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# Role of Librarians in the New Millennium of Information Technology*

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**Abstract**

This article highlights the librarians' connotations of Information Technology (IT), IT developments in libraries, and areas of IT as relevant to libraries. It also discusses the future IT use and role of librarians in future.

## 1. INTRODUCTION

Information Technology (IT) is all pervasive. There is hardly any activity of educational, economic and social importance which is not influenced by IT. Even the common man now feels the benefits he is getting from IT.

Information technology has been given different connotations by people belonging to different subject disciplines and specialisations. The computer and telecommunication specialists connote IT as a specialisation covering the technologies of computers and telecommunications (both software and hardware) aspects.

In the field of journalism, IT is generally meant a technology used for information dissemination which includes systems like telex, fax, teleprinter, e-mail and so on. For a librarian, IT has a much wider connotation which includes the technologies and systems like microfilms, microfiche, CD-ROMs, computers, information networks, etc. In IT, we will discuss all those technologies which libraries and information centres use for collection, processing, storage, retrieval and dissemination of recorded information.

* *An extract from the keynote address delivered at the 44th All India Library Conference of the ILA during 25-28 Feb 1999 at Hyderabad.*

## 2. IT AS RELEVANT TO LIBRARIES

The information technologies that are relevant to libraries mainly cover the following:

(a) Computer Technology;

(b) Telecommunications Technologies;

(c) Reprographic Technologies;

(d) Library Technologies;

(e) Technical Communication.

The activities and services in libraries in which these technologies are used are indicated in Fig.1.

The Information Technology Task Force recently constituted by the Government also seems to accept this wider connotation of IT, as can be seen from the recommendations it has made.

## 3. IT DEVELOPMENTS

Most of us generally know that more and more powerful computers in smaller and smaller sizes are arriving into the market, day by day. Lap-top and palm-size computers have already become common. Still smaller size (credit card size and still further smaller) are on the way. Similarly, fibre-optic cable networks with Integrated Services Digital Network (ISDN) capabilities for transmitting huge volumes of

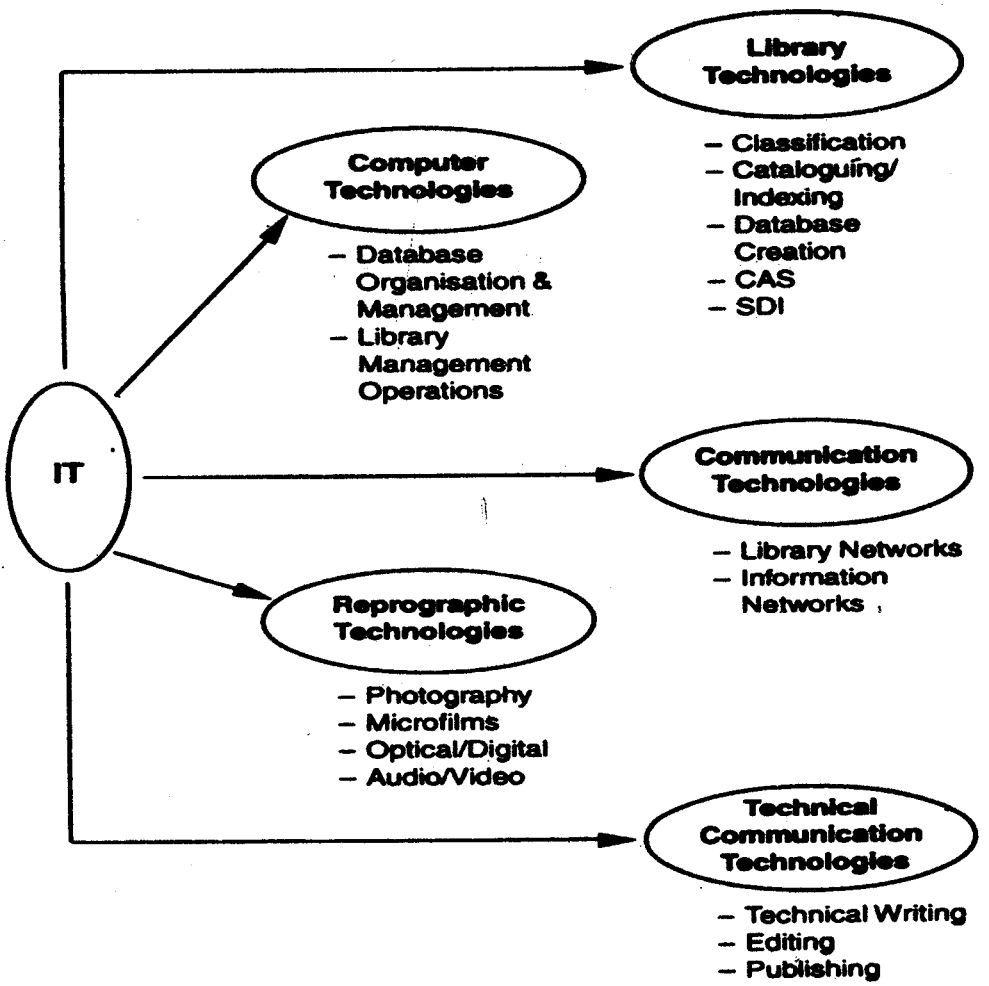


**Fig. 1: Areas of Information Technology as relevant to libraries**

data in a few seconds are also increasing in various countries including India. Optical digital discs (ODD) of higher and higher storage capacities will continue to come in. Presently, the ODDs can store from 2.6 to 3.9 gigabytes of data on a single-layer CD size platter, which is equivalent to more than 2700 computer floppy disks.

The US Government announced, a couple of years back, the implementation of Internet-II which will provide the following facilities:

(a) Connect universities and national laboratories with high-speed networks (10 to 100 times faster). While majority of them will be about 10 times faster, a few will be 100 times faster. These can eventually transfer the entire Encyclopaedia Britannica in a few seconds.

(b) Handle real-time services like high quality video-conferencing. There will be a variety of research challenges and many new commercial services will start operating.

(c) Meet national goals and missions related to scientific research, national security (including information warfare), distance education, environmental monitoring and health care.

A look at the developments taking place in various areas of IT would suggest that the developments are very fast, with high impact on various sectors like education, research, commerce, industry and government activities.

We find, even in a developing country like India, computers being used in schools, colleges, commercial shops and other small trading units, etc., apart from educational and research institutions. We also find information networks like Education and Research Network (ERNET) of the Department of Electronics for communicating educational and research information, National Informatics Centre Network (NICNET) of the Planning Commission for providing access to as well as communicating governmental data and information; I-Net, a public data network provided by Department of Telecommunications; and the VSNL information network, which provides e-mail facility and access to Internet. The VSNL has presently over 1,30,000 Internet customers with the actual user base touching 6,00,000 and 12,000 access lines. It has a bandwidth of 70 mbps for its backbones and is planning to have 2 gigabits per second by the year 2000.

The Mahanagar Telephone Nigam Limited (MTNL), the public sector company providing basic telephone services in the metropolitan cities of Delhi and Mumbai, has also started Internet service in dial-up mode and through ISDN at 64 kbps and 128 kbps and leased lines at 64 kbps. While these are Government-organised or Government-funded networks, with the liberalisation of the telecom policy, several private organisations have also started providing networks or communication services to the public. These include the e-mail and Internet access services provided by Satyam Computers, Hugh-Escorts, and others.

Similarly, we find the reprographic technologies of CD-ROMs, ODDs, multimedia systems and products in libraries and other information dissemination centres. While the use of these technologies in the country is presently not as high as in the advanced countries, it is growing at a very fast rate.

The information networks in advanced countries are providing backbones of capacity/bandwidth in gigabits, and are increasingly using fibre-optic lines whose capacity is about a thousand times higher than that of the coaxial cables. The Indian networks are also providing backbones of capacity in megabits. Soon, the advanced countries will be providing backbones or information highways of terrabits capacity and Indian networks will be having the capacity in gigabits. Similarly, several agencies in the Government and in the trade are producing multimedia products and CD-ROM and online databases. Although, the number of such indigenous online databases and CD-ROM products is presently not high, it is expected to grow exponentially soon after the high capacity information networks and information highways become available. The time lag in the release of a computer or communication hardware or software in the market in the advanced countries and its availability in the Indian market is hardly a couple of months at present and the use of such technologies soon after their arrival in the country is also increasing very fast.

## 4. NATIONAL TASK FORCE ON IT

To give a big boost to the use of IT in various sectors in the country for economic and all round development, the office of Prime Minister of India constituted a National Task Force on Information Technology and Software Development in May 1998. The Task Force has prepared an IT Action Plan and made 108 recommendations for the implementation of the Action Plan. A notable aspect of the recommendations is that the Task Force has recognised the development of information content in the form of databases and other information products as crucial for realising the benefits of the developments in IT. A clear indication of this is evident in that, out of the four Working Groups constituted by the Task Force, one is devoted to Information Content Development (ICD). The Working Group on ICD, which had its first meeting on 4 December 1998 noted among other aspects, the following :

(a) The content development industry has a very huge potential for development which is far larger than the software development industry and so, major thrust must be given for promoting the ICD industry in the country if the communication networks and other IT developments are to be fully exploited.

(b) The information products like databases and value-added information services would have global scope and international market. Such products include databases of maps, satellite pictures of geographical regions, agricultural statistics, natural resources, industrial and commercial products and market information, TV programmes on Indian art and culture, analysed information products, and so on.

(c) Enormous human resources will be needed for information content development in various sectors. To generate such quantum of human resources quickly, the universities and other training institutions must be advised to organise training programmes on a large scale. The universities must re-orient their information science programmes to provide human resources with appropriate skills required for the content development industry and related activities like providing access to information using various information systems and networks.

The four working groups were expected to submit their recommendations by the first week of January 1999.

## 5. IT DEVELOPMENTS IN LIBRARIES

It is interesting to note that library profession does not usually lag much behind in the use of technologies relevant to it. One can notice when the mainframe computers came into operation in late 1950s, libraries started using them in early 1960s. Similarly, when the personal computers (PCs) arrived in 1980s, they soon entered in the libraries also and were put into use for automating library activities and services and for development of databases. The activities in a library mainly include the following:

(a) Collection development and acquisition;

(b) Cataloguing and classification;

(c) Circulation;

(d) Reference work;

(e) Preservation, conservation and archiving.

With the availability of IT, these activities have undergone and are undergoing the following changes:

**Collection Development and Acquisition**: The price escalation of publications, the information explosion (literature explosion) and reducing library budgets have forced the librarians to shift their focus from comprehensive acquisitions to providing comprehensive or exhaustive access to literature or information available in databases and on online networks. Even in the selection of publications, many libraries now include not only paper versions but also electronic publications, CD-ROMs, and multimedia products. Acquisition through Internet is also becoming common.

**Cataloguing and Classification**: The traditional catalogue is being replaced by online public access catalogue (OPAC) which is a database of holdings of the library.

**Circulation**: This function has been influenced to the extent that it is computerised in many libraries. Also, since many journals and other documents are available on Internet, borrowing of library collections is reduced to that extent.

**Reference Work**: The library professional or the reference librarian now not only needs to consult the computerised catalogue of his library (OPAC) and the reference sources, but also the external sources through Internet, and other networks for providing reference service.

**Preservation and Archiving**: Since library acquisitions are increasingly in non-paper forms like electronic, CD-ROM or multimedia publications, the preservation measures cover these media also.

Also most of these library activities and the information services like Current Awareness Services (CAS) and Selective Dissemination of Information (SDI) services are computerised.

## 6. IT USE IN FUTURE LIBRARIES

Any library professional who keeps in touch with the literature on the use of IT in libraries can have a reasonably clear visualisation of the functioning of libraries in future. One can say, future libraries will have collections in multiple media, will have their activities and services fully automated, will be networked, and use

Internet and other information networks, and so on. However, one can also say that the extent of use of these facilities and systems will vary with the libraries. While the elite libraries will be using different information technologies for most of their activities and services, the less-endowed libraries will be using only some of these technologies and provide services mostly in a manual mode. However, the projections or visualisations of some experts who have made detailed studies and visualised the future libraries, are worth noting.

Philip Barker, Professor of Applied Computing and Research Director at the University of Teesside visualises the following categories of the future libraries :

**Polymedia Libraries** – with collections in several, independent media like paper, microfilm, compact disc, etc. The organisational and management processes within these libraries are basically manual in nature.

**Electronic Libraries** – which will have widespread use of computers and such other facilities as online databases and automated record keeping and computer-based decision making. The electronic media includes both digital and analogue.

**Digital Libraries** – in which all information exists only in a digital electronic format. The information itself may however reside on different storage media such as electronic memory or magnetic or optical disk but users will not necessarily perceive any differences between them.

One great advantage of having information in digital form is that it can be accessed simultaneously by many users and at a low cost. Thus, while a conventional library might only hold one or two copies of a book, a digital library could generate an unlimited number of copies *'at the touch of a button'*.

**Virtual Libraries** – which use the technology of virtual reality (VR). This is known as telepresence in its simplest form. In a virtual environment one would be able to browse around a library system without having to physically go to it.

Using the VR equipment and facilities, one would be able to enter a virtual library, browse around its rooms and shelves, use an index or catalogue, select a book (by pointing to it and touching it), open it and read it. Of course, the only place where the book really exists is in the computer and within the minds of its readers. The use of IT in the new millennium is reflected vividly in the vision of the policy document titled *Strategic agenda for the Ottawa public library* (published in June 1996). It says :

*The paradigm is shifting. Our world is increasingly depending on information. Libraries will be electronic doorways to information. Library workers of the future will be the navigators, the facilitators and the mediators of the digital revolution. They will help people retrieve, organise or develop the information they need. Library workers will be as comfortable with computers, networks and databases as they are with books, tapes and story-times. They will need to train and retrain constantly. They will have skills and strategies to meet the needs of people from different cultures, age groups, social and economic backgrounds, and levels of ability.*

Based on the expected use of IT in libraries, Natalia Grygierczyk, Project Manager of Electronic Library of the University of Utrecht, The Netherlands, makes a voyage into 2050. She visualises:

*Optical fibre cables and quantum-leap processors constitute the structure of the Global Library, a repository comprising a colossal digital collection amounting to the volume of atleast 25,000,000 complete Britannicas. All such information is available at fingertips. Without having to browse through dreary catalogues, without being afraid of missing crucial information because of an erroneous code, not knowing the author's name. The disheartening 'out on loan' has become a thing of the past, a phrase in a dictionary.*

## 7. USE OF IT IN INDIAN LIBRARIES

Use of IT in the Indian libraries has been slow though such attempts started as early as in the 1970s. INSDOC in 1976 started getting *Chemical Abstracts* condensate and providing SDI services in the country, using the IBM 370

computer of IIT, Madras. In 1975, a one-week demonstration of online accessing of the databases held by the European Space Agency Information Retrieval System (ESA-IRS) was organised at the TIFR, Bombay. Also, during the 1970s, INSDOC, Publications & Information Directorate (PID) of CSIR, and a few libraries in the country started automating some of their activities and services.

Now a number of libraries in the country use computers for library automation, have e-mail and Internet facilities and acquire CD-ROM and multimedia publications. Several software packages for library automation, current awareness and SDI services have been developed and are in use. However, such use of IT is more in the libraries of the S&T organisations but in many non-S&T libraries also the use is picking up fast.

## 8. ROLE OF LIBRARIANS IN FUTURE LIBRARIES

The importance of information content development has already been recognised in the advanced countries. This is evident from several thousands of databases being made available by those countries in various forms as online databases, CD-ROM/multimedia databases, etc. These are marketed in various countries the world over. Also, the role of libraries in national development is recognised in various countries. For example, the Library and Information Commission in UK has recognised that the library and information science sector is a substantial part of the UK economy. It has announced its Vision 2020 covering the following aspects:

**Connectivity**—providing universal access to the products of the human mind

**Content**—creating a digital library of the UK's intellectual heritage of culture and innovation

**Competences**—equipping individuals and organisations to play their full role in a learning and information society.

Information content development requires skills in data organisation, structuring and presentation of the content in a helpful format so as to enable easy retrieval of required information by the users. Development of all these skills is generally included in the curriculum of library and information science programmes.

As recognised by the IT Task Force Working Group on ICD, content development industry as well as the content development activity in libraries and information centres require enormous human resources. Since the library and information professionals are best suited for the content development activity, they must cash on this opportunity and prove their usefulness in this area of global importance. Also, the library and information science departments in the universities must re-orient their courses to develop skills among their students for content development and organisation and management of the four types of futuristic libraries stated earlier.

Another skill that the future library professionals must develop is to analyse the information queries and provide information which directly answers the queries, rather than providing documents that contain answers to the queries which the user has to go through and find answers. This means, the librarians will be more and more involved in information analysis and repackaging in future rather than just providing documents.

According to Klobas, Coordinator of Information Management specialisation in the University of Western Australia, librarians in the new millennium organisations will be knowledge managers and information analysts. They will work as integral members of business teams that need these roles and will work with those teams rather than in a library.

According to Peters, there are several areas in which today's information professionals can develop new skills and strategies in order to change, survive and continue to compete in the world of electronic information. These include the following:

- Corporate knowledge workers often do not know the resources (sources of information) that can help them in decision-making. Information professionals can help them.
- Intellectual capital is now-a-days increasingly being referred to as the new corporate asset.

Using information resources to create a knowledge base to support development of intellectual capital, presents an important new strategic marketing opportunity for information professionals.

To be able to survive in the digital and thus the end-user-oriented era, re-engineering might be the only solution. Ribbler lists a few but nevertheless critical elements of re-engineering by the information professionals. These are:

- In the re-engineering process, the role of information professionals changes from one of producing data and information to one of integrating new information technologies.
- He will assist people in the organisation by taking away the task of information gathering and organising.
- He will perform the creative tasks of information product development and product synthesis – thus providing information solutions and not just information.

## 9. PROBLEMS OF IT BASED INFORMATION SYSTEMS & PRODUCTS

Many technology enthusiasts often advocate that IT can take care of all the information problems. They also emphasise that future libraries will have no paper documents and no walls and they will be digital, cyber and virtual libraries, and they will provide information services and products as well as documents through networks. Since many of these advocates are acknowledged computer or communication specialists, the policy makers and the top bosses of organisations tend to accept these ideas as such and keep advising the libraries to transform their libraries into the new forms. However, many library managers are aware that paper editions of publications will not disappear from libraries and they will only increase. Of course, they will increase along with the electronic or digital editions of publications. Also, all is not all rosy with the electronic or digital publications and with the cyber or networked libraries. Colin Johnston, an Online Librarian, brings out some of the problems faced in libraries with the use of digital collections–including CD-ROM, and Digital Video Discs (DVD)–and Internet-based access to publications. Some of them are discussed here:

- Paper-based publications provide far more comfortable reading, when one has to read continuously and in comfortable postures (in easy chair, sofa, bed, etc.), than any electronic or digital publication. So, the libraries designed with a view to accommodate more digital collections and expectedly fast decreasing paper-based collections will have problems in finding space for the paper-based collections.
- With the rapid changes in IT, the CD-ROMs which are considered as *'interim technology'* and are likely to be replaced by DVDs in the near future, will become unusable as the drives for the CD-ROMs will go out of market. The heavy investments made in CD-ROM collections will have to be repeated for acquiring the new technology based collections.
- Using Internet-based publications has two main problems. One is lack of organisation of the information published through Internet and so, one has to spend several hours even for reasonably exhaustive information searches. The Internet may be compared to a large library without a catalogue, whose stock is unclassified and randomly shelved. Given such chaos and the time needed to become familiar with its ever-changing resource, academicians and researchers even in advanced countries mostly prefer paper-based scholarly publications than their Internet editions, perhaps because of the convenience. Second, a large part of the information available on Internet is not evaluated or authentic and therefore can not be relied upon for serious use. Such a situation can sometimes lead to the possibility that Internet becomes a vehicle for disinformation, ranging from conscious deception to inadvertent inaccuracies.
- A survey, published in the journal *Computers in Libraries* in 1995, found that librarians usually took less time to provide information from library collections than from Internet. A paper published in *'Communications of the ACM* (1995) also advises, *"If you are in a hurry,*

*go to library, not to Internet*". Searching on the Net is often less expeditious. This is not to say Internet is not useful for accessing information, but its contribution should not be overemphasized. If Internet is going to be used by librarians, then a number of steps will have to be taken to make it more useful. For example, it will be necessary to develop and implement standards for organising and evaluating information. One possible approach could be by developing catalogues for the materials available on Internet in which case the feasibility for such cataloguing is to be worked out first. A problem with such an approach could be that different versions of a file may be accessed through different gophers and files can disappear, be removed or amended without warning. Thus, any library cataloguing information of its interest available on Internet has no control on such aspects.

- Although more than 1,000 library catalogues are available on Internet, getting a book after it is located from such a catalogue would not be easy. Here the traditional inter-library cooperation has still to help the document supply, although some document delivery services are provided by some vendors.
- Converting the existing library collections into digital libraries will be a formidable task with the associated software, human skills and copyright problems.

## 10. THE RIGHT ORIENTATION

In spite of all these problems, it is certain that more and more electronic or IT-based information will be entering libraries and its use will grow year after year. The European Commission is presently funding about 75 electronic library projects at a cost of Ecu 898 million. The number of electronic library projects is continually increasing as any literature search in (Library & Information Science Abstracts (LISA) or *Library Literature* will show. However, as I mentioned earlier, along with the electronic or IT-based information sources, products and services, the traditional paper-based book collections also will grow. So, library professionals will have to gear up to handle both the current as well as traditional forms of collections.

## 11. CONCLUSION

I would like to conclude now that the role of future library professional will be:

- to develop as a provider of access to information, and as an integrator of information and as an information intermediary.
- to use current information technologies for effectively and efficiently doing the job.
- to provide information solutions rather than volumes of literature that contain the solutions. He/she will develop necessary analytical skills and general understanding of the disciplines in which information is to be provided.
- to develop appropriate information and knowledge bases and information products to meet the information requirements of the clients.

I believe, the following observation of Eliot is relevant in the present IT era and will also be so in the new millennium of IT:

*Where is the life we have lost in living?*
*Where is the wisdom we have lost in knowledge?*
*Where is the knowledge we have lost in information?*

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