks the security is necessary in the following way:

1) **Physical Security**: The physical threats may include natural calamities such as Flood, Earthquake, Fire, excessive heat etc.

2) **Personal Security**: Personal Security here means protecting and developing each kind of Information and Communication Technology resources.

3) **Software and Hardware Security**: Hardware and software security includes security against unauthorized access, alteration, deletion of the information and the records.
4) **Access Control and User Authentication:** Providing username and password is the most common for enabling the use of the library. The use of trusted computing is a better way to identify the user.

5) **Network Security:** The digital library is always connecting to the internet and as a result, there is always a threat from hackers and crackers. A hacker is someone who masters the inner working of the operating system and various types of utilities to better understanding them and to have fun testing the system limits. Crackers are the criminals who use their knowledge of operating systems and utilities to intentionally damage or destroy data and systems and should be prosecuted fully of the law.

Once connected to the internet, libraries become vulnerable to outside attempt to break into the library systems. It can facilitate undesired access to internal systems, unless systems appropriately designed and controlled. The open architecture of the internet also makes it easy for system attacks to be launched against systems from anywhere in the world. Library internet systems can even be accessed and then used to launch attack against other systems. Confidential information that sends over the internet could view, intercepted, or stolen. Any information accessed, stored, retrieved or disseminated on a web server may be susceptible to compromise, if proper security measures not taken. If proper access controls are not maintained, data integrity could also compromise. Web servers and internal networks can secure automatically by using software programs. This software is effective to check unauthorized access to the system. It is the responsibility of library to ensure that all data is maintained in its original or intended form.

The Information stored in a computer system is more valuable than the hardware and software. The users connected through web can destroy or alter the information stored. **Weiss** listed the areas of possible information abuse, as seven E’s as under:

1. error
2. eavesdropping
3. espionage
4. enmity
5. embezzlement
6. ego
7. Extortion.

Hence, to maintain an information security and to avoid the misuse of the information, technological developments have contributed a few applications. These applications attempt to build up several information systems. For protecting the stored information, user authentication is essential for the libraries.

4.3.15 Radio Frequency Identification Technique (RFID)

The Radio Frequency Identification (RFID) Technique is the latest and universally applied security technology in the libraries. RFID based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charging and discharging of the documents, efficient stock checking and documents handling. RFID is a combination of Radio Frequency based technology and microchip technology.

The RFID tags are thin and can apply to the library materials (like Bar Code Slips) and they contain a microchip, which can be readable and writable. These tags contain bibliographical details about the documents. Whenever library users refer the tag, that information is record. At the time of issue of a document to a user, every bit of information recorded. RFID tags are also like bar codes, but more information is record in RFID tags. Reading the RFID tags is also easy as several tags can be read at
one time accelerating all the scanning activities. RFID applications are very helpful for circulation system, shelf rectification and effective stock verification.

Libraries have become a driving force in the development of RFID for the mass market. The leading role for libraries seems to be understandable, since the libraries share their knowledge in these systems and the benefits have been greatest in the library community. Even though it is proved costlier for the libraries in recent years. The prices at RFID labels have dropped considerably.

4.3.16 Library security using biometric technology

A digital library is open to all registered users. It operates through networks especially web. The computer networks are always facing the threats from hackers, crackers and cyber-criminals, who may delete, alter or misuse the data. For this purpose, the specialized secured system is needed to access the information. The Security system using biometric technology is immensely useful and effective for the digital libraries.

4.3.17 Smart card technology

Smart cards may adopt in academic and special libraries for user authentication to library and information systems, resources and networks. Smart cards have been used to perform network authentication in conjunction with providing a library user with the type of internet access they prefer—filtered and unfiltered. In a public library environment, smart cards can use as a user identification card for the library circulation system. I.e., for borrowing and return of documents, payment of fees and fines, gaining internet access, for getting services such as reprography etc. The smart cards technology is an intelligent, single chip micro controller embedded within a small plastic card. It facilitates the implementation of a very high level of information security and the information may update from time to time after the card is issued.
4.3.18 Intrusion monitoring and detection

Intrusion Detection System (IDS) is the system, which tells the snooping element around the premises for security holes. It can consider as proactive defense for damage prevention. It monitors network traffic or hosts access attempts. It notifies suspicious traffic or hosts access attempts. It prevents unauthorized accessing of data through intelligent surveillance, and intrusion and attack detection, inappropriate URL detection and blocking and alerting, logging and real time response.

4.3.19 Library information systems and networks

The ICT also transformed the information communication and dissemination through information systems networks. The information systems and networks play an important role in collection, storage, retrieval communication and sharing of information, in a specialized subject discipline. Each information system stores information on a subject discipline and disseminate the same to the needy users through networks. The network is a group of information systems, which help to share the information among the members.

Objectives:

- To promote and support the adoption of standards in library operation
- To create databases for projects, specialists and institutions to provide online information services.
- To improve the efficiency of housekeeping operations
- To coordinate with regional, National and International network for exchange of information and documents.
- To generate new services and to improve the efficiency of existing ones

Network development in India: some factors are responsible for the development of library and information networks in India. Such factors are, the report of the working group of the planning commission on modernization of library services and informatics for the seventh five-year plan, 1985-90. The National Policy on library and information systems document (1986) is accepted by the ministry of HRD, government of India. The report on national policy on university libraries prepared by
the association of Indian universities (1987); the UGC report on information systems for science and technology under the department of science & industrial research (DSIR) government of India is vigorously promoting an integrated approach to library automation and networking.

Resource sharing in a networked system has been functioning since 1930 in developed countries, while India has concentrated on interlibrary loan. Networking activities in India started with the establishment of national information system for science and technology (NISSAT) in 1979. Some of the examples of such wide area network (WAN) networking are INDONET(INET), national information centre network (NICNET), information and library network (INFLIBNET) and developing library network (DELNET). CALIBNET and MALIBNET are typical examples of local area networking (LAN) system, which is now ongoing in libraries of metropolitan cities like Calcutta, Chennai and Mysore etc.

To keep in view of the regional level, some states are have library networks among academic, engineering and general library networks, MY;LIBNET(Mysore library network), HUDALNET (Hubli-Dharwar library networks), GUWAHATI academic library network (GUALIBNET), (GECLIBNET) government engineering college library network, Gujarat (proposed) ,TECLIBNET : Tamil Nadu engineering college library network (proposed) etc.

**Global networks:** the library network, as a means of resource sharing had its beginning in the 1970s and developed during the 1980s. The libraries in all the countries of the world have adopted some form of networking. As early as in April 1976, the library of congress network advisory committee (NAC) looked at options for a national system, for sharing the bibliographic information.

**OCLC** is the largest library network in USA. It was established in 1967, and supports resource sharing in more than 6,000 libraries. In Canada, Simon Fraser University, the University of British Columbia, and the University of Victoria established Triul in 1970. There are three major networks in UK: the Vincount project; Libertas project of Swalcap; and Janet. Janet is the major network connecting the libraries of universities and polytechnics. College libraries’ activities network of

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New South Wales (clann) and co-operative action by Victorian academic libraries (CALVAL) are the best-known networks in Australia.

4.3.20 Artificial intelligence and libraries

Artificial intelligence (AI) encompasses the following general areas of research: (1) automatic programming, (2) computer vision, (3) expert systems, (4) intelligent computer-assisted instruction, (5) natural language processing, (6) planning and decision support, (7) robotics, and (8) speech recognition. Intelligent library systems utilize artificial intelligence technologies to provide knowledge-based services to library patrons and staff.

Artificial Intelligence Techniques:

- Automatic Indexing: stop wording and algorithmic index phrase formation.
- Concept Space: index phrase co-occurrence information is used to generate an automatic thesaurus for search term suggestions.
- Automatic summarization: key sentences are extracted from a document to help users assess relevance and quickly digest available information.
- Meta-Search and Meta-Search Based Collection Techniques: The available online resources are intelligently combined to create focused collections and increase search coverage.
- Concept Mapping: The personal knowledge models are expressed in concept maps to support learning from digital libraries.
- The GetSmart system brings together basic curriculum functions, concept mapping and advanced information retrieval techniques in a web-based learning environment. One important goal is to support the accumulation of knowledge and educational processes using matching and merging algorithms.
- Multi-Lingual issues have explored practically and theoretically in the development of portals in several languages.
4.3.21 Internet and the Libraries

A network can be defined as the interconnection of two or more systems. The minimum number of systems required to make a network is two. Computer systems connected in a network can exchange information between themselves and share the use of hardware devices connected such as the printer, scanner etc. The computer networks are divided into three types. They are:

1. **Local Area Networks (LAN):** It is networks that connect the computers that are lying within a small distance (such as a room, within a building, or a group of buildings in the same premises) from each other they are called local area networks or LAN. Local Area Networks normally use coaxial cables to connect the computers together. Two or more computers connected together can share the files and software, their peripherals such as Printers, scanners etc. Now a day, the wireless LAN also built.

2. **Metropolitan Area Networks (MAN):** A Metropolitan Area Network is larger than LAN and distributed over the large area as a city.

3. **Wide Area Networks (WAN):** The Wide Area Network connects computers that are very remotely placed. It may connect across the countries or continents or the entire globe. Wide Area Networks can be either point-to-point type or broadcast type. Internet is a collection of different networks connected together or a collection of hosts connected together by a subnet. The internet is a very large network that is available worldwide. The internet is the largest network in the world, which provides World Wide Web (WWW) Service to the users. The internet often referred as Net is a general purpose, international communication and information system. The history of the internet began with the project of ARPANET (Advanced Research Project Agency on Network) of the Department of Defense of United States in 1960, the goal of which was to connect a number of computing facilities around the country.

Today, a number of technologies have contributed towards making the internet feasible. Input and storage technologies such optical digital mass storage system, graphic imaging technologies, optical character recognition, voice processing and
recognition, video and optical disks-permit recording and storing of large masses of information in textual, audio, visual, multimedia and other formats.

Developments in software technologies such as automatic indexing, expert systems, intelligent retrieval systems and hypertext linking- make it possible to manage digital information. User interface software and improvements in output equipment, e.g., flat panel display and high-resolution screen make it easier for the users to accept the output. Keeping pace with the developments in the technology of recording, storing, managing and communicating information are the developments in transmission technologies such as satellites, ISDN, LANs, Tele-facsimile and Tele-conferencing. The important uses and utilities of the internet includes Web, Electronic Mail, File Transfer Protocol, Discussion Forums, Mailing List Providers, Digital Libraries including digital information, Search Engines, List Serves, Electronic document delivery, Consortia of libraries, Teleconferencing and Video Conferencing.

4.3.22 Virtual engineering libraries

It was agreed that the principal emphasis of the virtual library would be to provide resources to assist in education at senior levels in schools, and at technical colleges and universities. It has been decided that the library network will be called the virtual environment and sustainable systems engineering library, and that the acronym vessel will be used to denote the network. Virtual engineering libraries are those that can be accessed by the internet, and range from those that will provide titles or abstracts only, to those that provide access and downloads for full text papers or lecture notes. Virtual libraries will generally allow the would-be reader to access the paper by clicking on the title of interest. This action will allow the reader to access within the library web site, or by direct connection to some other web site, that holds the paper. Many virtual libraries provide access to titles or abstracts of articles or links to other web sites, but have little or no full text access.

a number of virtual engineering libraries have been established. the engineering information offers access on a fee basis to compendia, the world's leading engineering abstracts database. EEVL, the Edinburgh engineering virtual library,
commenced operation in 1996, provides a free gateway to engineering information on the internet. EEVL has close links to UK based professional engineering institutions and had substantial initial funding by the UK higher education council. It is available at http://www.eevl.ac.uk/ and contains links to other virtual library services including the learning and teaching support network. eels, the engineering electronic library of Sweden, can access at http://eels.lub.lu.se/ none of these libraries at this time are catering particularly for the engineering education market at the undergraduate or technical college or secondary school level, and not specifically focused on sustainable development.

4.4 The similarities and differences in engineering library

Despite dire warnings of the death of print, the engineering library building projects have continued in a stable pattern over the past several years. It has found that new library buildings were designed to accommodate growing print collections, to provide more study space and to improve access to computers and information technology. Campus libraries are building for the future needs of teaching and learning and the shared tasks of faculty, librarians and students. Space is designed for change, flexibility, new growth, and developments in technologies. The libraries are being renovated or built with the users in mind, offering welcoming spaces for quiet and group study, project work, classrooms, labs for multimedia production, and increasingly, an information or learning commons.

The changes in teaching and learning, combined with advances in information technologies which have led to the concept of ‘information learning commons’ are more appropriate. The faculty, students and librarians rely increasingly on information technology: the array of online databases, full-text journals, e-books, library guides, websites, multimedia software and output production tools. The richness of electronic resources brings a complexity too, result the students, need more support to access and use their research findings and data effectively. The students want the library to be a place, where they can find print and online information, work individually, in groups using their research, with librarians and it staff, meet with course faculty for feedback and direction, then prepare, and produce their papers, reports and presentations.
‘the learning commons’ extends and consolidates in one service point the latest information technology hardware and software, with the help desks of librarians and it professionals. L. Macwhinnie describes the setting in the information commons: the academic library of the future. Information or learning commons enables active learning, provides timely support and training to students by expert staff, and ample workspaces for collaboration among students, librarians and faculty. Learning commons are designated spaces that often have extended hours and can independently access, once the rest of the library building is closed. The learning commons are very popular with the students and are well used. A learning commons brings the users together with each other, with technologies, and with support personnel, all within the larger context and setting of the library’s collections and services. The knowledgeable staffs are the key component of a learning commons; they help students find sensible information online and in print. The active learning fostered and enabled, guided by librarians teaching students critical thinking and analysis as they research and work on their assignments. The information/learning commons are important features in today’s academic library. They enable the librarians, faculty and it staff to support the mission of the university to enrich student learning. The librarians will need to monitor and assess their learning commons and develop measures, to gauge the effectiveness of this multi-faceted service area.

4.5 A Library for tomorrow

The rapid changes in information technologies are affecting the engineering library’s collections, services and spaces. There is a continued and growing need for more online resources, and services. Virtual reference (real time) services bring immediate instruction and support to students. The engineering libraries are reaching time zones across, to ensure round-the-clock coverage and service. E-reserves, e-books, videos and multi-media on streaming software, open source digital collections with network connections. These are all services required to support teaching, learning and research online and onsite. Our (new) libraries must include the latest in information technology, wireless access, production and multimedia software and work stations for users, with these now combined with the expertise of librarians and it staff help desks, and often focused in a learning commons area. As well, the print
collections of books, journals, government reports, special collections and archives are essential resources to access the past and present.

The key element, the critical success factor for the academic library of the 21st century, is to be a teaching library. The engineering college requires the library to serve as a place for scholars and students to gather, discover, research and collaborate. The librarians contribute to the university’s mission by participating in the educational experiences of teaching, learning and research. The engineering college library is a centre for the richness of scholarship, print and electronic, and the opportunities for exploration, discovery and sharing among librarians, faculty and students. The information literacy is an integral part of the educational success of students. The librarians and faculty must involve students in planning and sharing their learning, helping them to gain confidence and develop a fluency in handling the information.

Perhaps, the greatest impact that the open access movement may have on engineering libraries is that of putting them in a position to examine the very roles they play within their institutions and indeed within the global information market. The engineering libraries that, are wishing to control their financial destinies, so to speak, might begin to assume new or expanded responsibilities such as serving as one of the institution’s most prominent publishers of scholarly material. The role of the library as publisher is not entirely novel, but may become a key role that libraries play as they become more and more involved with open access, and may very well result in a radical transformation of scholarly communication, as it is known today. While it is reasonable to suggest that the engineering libraries will bear some costs in this emerging role, the nominal costs of electronic publishing [may also be] absorbed by the institution as part of its commitment to scholarship.

The libraries might go about the task of publishing scholarly material in a number of ways, among which are cultivating and managing their own electronic journals, and supporting an institutional repository. One of the key goals of the institutional repository, simply stated, is to capture the intellectual output of an institution and make it available via a single interface, so that, one no longer needs to scour disparate faculty and graduate student websites in order to find their research. A
single point of access, search, and organization of scholarly materials within the institution would be of value to the communities served by engineering libraries, and there are certainly other values of institutional repositories. One such value is digital preservation, as libraries are in a better position than individual academics to guarantee that, the collection is systematically available even after decades.

The implementation of institutional repositories may be the easiest step; the engineering librarians also must be able to persuade faculty, many of whom are for a variety of reasons quite reluctant, to contribute their prime research output. The liaisonship with the institution faculty thus sees another key impact of open access. Though the engineering librarians already engage in liaisonship, efforts to sell open access, and librarians' ability to do so, will need to step up. And even if the faculty understands and agrees with the vision of academic libraries in terms of institutional repositories and open access journals, that is no guarantee that they will be willing to modify their behavior such that they contribute. While most people recognize the need to save energy and recycle waste it takes much more than just awareness to get them to change their habits on a large scale. It takes a combination of measures of many different kinds, such as technical waste disposal infrastructure, legislation and taxation to get massive behavioral changes, underway.

The libraries may thus need to look elsewhere, for assistance in getting the faculty to change their behavior, perhaps to each other, and perhaps to the institution itself. For open access journals, one way to engage faculties and get them actively interested and more importantly, involved with open access might be to present them with opportunities to serve on peer review editorial boards.

In the changing environment, every library grows in terms of reading material, equipment, space, staff, readers, etc. The library and information scenario is changing at a dynamic pace; there is a paradigm shift, from print media to web media; from ownership of documents to access to information; intermediary to end users model of services; and from location of specific libraries to digital/virtual/hybrid libraries. Similarly, there is a change in the needs and interests of the readers. Hence, the role of library and information professionals has also changed dramatically, to meet the
current requirement. The library professionals must be able to perform various tasks while coping up with the changes in technological environment.

4.6 Skills for the library professionals

4.6.1 Introduction

The paradigm shift of the present knowledge society is that the transition of information formats from print to digital medium has made a high impact on the libraries, information centres and other institutions involved in processing it. The knowledge society mainly being created by the ICT revolution, fuelled by a huge driving force is called internet. This has influenced the role of information professionals in more than one way. The emergence of internet and web 2.0 tools, the technologically proficient users, the availability of vast amounts of information in multimedia and digital format, has made library professionals to make a proactive move to acquire those ICT skills that are necessary in providing value added services to their patrons.

The expertise, skills and competencies of individuals are not everlasting in this dynamic environment. Knowledge society, thus requires inquisitive learning professionals who constantly track new ideas, keep in touch with the latest happenings in the profession.

Since the library and information profession itself is in a fluid state, it is essential that library and information professionals make enough efforts, in catching up with ict and associated influence on their professional life. The learning curve of lis professional must have the blend of the following aspects:

- Librarianship Skills
- Information Communication Technology Skills (ICT)
- Managerial Skills
- Leadership Skills
- Information Skills
- Communication Skills
When we compare the role of lis profession in those traditional days, to their role expected in this knowledge environment, what we see is that the roles have remained same. What has changed is how these roles are performed. Today’s lis profession relies heavily on ICT tools for knowledge management activities. The knowledge environment has posed several challenges, which are no doubt staggering. While the great core of principles, practices and values they espouse remains relevant, the skills and knowledge required to perform their jobs are constantly changing. These developments require increased technological skills to ensure appropriate and effective action on the part of information professionals.

4.6.2 Librarianship skills

At the 2012 eScience Symposium, Christine Borgman stated, if we don’t produce a new workforce, the libraries will become ever more irrelevant. The Conversation around this topic called for more people with math, science, and programming skills to become part of the profession of the librarians.

The librarianship caught in the midst of dynamic changes with respect to collection, preservation control and dissemination of recorded knowledge appear to be at risk in a world where uncertainty, contingency and the transforming nature of the information technology impact, especially electronic media and internet are increasingly dominant. As a result, the library managers encountered with twin challenges of managing print collections and simultaneously developing digital resources and network based information services.

To become able to face the technological challenges, the continuous professional development is an essential part of the modern library and information professionals and it is a way to successful career planning and prospects. The library professionals with better managerial, personal, professional and technological competences and skills have greater demand and bright future in the modern libraries. The frequent changes in the information and communication technology in libraries require immediate improvement of different competencies and knowledge among library professionals. The continuous staff training in emerging technologies is essential to learn, improve and develop various kinds of professional skills and
competencies. Pinfield stated that, the library professionals require a wide range of new or enhanced skills, including:

- Professional skills
- Technical and IT skills
- Flexibility
- Ability to work under pressure
- Ability to learn quickly
- Negotiating skills
- People skills
- Presentation skills
- Teaching skills
- Team working skills
- Customer service skills
- Analytical and evaluative skills
- Subject skills
- Project management skills and
- Vision.

According to Burke and Miller, in most fields the issue of the professional competence and qualification of individuals are viewed as an integral part of the quality assurance of organisations and the services that they provide. This view has long embraced within the librarianship profession. Librarians and information professionals have a strong culture of responding to new opportunities in professional development to ensure that, their skills meet the continually changing environments in which they work. This is illustrated by initiatives such as the Library Associations programmes of Continuing Professional Development (CPD), Masters programmes for librarians entering management positions, increased availability of qualifications and training for paraprofessional staff and the adoption of the government instituted system of National Vocational Qualifications (NVQs) and Scottish Vocational Qualifications (SNVQs).

The librarians tend to be a very adaptable bunch of people and as professionals they cover a wide range of roles and responsibilities. One of the roles that have been on the increase in the past ten years has been that of digital content creator, something
that has developed in many ways through our role as preservers of information resources and the resultant opportunities to provide access more widely through digitization. Yet, well into the internet era with Web 2.0 and content creation, something that people all around the world are now taking part in, it is the researcher’s fervent belief that, few libraries and librarians are seriously taking their role as content creators.

### 4.6.3 Information and communication technology (ICT) skills

According to Margaret Rouse, ICT (information and communications technology or technologies) is an umbrella term, that includes any communication device or application, encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning.

According to Webopedia, the information and communications technology is the study or business of developing and using technology, to process information and aid communications. ICTs are information and communications technology (ICT) - technologies that enable society to create, collect, consolidate, communicate, manage and process information in multimedia and various digital formats for different purposes i.e. computing and telecommunications technologies like the personal computer, CD-ROM, cable TV, cellular phones and the Internet.

### 4.6.4 Impact of ICT on Library and Information centres

The Information is a dynamic and unending resource that affects all disciplines and all occupations. ICT has revolutionized the field of library and information services. ICT has developed to such a stage that it has given access to information at fingertips. UNESCO defines Information Technology 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 with social, economic and cultural matters (Peltu, 1982). In short, ICT on LIS means the application of computers and
communication technologies to the acquisition, organization, storage, retrieval and dissemination of information process. The convergence of computer and communication technologies and their subsequent application to library and information activities have changed the philosophy of information from unitary to universal access.

4.6.5 The LIS professionals in engineering educational institutions

The Engineering educational institutions have been certified by the agencies like the International Organization for Standardization (ISO), or the National Board of Accreditation (NBA) of the All India Council of Technical Education (AICTE), or both. In India, the independent accrediting agencies (NAAC, NBA) evaluate higher educational institutions based on their strengths in curricular aspects, teaching methodology, research facilities, infrastructure, and student-support mechanism. The NBA offers accreditation to the institutions offering courses in engineering, management, architecture, pharmacy, hotel management, and country planning. The Engineering educational institutions in Karnataka are keen in being accredited either by a national agency or by an international organization to exhibit quality and competition.

The libraries of these institutions have varied collections such as printed books and journals, and e-collections such as e-books, CD ROM products, e-journals, and e-project reports. The Packages include the programming languages, library automation software, web awareness and online facilities/services, besides the technical skills and managerial skills. The LIS professionals were familiar with the popular operating systems such as DOS and Windows, a mandatory requirement for using PCs. The LIS professionals possess skills in software packages and programming language, but the degree of skills varies. For online facilities, most of library professionals preferred OPAC/Web OPAC. It was followed by CD ROM search; e-mail Internet surfing and search engines.

The Library and Information professionals are globally being affected by the pace of ICT developments, as their roles keep on changing. On the other hand, ICT offers a number of new opportunities to library and informational professionals. The
library professionals with appropriate ICT skills and technological expertise that focus on the needs of the users/organization will have many opportunities in future. Most of the opportunities are available outside the traditional settings. These new roles include cybrarians, website coordinators, webmasters, database consultants, metadata specialists, digital literacy managers, information literacy coach, corporate information officers, knowledge managers, etc. Now, the information specialists have to work as e-information resources in which various professional groups are expected to map strategies that lead to produce, manage, maintain and service the information.

4.6.6 The Skills, knowledge and competencies required for LIS Professionals

The basic goal of library and information profession has always been to provide access to information to those who need it. The activities realizing this goal have evolved and transformed over the years. This includes - available technology, and need of an evolving information society. The information activities have guided by the developments in the field of storages, presentation and archiving of knowledge, collection development and organization of knowledge, information explosion and computers in information retrieval. The library and information professionals are involved in information gathering, storage, retrieval and dissemination on one hand and on the other hand the computer specialists who support the library and information professionals in this endeavour. For successful implementation of library, it is essential that LIS professionals are well trained and possess requisite knowledge and skills in this respect.

As discussed earlier, due to the invention of the ict applications, the libraries of the engineering colleges are also transformed by providing electronic information services. To work in continuously changing and transforming technological environment in these libraries, there is a need on the part of the library professionals, to acquire and develop necessary skills and competencies in different techniques such as library automation, internet, web, electronic mail, database search service, opac, video conferencing, electronic information/document delivery, consortia related services, etc. The nature and application of the technology is continuously changing and developing and as a result, it is required on the part of the engineering college libraries to update and upgrade the technological applications.
4.6.7 Managerial skills

Management is a challenging job. It requires certain skills to accomplish such a challenge. Thus, the essential skills that every manager needs for doing a better management are managerial skills.

Historically, the libraries have been the hierarchical organizations. In the last two decades, the library administrators have started introducing different work systems with the idea of turning libraries into more flexible, dynamic, and customer-oriented institutions. Among others, the team and working groups are the systems that empower employees to become more involved in the management of library resources and services. Nevertheless, regardless of the organizational structure, it is becoming increasingly imperative that librarians acquire managerial skills to guide their actions towards the achievement of the library’s mission and goals.

A manager must exercise a unique set of skills. Let us start by mentioning the skills required as technical skills, human skills, conceptual skills, leading skills, planning skills, organizing skills, controlling skills, decision-making skills etc. These skills refer to the personal ability put to use by the manager in specific position that he or she holds in the organizational hierarchy.

As one moves up in the hierarchy of the managerial positions, the responsibility increases. The fundamental functions of a manager such as planning, organizing, leading, controlling and decision-making are the skills required to master by the managers. In order to exercise these functions, one has also to keep in mind, the type of job, the size of organization, the skills and experiences of the people one works with and the time available at his or her disposal to do these management functions.

Katz (1974) talks of three types of skills that are recognized by all managers. These are the technical, the human and the conceptual skills. The use of these skills differs for various levels of managers. Let us understand the skills first and then see
how much each skill is used at various levels of managerial hierarchy and what importance each has in the career growth of a manager.

The Managerial Competencies and Skills refer to the Skills and Competencies that are needed to manage the library and information centre. In other words, the library professional must possess certain management skills and competences, to manage the Library Resources (i.e., Books, Periodicals, e-Resources, Non Book materials, etc). Users (faculty, student) and Library subordinate staff. (a) Planning & Forecasting, (b) Independent decision making, (c) Leadership, (d) Self-confidence & supervision, (e) Time management, (f) Authority & Responsibility, (g) Direction (Directing), (h) Interpersonal & human relations, (i) Conflict Resolutions and (j) Problem solving competencies must adopt by all the library professionals in this ICT era and it is essential for each of the library professionals.

4.6.8 Leadership skills

Management is to do with planning and organizing something and coping with complexity, the processes and procedures. Leadership is to do with creating that thing in the first place. It is about coping with change and helping to adapt to a volatile world.

The library professionals require these skills to lead the library in this ICT environment and adopt the leadership skills to lead co-employees, users etc.

The leadership attributes:

Besides the process, there are few leadership attributes that can be practiced by the leaders to achieve the desired success for the institutions. (Nirjar, 2012)

- An integrated value system and vision: Since the leader is a role model for others, he has to demonstrate the same value system on the personal and professional front.

- Interself Awareness: Knowing oneself is not enough as there is a need to know others as well, so that one can determine how people can function effectively in a team.
Intrinsic Commitment: If the leader demonstrates a sense of belongingness to the institution, he can expect the others to demonstrate the same.

Relational Responsiveness and Sagacious Disposition: The leader has to grow and take magnanimous decisions with the disposition, beyond that of normal people.

Your image travels faster than you do: Before you take up an assignment, people at that place would know so much about you and would have already made up their mind on how to work or not work with you.

Justice, Equity and Fairness: As a leader, one must pursue the virtues of justice, equity and fairness with respect to all. Lack of these can be a source of significant problem for the leader as well the organization as a whole. Majority of leaders fail because of the lack of these three virtues.

Sense of Belongingness builds passion: When a leader demonstrates a sense of belongingness to the institution, it in turn helps foster a similar sense among the people in the organizations. This gives an impetus to any effort made by the leader and the institutions as a whole.

Transparency and Accountability at the top, leads to transparence and accountability throughout: Leaders who are transparent and frank in their working are able to ensure their transparency at all levels of work. At the same time, taking responsibility of anything that goes wrong is an important element of institutional leaders.

Communicate regularly, clearly: The importance of communication with the different stakeholders repeatedly, has mentioned in the process. This is by far one of the most important elements which can lead to succeed. Within communication, listening seems to be playing the dominant part.

Balance task orientation with people orientation: Often leaders tend to become either only result oriented or only people oriented. If a balance is maintained between these two, it will contribute more to the chosen path of excellence.
Table 4.1: Leadership versus Management

<table>
<thead>
<tr>
<th>Leadership</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>A leader does the right things</td>
<td>A good manager does things right</td>
</tr>
<tr>
<td>Leadership is about effectiveness</td>
<td>Management is largely about efficiency</td>
</tr>
<tr>
<td>Leading is about what and why</td>
<td>Management is about how to do things</td>
</tr>
<tr>
<td>Leadership is about trust and about people</td>
<td>Management is about systems, controls, procedures, policies, and structure.</td>
</tr>
<tr>
<td>Leadership is about innovating and initiating</td>
<td>Management is about coping, about managing the status quo</td>
</tr>
<tr>
<td>Leadership looks at the horizon, not just the bottom line</td>
<td>Management is about the bottom line</td>
</tr>
</tbody>
</table>


The Library/Information Professionals Leadership Agenda/Strategy

The following initiatives are desirable and could be found rewarding:

- To Awareness, Create of leadership development skills among professionals.
- Self-development skills in leadership by the Librarians and Information Professionals
- Integration of leadership development into the library/information centre strategic planning.
- Leadership Development Programme to run through the ladder (i.e. from the top to bottom)
- Library and Information Schools to integrate Leadership Skills Development into their curricula
- Need for librarians and information professionals to maintain strong network within and without their organization, to enhance development of skills and knowledge.

Library leadership implies

Library directors seek to influence member of the parent organizations to provide resources to support expansion plans to accept the goals of the library as valid and thus observing of support.

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Three dimensions used to measure library leadership:

- Leader activity
- Reputational effectiveness
- Management of organizational change

Leadership is essentially a subject of management research. However, a theme is relevant to all human endeavours. Business enterprises and corporations have embraced the application of leadership principles and have found them to be agents of productivity and profitability. The time is therefore ripe for the library and information professionals, particularly in this part of the world, to take a cue from the latter is experience to enhance professionalism, information service delivery as well as social/educational relevance of practitioners. This needs to learn about, cultivate the qualities of a good leader, and know when to exercise leadership. Share leadership with others or allow others to take the leadership role. Exercise leadership within the library and as a member of other teams or units within the organization. Acknowledge the continuation of all members of the team. It is also expedient to add that, the phenomenon of the knowledge society has made cross-fertilization of ideas imperative, in the process of knowledge acquisition. This, without mincing words, is the surest way of survival in an extremely competitive world.

4.6.9 Information skills

Information played an important role in every aspect of life, in the modern world. Nothing moves without information and it is believed that information is the power and it is an important resource needed to develop other resources. The changing environment in all aspects has necessitated the need for the proper dissemination of information at various levels of management. The development and use of information systems is a modern phenomenon concerned with the use of appropriate information that will lead to better planning, better decision-making and better results for organizations.

For every organization, information is needed as a basic resource like materials, machinery, money and men (human resource). Therefore, information has
become a critical resource, just like energy, both of which are vital to the well-being of individuals and organizations in the modern world. Like other resources in an organization, the information is also a resource and should properly manage to ensure its cost effective use.

Information skills are often confused with information technology skills. Although information technologies are often essential to enable the users to access information resources, the two concepts are distinct. Information technology skills are concerned with the ability of users to use computer hardware, software and applications such as email and the internet. However, information skills are concerned with the ability of users to locate information sources and to evaluate, navigate, organize and communicate the information that they find.

Information professionals also require information skills training in order to meet the needs of their users and provide training to users. The following information skills training courses include:

- Library inductions
- Library catalogue/intranet training
- Copyright and plagiarism issues
- Citing bibliographic references
- Using electronic resources
- Internet searching
- Literature searching
- Bibliographic database searching
- Critical appraisal
- Reference management

Hence, the library professionals require the management of information systems in the library.

4.6.10 Communication skills

Communication is a significant part of a manager’s job. In today’s team-oriented workplace, the development of good interpersonal communication skills is an
important key to success. To build the competence and commitment of employees, a manager has to communicate effectively. Through effective communication, a manager can mobilize the employees behind an organization’s vision and inspire a conscious and concerted team effort to attain the vision. The pay-off of effective communication is:

- A more professional image
- Improved self-confidence
- Improved relationships
- Less stress
- Greater acceptance by others

Communication makes the world habitable. It consciously involves sharing of ideas, feelings, thoughts, and many other things that humans share. Communication is one of the core competencies that all information professionals should possess. In the advancement of technology, the libraries have become information storehouses; hence, the library professionals must have communication skills to deliver all the information to their clients in a proper way.

4.7 Conclusion

The engineering education in India as well as in Karnataka grows rapidly during 21st century and the libraries of these institutions are transformed into modern libraries with adoption of new technologies. It is well recognized that the libraries all over the world are undergoing transformation, especially owing to the development in information and communication technologies. The traditional libraries are changing into digital libraries and the new libraries that are being set up are increasingly of the digital kind. As a result, there is a widespread interest and consequently, many research and development activities are being carried out in this area world over. The role of libraries in technical institutions has changed. The libraries had to revise their activities and evolve new strategies.
References


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Digital Preservation.


