CHAPTER-3
IMPACT OF INFORMATION TECHNOLOGY ON LIBRARY AND
INFORMATION SCIENCE EDUCATION AND TRAINING

3.0 INTRODUCTION

Since the dawn of civilization man has been striving to explore the affinity. On the long voyage of exploration man has collected innumerable objects as per requirement and tried to preserve them, undoubtedly a very fundamental attitude of mankind that initiated the concept of preservation of thought contents or knowledge and gave rise to the concept of library later on.

The Information Technology is a blend of two words. Information means knowledge, can be bit, or a paragraph or a page. Technology refers to the use of computer and communication technologies for gathering, processing, storage, retrieval and dissemination of information.

The libraries have undergone several changes in their activities and services particularly in the areas of information storage, access and retrieval. The existence of the present information orient society is dependent on information resource; thereby librarianship is changing and expanding at a tremendous rate. Computer and communication technologies have revolutionized library and information services. Libraries are now expected to use various information technologies to provide information more expeditiously and exhaustively than before. If librarians are to play technology-oriented role, it is important that they keep abreast of the latest developments and the potential effects, which the advances in computing may have on information management.

The virtual/digital libraries have brought revolutionaries changes in accessing information. The role of internet or e-learning in education and research has become multifold. The emergence of virtual universities has brought a dynamic change and necessitates the restructuring of syllabi. Now the Indian Universities have also started to follow this system of education. For example, the Indira Gandhi National Open University (IGNOU) has launched a number of courses on line. The Madras University has also taken initiative in this venture and offering two courses on global Information Sources and Development of Web-based courses in LIS.
3.1 PRIMITIVE INFORMATION SYSTEM

The so-called information system of the primitive man consisted of sense organs as devices of receptors and conveys messages. Therefore, the transitional development in script, clay tablets, papyrus, abacus, quill pen etc. had increased the speed and accuracy in communication and information.

3.2 CATEGORIES OF RESOURCES

i Libraries based on pre-Guttenberg technology;
ii Libraries based on Guttenberg technology or paper based;
iii Computerized and networked libraries; and
iv Electronic/Digital/Virtual libraries.

3.3 SPECIAL LIBRARIES AND INFORMATION CENTRES

Special libraries and information centers are the natural outcome of the need for information support to research and development. The development of special libraries all over the world started during early 19th century. The youngest special libraries were those of technology and industry. In 1855 the Patent Office (UK) established a technological library, which is the oldest of such libraries.

In India, statistics show, when the public library development was in initial stage, the special libraries of varying magnitude were growing in number steadily to meet the growing demand for information in research (Evans and Ghosh, 1959).

3.3.1 DIFFERENT FACETS OF INFORMATION DEVELOPMENT

3.3.1.1 EXISTENCE OF CSIR

In the light of tremendous growth in the scientific and technological research after the Second World War. A major factor in this was the work of CSIR, which was founded in 1942 and now supervises 42 national research laboratories.

3.3.1.2 CREATION OF DRTC

During 1960s, Document Research and Training Centre (DRTC), Bangalore conducted a series of experiments to examine the feasibility of using computers in Document Finding System. DRTC developed a complete set of programs for DFS under the guidance of Prof. Neelameghan. Bhabha Atomic Research Centre (BARC) developed machine readable catalogue (MARC) of technical reports since 1970.
3.3.1.3 DIRECTORY OF SPECIAL LIBRARIES

In 1962, IASLIC provided a valuable service by the publication of a Directory of Special Libraries, which give detailed information about 173 libraries, including their staff, stock, opening hours, accommodations, issue figures and finance.

3.3.1.4 RECOMMENDATIONS OF INFORMATION SCIENTISTS, 1963

Following the recommendations of the information scientists held in 1963, Project Oriented Central Information Service was set up on experimental basis and the first experiment took place at National Metallurgical Laboratory, Jamshedpur in 1963. The National Science Library, 1964 was developed to co-ordinate the periodical holdings of Indian scientific libraries. In 1964, INSDOC set up a small Information Retrieval Cell, which developed an alphabetization program for Union Catalogue of Scientific Serials and output was produced on punched cards (Raizada, 1964)

3.3.1.5 CATEGORISATION OF INDIAN LIBRARIES

Indian libraries may be categorized into different generations- a large number of them without any computer application, still solely relying on manual means can be deemed as the first generation, those libraries with partial/full realization of OPAC and automated housekeeping are in the Second generation, the third generation libraries further augment their facility with multiple database access, where as libraries with full/digital access to contents may be placed under fourth generation.

3.4. SPECIAL LIBRARIES

A broad picture of special library scene in India has been provided by Rajgopalan (1970). His survey of 127 libraries shows that almost half of them (64) have fewer than 10,000 volumes, and most popular classification scheme is DDC (used by 50 Libraries), followed by UDC (31) libraries, followed by CC (14 libraries).

During 1970, Tata Institute of Fundamental Research (TIFR) Library developed programs for generating their catalogue based on annual acquisitions (Havanur, 1975). By late 1970s, the importance of computers and on-line facility was realized and Vashisht (1979) highlighted the fact that in Western and a few other developed countries, the on-line facility had reduced the gap between the user and piece of information to zero. He suggested that effort should be made so that the Indian scientists are not at a loss. Patwardhan (1985) studied the on-line information system for providing SDI service to users at Kirloskar Electric Company Ltd.
Bangalore. His study shows that SDI service offered by using on-line systems is superior both from qualitative and quantitative aspect. Krishan Kumar (1986) in his report on the conference of FID held in New Delhi, has described that there was consensus on using Facet Analysis to organize databases or knowledge bases containing highly standard and categorized knowledge. It was also emphasized that there should be collaboration between specialists in the fields of library science, computer science, linguistics, artificial intelligence, knowledge engineering and numerical taxonomy to carry out inter-disciplinary research and also to avoid duplication of research in the area of classification and communication. In 1986 an in-house database using MARC tapes for accessing documents related to computer science was developed by Murhy. Harav’s (1993) review of the development of library automation in India, in last 10 years, shows that the main players in the area of library automation in 1980s have been special libraries of the country. These libraries/documentation centers are in the R&D institutions under the Council of Scientific and Industrial Research (CSIR), Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR) and the Defence Research and Development Organization (DRDO). The National Information System for Science and Technology (NISSAT) was established in 1977 with the objectives of resource development, identification of Information users and manpower development. The Environmental Information System (ENVIS), initiated by the Department of Environment, became operational in 1984. Biotechnology Information System (BTIS) was initiated in 1984 with an objective to provide variety of access mechanism to a number of international information sources on the subjects.

Institution based multidisciplinary systems like INSDOC (1952) by CSIR, DESIDOC (1967) by DRDO, BARC (1954) by Department of Atomic Energy, SEDOC by the Ministry of Industries. BHEL (late 1950s) by Ministry of Industries, NML (1966) by Health Services, etc. were also set up.

3.4.1 DEFINITION OF INFORMATION TECHNOLOGY

The UNESCO has defined Information Technology (IT) as the scientific, technological and engineering disciplines and the management techniques used in information handling and processing their applications, computer and their interaction with men and machines
3.4.2 IT ENVIRONMENT IN INDIA

The Indian Statistical Institute (ISI), Kolkata was the first organization in India, which had installed HEC-2M computer system in 1955 with Russian collaboration. The ISI, Kolkata developed the first indigenous computer in 1964 in collaboration with the Jadavpur University, Kolkata. On the other hand, the software industry in India is considered amongst the largest industry in the world. The National Association of Software and Service Companies (NASSCOM) is an apex body of the software industry in India which has been effectively used towards four Es i.e., Education, Entrepreneurship, employment and Economy. The software industry has great potentiality to transform the Indian Economy and Education. The National Informatics Centre (NIC) established in 1977 is a premier IT organization in India committed to provide State-of-the-Art solutions for the IT needs of Government of India (GOI). NIC has set up a satellite based nationwide computer communication network, the NICNET, in 1988. NICNET is one of the largest VSAT based network. The Computer Maintenance Corporation (CMC) of the Department of Electronics (DoE) has installed INDONET, a commercial data network to cover entire India by setting up computer nodes at the major metropolitan cities.

BEGINNING OF IT ENVIRONMENT IN INDIA

<table>
<thead>
<tr>
<th>SNo.</th>
<th>INSTITUTE</th>
<th>SYSTEM INSTALLED</th>
<th>YEAR</th>
<th>WITH FOREIGN HELP</th>
<th>INDIGENEOUSLY BUILT WITH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ISI, KOLKATA</td>
<td>HEC-2M computer system</td>
<td>1955</td>
<td>Russia</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>-Do-</td>
<td></td>
<td>1964</td>
<td>-</td>
<td>Jadavpur UNI, Kolkata</td>
</tr>
<tr>
<td>3.</td>
<td>NIC</td>
<td>Indigenously state-of-the-art solutions</td>
<td>1977</td>
<td>-</td>
<td>GOI</td>
</tr>
<tr>
<td>4.</td>
<td>NIC</td>
<td>-DO-</td>
<td>1988</td>
<td>-</td>
<td>-DO-</td>
</tr>
<tr>
<td>5.</td>
<td>NICNET</td>
<td>Satellite-based initial IT</td>
<td>-</td>
<td>-</td>
<td>-DO-</td>
</tr>
<tr>
<td>6.</td>
<td>Computer Maintenance Corporation</td>
<td>INDONET</td>
<td>-</td>
<td>-</td>
<td>DoE</td>
</tr>
</tbody>
</table>
3.4.3 IT AND ITS IMPACT

The medium of publication of Journals and other forms of literature is shifting from paper print to electronic, and their mode of distribution is also shifting. Besides, libraries have converted their card catalogues into online catalogues. Efforts are being made to provide union catalogues so that the library becomes essentially a gateway to a universe of resources in printed, electronic or other forms. Surely, all these developments are directed at creating an electronic library, a virtual library, a digital library, or a library without walls. In the information age, libraries may exist in both the states i.e. physical as well as virtual.

3.4.4 USE OF IT IN LIBRARIES

The activities in a library mainly include the following: Collection development (Acquisition), Cataloguing and Classification, Circulation, Reference work, Preservation, Conservation and Archiving. With the availability of IT, these activities have undergone the following changes:

In the selection of publications, many libraries now include paper versions but also electronic publication, including e-journals, CD-ROMs and multimedia products. Acquisition through internet has also become common. The traditional cataloguing is being replaced by on-line Public Access Catalogue (OPAC) which is a database of holdings of the library. Regarding circulation, the borrowing of journals/documents is available on internet. Reference service via internet is now available. Since library acquisitions are increasingly in non-paper forms, the preservation measures cover these media also. Besides, most of the information services like current awareness services, (CAS), Selective Dissemination Information (SDI) are computerized.

Effecting quality into library and information system and services has been a continuous national and international activity of professionals. These efforts have resulted in the creation of institutional, national and international standards and specifications. The aim of education (Teaching and Learning) meant for a profession is to develop the manpower to practice that profession. Advances in IT have vastly enhanced library's capabilities of collecting, storing, processing, and transmitting information. Libraries have embraced various technologies such as computer, CD-ROM, telecommunications, micrographics, reprography, internet, digital libraries to enhance their efficiency and provide better and improved sources to the users. But the best thing for us would be to see that the spirit of Ranganathan's laws be made
permeate the information system to ensure that the system continues to remain amenable to the needs of society.

### 3.4.5 LIBRARY SOFTWARE PACKAGES USUALLY USED IN INDIA

<table>
<thead>
<tr>
<th>Sno.</th>
<th>SOFTWARES</th>
<th>AGENCY</th>
<th>WEBSITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>Libsys Ver.4</td>
<td>Libsys Corporation</td>
<td><a href="http://www.libsys.net/">http://www.libsys.net/</a></td>
</tr>
<tr>
<td>ii</td>
<td>TLMS</td>
<td>OPAC Infosys Pvt Ltd</td>
<td><a href="http://www.time.net">http://www.time.net</a></td>
</tr>
<tr>
<td>v</td>
<td>DELSIS/DEL-WINDOWS/DOS</td>
<td>DELNET</td>
<td><a href="http://www.delnet.ron.nic.in/">http://www.delnet.ron.nic.in/</a></td>
</tr>
<tr>
<td>vii</td>
<td>SANJAY</td>
<td>DESSIDOC/NISSAT</td>
<td><a href="http://www.nisat.org/">http://www.nisat.org</a></td>
</tr>
<tr>
<td>x</td>
<td>SOUL</td>
<td>INFLIBNET</td>
<td><a href="http://www.inflibnet.org/">http://www.inflibnet.org/</a></td>
</tr>
</tbody>
</table>

The success of digital project lies on sound project planning. For, study of potential clientele, study of current library services and digital resources, setting goals and objects, priorities and budget etc. In India the concept of DL is not yet full fledged. Today the most of the research in libraries have been equipped with digital infrastructure, but there is no any kind of D Ls as developed in USA and other developed countries. In India, the internal publications like Ph.D thesis, other thesis,
reports, patents, and the documents (including a few books and journals) which are not coming under copyright Act, can be digitized for subsequent access.

3.5 PRESENT TREND IN LIS EDUCATION & TRAINING

As per the present trend, LIS education and training be imparted in such a way so that the products rely less on collection development and more on resource sharing and networking. Similarly a lot of reflection and research will maximize the merits and minimize the demerits. Now the LIS schools have the daunting task of improving the quality and relevance of LIS education and training through improved infrastructure in the form of IT laboratories, course trained manpower, new syllabi, new approaches and methods to teaching and matching infrastructure.

Library educators have to keep their doors and windows of their profession wide open making way for an inward flow of new ideas, concepts and trends emanating from neighboring disciplines. The organization has to see that its professionals continue to be productive throughout their working period. If this not taken care of, there are possibilities for the professional to become obsolete.

3.5.1 PRESENT SCENARIO IN LIBRARY NETWORKING

The current status of library networking in India is that most of the libraries are covered by some network and have created databases of their holdings. The library network centers provide access either by e-mail or online or by common software. In order to have network of all Indian university libraries, the GOI under UGC established INFLIBNET (Information Library Network) at Gujarat University, Ahmedabad in 1991. The program is directed towards modernization of university libraries by introducing the installation of computers, which is basically a cooperative endeavor. The software named SOUL (Software for university libraries) was released in February, 2000. This cooperative venture for pooling, sharing and optimization of library resources, provides a channel to academicians and researchers for exchange of information from sources within the country and abroad.

Library management software is being developed jointly by DESIDOC AND INFLIBNET to work under DOS and UNIX environment. Utility software for the book database on CDS/ISIS has been developed for generating catalogue cards in CDS/ISIS as per AACR-2 format from data available in ISP-2709 format having standard tags from CCF. The Indian Library Association (ILA) created a NALANDA database, under a project from National Institute of Social Science and Technology (NISSAT), which includes more than 10,000 libraries in it. NISSAT supplied
CDS/ISIS packages free of charge and trained library personnel in computers led switching over to technology adoption in libraries in institutions like Bhaba Atomic Research Centre (BARC), Trombay, Central Food and Technology Research Institute (CFTRI), Bangalore, Central Leather Research Institute (CLRI), Chennai, Bharat Heavy Engineering Limited (BHEL), Bangalore, etc.

3.5.2 COMPUTER APPLICATION IN LIBRARIES

Computer applications in libraries may be traced to 1960's, when Indian National Scientific Documentation Centre (INSDOC), New Delhi and Documentation Research and Training Centre, (DRTC), Bangalore begin use of computers. During the year 1970's INSDOC, Publication and Information Directorate (PID, now NISCOM) of CSIR, and a few libraries in the country started automating some of their activities and services. INSDOC produced catalogue of serials using IBM/602 unit record equipment. In 1970 National Aeronautical Laboratory (NAL), Bangalore conducted experiments using ICL 1004 system for automating circulation control. By 1971, nine libraries were using computerized procedures for procurement.

3.5.3 IT COMPONENTS AT BLISc. AND MLISc. LEVELS

As overview made by Chatterjee, indicates that Bachelors and Masters Programs of LIS schools reveals that very few schools incorporate IT components in the extent necessary for gaining required competencies and that too only in Masters level. Even IT get in syllabus, students do not get enough practical exposure of the modern technology due to infrastructure limitations. Moreover, due to the legacy of Dr. Ranganathan, half of the curricula is allocated to the classification of the Curriculum Development Committee (CDC) Report, 1992 under Dr. P.N. Kaula, there was some visible change in the curricula of the LIS towards the inclusion of IT components, but most of the DLIS didn't implement it.

3.5.4 ROLE OF INFLIBNET

INFLIBNET has developed five databases- one each on books, thesis, serials, experts and research projects using CDS/ISIS (Keeping in view the west trends in IT towards middle tier architecture i.e. to provide access to middle media kits, and other accessories are absolutely inadequate in majority of the LIS departments.

3.5.5 BEGINNING OF ONLINE ACCESSING

In 1975, a one-week demonstration of online accessing of the databases held by the European Space Agency Information Retrieval system (ESA-IRS) was organized at the Tata Institute of Fundamental Research (TIFR), Bombay. In 1976,
INSDOC started Chemical Abstracts condensate and providing Selective Dissemination Information (SDI) services in the country, using the IBM 370 computer of IIT Madras.

3.5.6 PRACTICAL TRAINING

Education in any profession must respond to the needs of the profession. These changes may lead to departure from the conventional courses. It is therefore, essential for LIS schools not only to integrate the application of IT, but the practical training to students is as important as formal theoretical knowledge. It is pathetic to know that the majority of the Indian University departments are being run by either one or two full-time staff members supplemented by contributing staff, for running the courses at all levels, i.e. BLISc, MLISc and PhD programs.

3.6 INFORMATION EXPLOSION

The third quarter of the last century has witnessed immense knowledge explosion and information explosion as well. There are about three to four million articles appearing each year in some 30,000 significant journals with a growth of 8-10 per cent per year. The periodical publication within just a span of 10 years has been doubling of its publication; some scientists call this as ‘Information Deluge’. The advancement in IT with computer communication has made accessibility from any part of the world. In the light of these developments, most of the libraries and Information Centers (L&ICs) are flooded with modern technology.

THE RATE OF ALA* ARTICLES APPEARED IN JOURNALS

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>YEAR</th>
<th>ALA CONSTANT NUMBER OF JOURNALS</th>
<th>NO. OF ARTICLES PRODUCED</th>
<th>% GROWTH RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1980</td>
<td>30,000</td>
<td>62,000</td>
<td>8-10 %</td>
</tr>
<tr>
<td>2.</td>
<td>1990</td>
<td>-DO-</td>
<td>1,66,000</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>2000</td>
<td>-Do-</td>
<td>2,40,000</td>
<td></td>
</tr>
</tbody>
</table>

*American Library Association
3.6.1 NEED FOR ELECTRONIC LIBRARIES

In 1990 Alwin Toffler in his book 'Powershift' estimated that 1.3 trillion documents are appearing only in US. By now the number must be more. Keeping in view the universe, the publication of documents will be much more. Financial constraints, budget allocation for Indian University libraries is insufficient for purchase of even 10% of books published in India. The most severe price increase occurred in reference manuals (abstracts, indexes, etc.) e.g. Chemical Abstracts rose from $12 in 1940 to $1450 in 1970, $16350 in 1994 and $21764 plus postal charges in 2001, which is presented in a tabular form below:

<table>
<thead>
<tr>
<th>SNO.</th>
<th>PRICE</th>
<th>YEAR OF PUBLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>$12</td>
<td>1940</td>
</tr>
<tr>
<td>2.</td>
<td>$1450</td>
<td>1970</td>
</tr>
<tr>
<td>3.</td>
<td>$16350</td>
<td>1994</td>
</tr>
<tr>
<td>4.</td>
<td>$21764</td>
<td>2001</td>
</tr>
</tbody>
</table>

Chemical Abstract is a journal covered globally the prominent researches in chemistry (organic and inorganic). The journals are in the abstract form, simply classified with code number. It is upgraded weekly.

Millions of books in various languages on various subjects are appearing all over the world. About 2 lacks periodicals are publishing, undoubtedly majority of books and periodicals are publishing in the developed countries. Even in India more than 60,000 books in various languages are published annually. In the face of space shortage; electronic media will solve this problem to a great extent. Databases have become a universal phenomenon. DIALOG, BRC, ORBIT, INFOLINE, IRS, STN international are some of the well known online service providers using databases. Internet is the world's first digital information technology that lets anybody to send anything digital at anywhere in the world. Where as CD-ROM is one of the largest data memories available for a commercial PC application. CD-ROM has
revolutionized the complete educational world. CD-ROM offers on disc access to bibliographic database without the need of telecommunication facilities, connect time costs and communication fees. The CD-ROM system resolves many of the retrieval issues, preservation, access, storage and security of Libraries and Information Centers (L&ICs).

Now most of the International journals offer some provision to access the abstracts/full-text of paper through web along with the print subscription. So the information centre is undergoing a transition from the paper-dominated manual environment to the shred access-oriented electronic environment.

3.6.2 DIGITAL LIBRARIES / ELECTRONIC LIBRARIES

Digital libraries/electronic libraries are the extension of traditional libraries in the internet era. They combine the structuring and gathering of information. It is the integration of varied technologies like hardware, software, network, web, imaging or OCR, library techniques and other developing technologies for information transfer and dissemination.

3.6.3 GENESIS OF VIRTUAL LIBRARY

We are experiencing disappearance of printed secondary sources of information and rely mostly on the electronic databases. Therefore, the need to upgradation and systematic automation of libraries systems in educational and research institutions is essential. The VL is formally opened its doors to the public in 1995 at Public Library of Charlotte and Mecklenburg Country (PLCMC) North Carolina. According to Lois Kilkka, a PLCMC manager—'It was the demise of the library’s collection of 16 mm films and photograph records that led to the birth of the VL. The concept of VL embodies that any person who has a connection the library network (s) can access the resources of not only that library but internationally through networks like the internet, VL may have multimedia capabilities that to see graphics and listen to sound, (b) hypermedia capabilities that incorporate the techniques of hypertext and multimedia.

3.6.3.1 DEFINITIONS

1. Digital Library / Electronic library is the library where information is stored in one form (i.e. digital form) irrespective of their different forms in traditional libraries.
2. DLs/ELs are organizations that provide the resources, including the specialized staff, to select, structure, after intellectual access to, interpret, distribute,
preserve the integrity of and ensure the persistence over times of collections of
digital works so that they are readily and economically available for use by a
definite or a set of communities.

3. Clifford Lynch (1995), redefined it as ‘a system producing a community of users
with coherent access to a large, organized repository of information and
knowledge. The DL/EL is not just one entity, but multiple sources are
seamlessly integrated’.

4. According to Berkley Digital Library Project, University of California, ‘The DL will
be a collection of distributed information sources, producers of information will
make it available, and consumers will find it through the help of automated
agents.’

From the above definitions, the characteristics can be briefly stated as:
The DL is not a single entity, it requires technology to link the resources of
many, Digital Library collections are not limited to documents surrogates, and they
also include digital artifacts that cannot be represented in printed formats. The term
DL/EL became popular during the last decade of the 20th Century in the advanced
countries. Typically, such as DL/EL will include a number of search or navigation
aids that will both operate within that particular library and allow access to other
collections of information connected by networks worldwide.

3.6.3.2 DIGITAL / ELECTRONIC / VIRTUAL LIBRARIES

All the three terms are being used near synonymously, which is not exactly
the case. DL/EL may roughly mean one and the same thing but DL/EL may not
always be networked, but would largely contain digitized information, and since a
virtual library (VL) is a library without walls, spread across the globe, from where one
is able to retrieve the whole world, which Sherwill describe the VL as also called EL,
online library or desktop library.

3.6.3.3 CHARACTERISTICS OF VL (VIRTUAL LIBRARY)

Powell defined a virtual library as ‘A library with little or no physical plant of
books, periodicals, reading space or support staff but one that disseminates
selective information directly to distributed library customer, usually electronically.
Sherwell describes characteristics of VL as: i) there is no corresponding physical
collection, ii) documents are available in electronic format, iii) documents are not
stored in any one location, iv) documents can be accessed from any workstation, v) documents are retrieved and delivered as and when required, and vi) effective search and browse facilities are available.

3.6.3.4 A FEW EXAMPLES OF VIRTUAL LIBRARY

VIRTUAL LIBRARY - [http://www.vlib.org/](http://www.vlib.org/)

<table>
<thead>
<tr>
<th>No.</th>
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<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South Asian Virtual Library</td>
<td><a href="http://www.columbia.edu/eu/libraries/indiv'area/sarai">http://www.columbia.edu/eu/libraries/indiv'area/sarai</a></td>
</tr>
<tr>
<td>2</td>
<td>India Virtual Library</td>
<td>[<a href="http://webhead.com/wwwvl/india/india">http://webhead.com/wwwvl/india/india</a> 2.html](<a href="http://webhead.com/wwwvl/india/india">http://webhead.com/wwwvl/india/india</a> 2.html)</td>
</tr>
<tr>
<td>3</td>
<td>Pakistan Virtual Library</td>
<td><a href="http://www.clas.ufl.edu/users/gthursby/pak/">http://www.clas.ufl.edu/users/gthursby/pak/</a></td>
</tr>
</tbody>
</table>

3.6.3.5 FUNCTIONS

i) Any number of users could view one copy of document simultaneously; ii) study material never go out of print, iii) protects rare books, iv) cost-effective and cost-efficient.

3.6.3.6 CREATING DIGITAL RESOURCE

For creating a digital resource to convert print resources into digital format, adequate attention is given for selection of the material. And digitization would prevent any duplication of work and wasting of money. The library acts as an intermediary between the author and the reader. The libraries will no longer own resources, but only serve as a channel for information. The library would have to arrange the information to provide it to the user. The prospective librarians need to have primarily is a firm grounding in any of the programming languages and expertise to develop programs not only to prepare a catalogue but also to meet the demands of all sections of the library. The librarians should be able to guide the readers to right search engines. So the thrust in the syllabus has to be on the application of computers to library management and service to readers.

3.6.3.7 INFRINGEMENT OF COPYRIGHT

To overcome the copyright violations like, illegally photocopying, many projects are underway. ISI, now Bureau of Indian Standard, BIS is developing a
system provides secure viewing through password, secure printing through encryption and water marks, guaranteed document authenticity by means of a digitally signed finger print, and use privacy. A hidden watermark in the image file of article will discourage unauthorized copying to a large extent.

3.7 IT ENVIRONMENT IN LIS SCHOOLS

The convergence of digitization, telecommunication and other devices of IT provide the LIS schools the opportunity to build an environment for learning which have implications on the core curriculum of LIS education. Students can be best prepared for technically efficient positions by introducing electronic information services on advanced IT sills and research opportunities. Even LIS schools should undertake internet based continuing education programs. Moreover, the faculty should have the state-of-the-art information technologies and relevant training on its use. They should also explore possibilities of computer based teaching for better understanding of the latest and critical concepts.

Establishing IT laboratory will call for adequate infrastructure in LIS departments. Many of the problems involving in the country are rooted in lack of adequate infrastructure. Many of them do not have sufficient number of practical tools such as DDC schedules, Colon Classification schedules, classified catalogue Code and the likely. Some of the universities have started self-financing courses and the fees charged by them is in no way sufficient to met the expenditure required to be spent on maintaining technical tools laboratory and the computer laboratory, the two types of laboratories, following the impact of IT within the department.

3.7.1 TEACHER TRAINING

In the wake of more and more use of computers and IT in organization and dissemination of information through libraries, the departments of LIS are hard pressed to provide necessary education and training in this area. This can be achieved by either of the two ways: i) by inviting/appointing a computer expert in the departments of LIS for delivering lecture/training the students in the use of computer training; or ii) to train existing teachers in application of computer and IT in library and information work and services and in future to appoint library science teachers with degree/diploma in computer application/science.

If the first opinion is favored, then it will be necessary to first train the computer specialists in library house keeping jobs and services, without which they will not be able to give the required slant to the application of IT in library work and
services. It was further felt that this is much more a difficult task. Therefore, it was felt more viable to provide opportunities to existing LIS teachers for receiving training in computer application. Since they know every bit of LIS and services, they will be more amenable. As far as new recruitments in the faculty are concerned, these days the aspirants are fully equipped with required knowledge of computer application.

3.7.2 NATIONAL INSTITUTE OF EDUCATIONAL PLANNING AND ADMINISTRATION (NIEPA)

National Institute of Educational Planning & Administration (NIEPA), New Delhi is an autonomous organization under the Ministry of Human Resource and Development (MHRD), Department of Secondary and Higher Education. It is an apex training institute in India for educated, planners and administrators. Its main functions cover the fields of training, research, advisory and consulting services, knowledge dissemination and networking with other institutes and international agencies.

3.8 REMODELLING LIS CURRICULUM

The UGC Subject Panel and the curriculum Development Committee (CDC) Report 2002 under the chairmanship of Prof. C.R. Karisiddapa have thoughtfully combined the traditional and modern subjects. Besides, introducing the full paper on IT Basics (Theory & Practice) and IT Applications (Theory & Practice). And IT components have been introduced in other papers as well, wherever applicable.

3.8.1 THE CDC REPORT, 2002

The UGC Subject Panel and the CDC Report 2002 under the chairmanship of Prof. C.R. Karisiddapa have thoughtfully combined the traditional and modern subjects of studies in adequate proportion so as to enable the DLIS to choose their own structure and content of the syllabus. It was hoped that the Model Curriculum will serve as platform for change in the future. Besides introducing two full paper on IT : Basics (Theory & Practice) and IT : Applications (Theory & Practice). IT components have been introduced in other papers as well, wherever applicable. They have also emphasized upon the adoption of two years integrated course, which at one hand can ensure eliminating duplication of course content and also provide necessary time for teaching of automation and IT component and their application in library work. Imparting all these subjects in the professional would mean redefining the curriculum and teaching methodology of LIS education. Further, strengthening
the LIS teaching faculty along with IT infrastructure and curriculum would in fact produce efficient information managers.

The Report has also emphasized upon the adoption of two years integrated course. The CDC Report has two separate sets of curriculum. One is for two year integrated MLSc, another is for truncated BLISc and MLISc one year each. Out of seven modules for integrated course, one module is meant for IT Applications in LIS.

The first unit introduces computer to LIS students along with its architecture, hardware and software; second unit introduces Operating Systems- single version as well as multi-version- their programming language, algorithms, flow charting up to data structures; in the third unit, students are supposed to learn network architecture, fourth unit contains the basic features and tools of internet – internet services, e-mail protocols and other protocols for file transfer, transmission control, etc. unit five carries the content of Database Management System (DBMS); the sixth unit intends to teach the design and development of library house building operations and the last unit is for digital library construction and operations.

In the light of the current developments in the US a number of library schools have eliminated the word 'library' and call them the schools of Information Science. Similarly the librarians are called Information Brokers, Information Architects, Cyberarians, Database Consultants, Digital Librarians, Knowledge Managers, Metadata Librarians and it seems to be an ongoing process with more developments in IT. On the lines of various library schools in US, we may also think of the organization of specialized degree programs with competitive and selective enrollment to serve the needs of librarians and information specialists desiring advanced training for increased professional responsibility.

3.8.2 NEED FOR IT TRAINING

The role of technological change is tremendous and it is affecting all types of libraries and Information Centers (L&ICs). At the same time the library clienteles are becoming more sophisticated in their demands for information and expect librarians to respond to their needs in an efficient and up-to-date manner. The above statement shows clearly the need and necessity of proper and up to date training to the LIS professionals. If the LIS professionals are not trained in handling IT, there is a possibility of replacement of library professionals by computer professionals. And library professionals may also use their time relived from routine work for research.
and compilation of reference tools and will also be an important asset in the job market.

3.8.3 AGENCIES IMPARTING TRAINING

The main sources of training in India are the library schools, INSDOC and DRTC and a few polytechnics and library associations. There is an urgent need for INSDOC & DRTC to revise and tune their apprenticeship courses to the present requirements. Moreover, being pioneering training institutes, both are to revise their training programs from time to time, so that trainees could know about the changing technological trends in LIS education & training.

3.8.3.1 INFLIBNET, NISSAT AND NIC

The trio- INFLIBNET, NISSAT and NIC should conduct IT courses of one or two month’s duration by charging nominal fees. This may enable large number of teachers and senior library professionals to undergo training to update them.

3.8.3.2 ILA, IATLIS & OTHER LIS ASSOCIATIONS

The professional associations should create IT culture and environment among the professionals. Therefore information professionals working in libraries, they alone can merit or man our institutions. Their efficiency is our future and their inefficiency will throw into nowhere.

3.9 EDUCATION & TRAINING PROGRAMMES

The education and training (E & T) programs need to be revised and restructured by the universities. The gap between the university education and training and the expertise required to handle specific expert roles especially in the use of management skill and use of computer software is largely being filled up by the professional organizations or national information centers. For instance, National Centre For Science Information (NCSI), for instance, conducts one-year training for application of information technology to library and information services.

3.9.1 DISTANCE EDUCATION

Distance education in its chequered history of over 100 years, starting with the Chautangua continue education program initiated by the University of Chicago in the 1890s, has made use of varied technologies. Similarly, Massachusetts Institute of Technology (MIT) has announced in 2002 that it is going to put all the courses on the internet for free. For this MIT is to spend $ 100 million in 10 years. In India, the Indira Gandhi National Open University (IGNOU) New Delhi has introduced a few online courses and following suit, Madras University has also launched a few online
courses. And now the infrastructure is problem, it is the universities to come forward to launch courses online so that the pressure of admission-seekers to the universities could be lessened to some extent.

3.7.2 REVIVAL OF SCIENTIFIC TEMPER

Dr. Ramashelkar, the Director General of Council of Scientific and Industrial Research (CSIR) elected to America's Prestigious National Academy of Science—an honor considered second best to getting a Nobel—maintains that India is well equipped to handle the research need of top NRE scientists. Apart from Tata Institute of Fundamental Research (TIFR) etc., even some universities have top class departments like the University of Hyderabad, Pune and JNU.

The government recently announced a Fellowship Scheme to try and attract some of this talent. The science and technology department is offering scientists Rs. 50,000 a month, a contingency fund of Rs 5 lakh a year. It is unlikely to bring back the best. As former Union Science and Technology Minister and one of the country top scientists, Prof. MGK Menon, points out that people are in top companies and universities and many of them are at the top of their organizations. It will be difficult to match the kind of facilities and money that these people used to, like the Americans and the Brits. For instance, a professor gets about 150-200 thousand dollars a year, and teaches one or two days and work and spends the rest of the days on research and travel. For NRI scientists with strong ties to India and willing to work in India, their half time appointments seem a good way to start the process of moving back.