Chapter 8

CONCLUSIONS
CONTENTS

Chapter 8 : CONCLUSIONS

8.1 Introduction 339
8.2 General Findings 339
  8.2.1 Mass Storage Media 339
  8.2.2 Electronic Publishing 340
  8.2.3 Digital and Virtual Libraries 341
  8.2.4 Computer and Communication Technologies 342
  8.2.5 Internet 342
  8.2.6 Issues and Concerns of Electronic Media 343
  8.2.7 Role of Library Professionals in Future Libraries 345
8.3 Indian Scenario 346
  8.3.1 Use of CD-ROMs 346
  8.3.2 Library Automation and Database Development 346
  8.3.3 Communication Technology 348
  8.3.4 Development of Networks 349
  8.3.5 Internet 352
  8.3.6 Education and Training 353
8.4 Survey of Library Professionals 353
8.5 Summary 355
8.6 Suggestions for Further Research 357
8.7 References 358
CHAPTER 8
CONCLUSIONS

8.1 INTRODUCTION

The study concentrated on different facets of electronic media and their impact on libraries and information centres in India. An evaluative account of the various components has been covered with a view to assess their impact. The study reveals that most of the developments taken place in various fields related to e-media are driven by technology push rather than users' demand or preference. Many research projects have been undertaken to establish the viability of many of the technologies covered by the study including e-publishing, digital libraries, online journals, rights management, virtual libraries, and so on. The key players of these projects mostly are from academic and research institutions with liberal financial support and funding from government agencies. Most of these developments took place in developed countries, mainly the USA, followed by the UK, France and Germany. In so far as it relates to India, the study took into consideration of various aspects like growth of the technologies, liberal government policies and initiatives by agencies (mainly from public sector) to improve the prevailing situation.

8.2 GENERAL FINDINGS

8.2.1 Mass Storage Media

Of all the mass storage technologies, the optical disc media are becoming more popular and acceptable with users. Libraries are no exception to this. The obvious factors to this include the advantages in access time, integrity and non-corruptness of stored information, multimedia capabilities, transportability, ease of use and compactness. Other aspects like high optical and mechanical stability, low cost, and proliferation of PCs have helped their acceptance as important and integral compo-
nents of libraries around the world.

Among the optical media, CD-ROM technology found wider acceptance in libraries, thanks to the ever-growing e-publications. However, the DVD with its versatility and enormous potential, is inching towards displacing CD-ROM as the primary medium of optical storage media. However, CD-ROM may stay for some time to come, mainly due to the backward compatibility provided by DVD drives. In the long run DVD and its variants are expected to replace CD-ROM and its variants. The erasable and rewritable medium would emerge to replace the floppy discs. The study reveals that while magnetic media is mainly used for long time archival storage, optical media is used both for online and archival usage. The major concerns of users of optical media, the outcome of the study, are the multiplicity of standards and formats. Use of a common standard would enhance users’ confidence, clear confusion and facilitate all round growth of the media.

Another concern of the users is the technology obsolescence, which is high in electronic industry. No one is sure about which technology would be available for future usage. Users of optical media have to cope with the situation of constantly changing technologies and the future scenarios. Although the shelf life of optical media is quite high, the users, particularly those who use them for archival storage, have to be watchful about the obsolescence of storage and access technologies. Constant innovations and research efforts in volume holographic storage, electronic trap, and proximal probe technologies, it is difficult to decide the technology of future mass storage (Stone, 1997).

8.2.2 Electronic Publishing

The development of DVD and its gigabyte storage potential has provided opportunities to expand the capabilities beyond the realm of CD-ROM. The presence of Internet is felt more and more now than earlier, and many CD-ROM publishers are
turning to Internet publishing. It is revealed by the study that the publishing industry is moving from print-on-paper to electronic to hybrid (combination of CD-ROM and online) and online publications. Subscriptions of print journals are falling by 3-5 per cent per year and are resulting in the exponential growth of and migration to the electronic and online journals. Aggregators of electronic and online journals are appearing on the scene with an option to act as a single window to access e-journals subscribed by libraries including archival access to back files (of subscription period). The study also reveals that despite the growth of electronic products, print publications are not decreasing, and so would continue to be in reckoning for some more time (Crawford, 1998).

The study reveals that although not accepted initially, the citations to the e-journals and resources on Internet are on the increase. Now many secondary periodicals are also indexing and abstracting the articles published in the electronic and online journals.

It is observed from the study that the concerns of librarians in using e-publications include the inadequate budgetary support, lack of suitable infrastructure and re-appropriation. Further, although electronic publications do not involve printing, packaging and posting which reduces the costs by 24-36 per cent (Woolfrey, 1993), these are not passed on to the libraries (except in few cases where they are offered free). In many cases electronic versions are offered at a slightly higher premium over the print subscriptions. Some publishers insist that dual subscription (to print and online versions) is compulsory. In fact, there is no agreed or standard format for charging electronic journals — either on CD-ROM or online.

8.2.3 Digital and Virtual Libraries

The study reveals that there is an apparent paradigm shift in the libraries in the face of the development of digital and virtual libraries. The development of digital
libraries have been perceived to improve the quality of services rendered and so the user satisfaction resulting in the overall image of the library. On the other hand, the virtual libraries, i.e., libraries without walls, result in individual, independent and informal learning. This may lead to the less frequent or non-usage of library leading to psychological and sociological issues.

The study revealed that these developments call for sharpening skills of the librarian in various branches of library management. The librarian has to upskill his abilities in the new environment in critical areas like intellectual property rights, cyber laws, Internet technologies and network management.

8.2.4 Computer and Communication Technologies

There were all round developments in computer technologies resulting in miniaturisation, compactness, higher processing speeds, and manifold increase in storage capabilities besides reduced prices. The ever innovative technologies led to the prediction of cheap microprocessors with DVD, TV and VCR capabilities, and PCs costing less than US $ 10 has (Gilheany, 1999). The costs of storage costs are also expected to drop steeply.

Communication technology is the crux of information dissemination and library networks. The study reveals that transmission speeds have been improving over the recent past. Research is in progress and transmission and switching speeds of the order of a Terabit (TB) per second are expected to be available in the near future. The study also reveals that the use of various communications tools such as e-mail and fax are steadily growing and videotext and teletext technologies are popular only in a few developed countries.

8.2.5 INTERNET

The Internet is linking the electronic information resources of the work. It provides interconnectivity between the networked information, digital libraries and the
users and seekers of information. It is creating a global information society that provides instant access to information without any discrimination irrespective of the location of the resources or users. It has enabled the creation of virtual libraries and virtual universities. The study reveals that the use of Internet is growing at a steady rate. Many reference and current awareness services are possible by using electronic information resources available on the Internet. It also offers services like e-mail, bulletin boards, discussion forums, network newsgroups and electronic conferences to facilitate informal dissemination of professional information in each and every field of human knowledge. These are facilitating free exchange of information thus fostering cooperation and reducing the gap between peers. Internet also hosts many library-specific Web sites that are helpful to the librarians; a few like Aquiweb, Amazon.com, and Barnesandnoble.com, are highly useful and are often used by librarians around the globe.

The study found the ever-growing influence of e-commerce in various fields and its potential applications in library field. It has been found that many libraries of developed countries are having their presence on Internet through Web sites and homepages. These have potential to be utilised for marketing library services and products as well as for publicity and informing users.

However, Internet also causes some concerns. The foremost is the inability of have-nots in accessing Internet. The concern about the quality, authenticity and integrity of information can be, to some extent, overcome by evaluating the sources and Web sites. Another concern is the intellectual property rights that are associated with the cyberspace. The study reveals that users and librarians are to be trained in these areas.

8.2.6 Issues and Concerns of Electronic Media

The study reveals that the various developments in technologies associated with e-media resulted in a paradigm shift in the functions of the libraries and librarians. The electronic information resources in general, facilitate faster location of informa-
tion, access and dissemination through efficient document delivery making optimal utilisation and sharing of resources. These in turn lead to the qualitative improvements in accessing, processing, dissemination and providing services. These developments also resulted in the introduction of new services.

The study also covered the copyright issues. It has been revealed that the technological developments and breakthroughs outpace the legislative efforts thus creating a necessity to revise old or enact new laws to prevent rights violations, and unlawful acts like hacking, eavesdropping, using cyberspace for terrorism and so on. Although many developed and developing countries have enacted stringent laws to protect rights of authors, there is no harmonisation between laws of different countries thus affecting transborder flow of information. There is a necessity to include explicitly the electronic products like databases, multimedia works, computer software, graphics and the like in the copyright laws to prevent infringements. Steps are to be intensified to provide security to the information over networks, particularly in the light of e-commerce.

The study throws light on the many thorny issues and concerns like preservation, permanency, archiving and access to back files, and accountability that are to be addressed. It is observed that the acceptability of papers published in e-journals for the purposes of appointments, promotions, and tenure at present is not encouraging due to the quality and integrity considerations. It is important to maintain quality in e-journals and other e-publications through peer reviews and stringent editorial policies. To instill confidence in authors, readers and peers so that the papers published in e-journals are also treated on par with printed versions. There is an urgent need to evolve a uniform pricing policy for electronic and online journals including common archiving programmes enabling the subscribers to access the back volumes of the subscription period even after discontinuing the subscription. There is also a need for standardisation and compatibility of hardware and software. Stringent bibliographic control measures are to be introduced to streamline and control the proliferation of the e-publications, especially over Internet and to facilitate access to genuine litera-
ture. The sociological and psychological issues in the virtual library environment are to be addressed.

8.2.7 Role of Library Professionals in future Libraries

The developments in the IT and the advent of Internet made many authors to envision the future of the information society. Berghel (1995) called the future cyber community as digital village, without any specific location yet connecting individuals of common interests. Targowski (1994, p. 118) proposed an Electronic Global Village which can help people live anywhere without foregoing any opportunities, telecommuting to their offices through information highway, with availability of best teachers and courses to the students wherever they are. The print publishing has graduated to electronic and Internet/Web publishing. The death of written word and printed book have been predicted. Although print publications would be there for some more time, say a couple of decades (see Crawford, 1998 and 1999; Odlyzko, 1994), future of digital libraries and the role of library professionals have been dealt by many authors (see for example, Barker, 1997; 1997(a); Grygierczyk, 1997; Norman, 1995; Klobas, 1997; Odlyzko, 1994, etc) where in the electronic documents, high speed (hundreds of Gbps) fibre-optic networks, all-digital collections, etc have been envisaged. In the changing environment, librarians too should adapt and should market their skills in knowledge transfers policy making information organization and analysis. This calls for upskilling the information professionals who will have to play newer, complex and entirely different roles in the new environment.

The future librarians should not only be information providers and intermediaries, but also should be information aggregators. They have to be identifiers, evaluators and selectors of authentic, useful and reliable electronic information over Internet/intranets. As users develop skills in identifying, evaluating and using electronic resources, librarians have to develop the skills of specialist information providers by obtaining such information from sources outside the users' domain. With the information organisation skills, librarians can structure information resources for Internet and
intranets. They should be integrators of print and electronic collections (until all information is available only in electronic form). They should be skilled in information content development, especially databases of indigenous information to help corporate decision making as well as for internal users and for marketing purposes. They should be skilled information content experts, well versed with acquisition, organisation and transfer of data, information and knowledge. In other words they should facilitate IT-assisted knowledge transfer. They should be capable of information product development, product synthesis and should provide information solutions rather than providing information. They are expected to be proactive service providers with knowledge of intellectual property rights, cyberlaws, licensing and electronic copying regimes.

They should be coordinators of specialised activities like database development, network applications and management, skilled organisers of electronic resources and training for staff as well as users.

8.3 INDIAN SCENARIO
8.3.1 Use of CD-ROMs

The study makes it clear that despite the slow percolation of the technology and the problems associated with the acquisition of CD-ROM products, their use is growing slowly but steadily. Although started with financially strong and premier libraries of national importance, their usage is gradually increasing in smaller libraries also. With the recent spurt in the publication of CD-ROM and multimedia products, the electronic publication industry is gaining momentum. The National Centre for Digital Information is taking necessary steps to cover CD-ROMs and e-publications under legislation.

8.3.2 Library Automation and Database Development

The study reveals that due to the non-receptive policies of the government
and trade unions, computer technologies got a hold in the country only in the late 1980s. The liberal economic and new technology policies of the 1990s have seen an all round growth in information technology in the country. This resulted in the healthy indigenous production and export of computer hardware and software. The PC density in the country is very low. As against 10 and above for advanced countries, India's PC density was 0.2 in 1997 which is expected to reach the figure of 1 and 2 (per 100 people) by the year 2000 and 2008, respectively (NTFIT&SD, 1998). The present level of PC penetration is lower than the average for developing countries and India stands far behind the developing countries of the region. However, the continued downfall in the prices of PCs and the IT-friendly policies of the government are expected to improve the PC penetration further.

The study reveals that many of the library automation and software development efforts began in public sector with simple routines, which later led to the development of integrated packages. Although the number of integrated library automation software packages available from commercial and private sector in the country is large, very few could penetrate the libraries. Lack of awareness and publicity, multiplicity of standards and formats, and the absence of a national coordinating agency besides inadequate budgetary support for purchasing and maintenance of the software are the main reasons. As a result many library automation efforts were made around free and inexpensive software packages like CDS/ISI, dBase, FoxPro, etc.

It is observed from the study that special libraries, mostly from government sector, took lead in library automation with libraries from academic, social sciences, humanities and management institutions following suit. In the university environment, INFLIBNET has taken lead. As many as 73 of the 87 university libraries (many of these have not responded to the survey by the researcher) funded by INFLIBNET upto 1997-98 possessed infrastructure for library automation (INFLIBNET Centre, 1999). By the year 1997 there were about 200 machine-readable databases amounting to roughly 50 per cent of total databases available. This improved further with the
participation of private industry, particularly in the financial and business information field, which were successful in marketing them. As revealed by the survey, a majority of libraries are involved in database development. There are at present about 30 libraries with holdings databases of 1,00,000 or more records. More than 67 libraries funded by INFLINET have created databases of varying sizes of their holdings (INFLIBNET Centre, 1999). Most of the libraries covered by library networks create databases of their holdings. They are also taking up automation of library activities thus slowly moving towards total library automation. Some of the efforts resulted in rationalising acquisitions and achieving a greater level of resource sharing. Some efforts are expected to help in retrospective conversion. Already INFLIBNET has funded more than 120 university libraries for creating infrastructure for library automation, database creation and retrospective conversion of documents. With the libraries participating in the metropolitan/city library networks taking this activity seriously, this situation is expected to improve further.

However, these efforts are not sufficient if we look at the volume of resources held by libraries in the academic, R&D and private institutions and the quantum of information/records contained in them. Further, databases in fields other than business, finance and industry contain information of imported documents. Thus, there is an urgent need to create databases of indigenous information to facilitate optimum utilisation of resources held in libraries as well as to market them to the outside world.

8.3.3 Communication Technology

The study reveals that due to the monopoly of the government agencies, the communication infrastructure has not grown well in the country. At present the country has a teledensity of 2.1 (The Hindu, 1999) lower than the average teledensity of lower income countries. Although in terms of number of telephone lines, India ranks among the top 15 countries, the fibre-optic component of the long distance network is only about 64,000 route km (in March 1999) amounting to 30 per cent of the total
network. Even though all the state capitals and the 12 major cities are expected to be connected through fibre-optic network, this will not be able to provide the required bandwidth for the widespread use of e-mail and Internet. For meaningful participation at the global level, India needs to have the fibre-optic backbone at the earliest.

Diffusion of IT in the country is also observed to be lower than other developing countries. This is mainly due to the low IT spending, which must be increased to 2 per cent (as against the current 0.7 per cent) of the GDP to get benefits of National Information Infrastructure. The existing 22 Mbps bandwidth at major Internet hubs is inadequate to support the growing Internet access and has to be increased to a few Gbps bandwidth. To strengthen the security of information and transactions over communication networks, the existing laws such as Indian Evidence Act, Indian Telegraph Act, Copyright Act, etc are to be amended. There is a need for setting up an Information Security Agency at the national level to oversee the security of transactions over Internet and intranets, formulation of a National Policy on Information Security, and the enactment of Information Security, Privacy and Data Protection Act for handling digital data, Computer Crimes Act, Electronic Funds Transfer Act, E-Commerce Act and IPR Act which are also suggested under the Policy framework of the National Task Force (NTFIT&SD, 1998).

8.3.4 Development of Networks

It is observed from the study that networking activities started in the country rather late. Although INDONET was established in the early 1980s, it did not have much impact. It is the establishment of NICNET and ERNET in the late 1980s, which actually gave momentum to the activities like resource sharing, network-based services, and Internet access. They facilitated communication amongst the scientific community. While ERNET helped in ‘discovering’ Internet among academic and research institutions, it is largely urban-oriented. On the other hand, NICNET with its large geographical coverage popularised the services and benefits down to the district level. NICNET is expecting to reach all the colleges and higher secondary schools in the
country. INFLIBNET is also trying to establish its own network based on VSAT technology. Out of over 100 university libraries funded by it till 1998-99, 80 possess network connectivity (to VSNL/GIAS, ERNET, NICNET, and I-Net).

The creation of infrastructural networks aroused interest to establish application networks leading to the initiation of library networks during the 1990s. Many of these have been modelled on the successful networks in the USA and UK. The study reveals that the member institutions were not ready for active participation and these efforts became premature. As a result, these networks were not as successful as expected. The reasons are many. The old notion that network means nothing but resource sharing is still prevailing. Sharing the resources — financial, technical and material resources, and means, the twin objectives of networking in India, have been achieved to a limited extent only. It is not difficult to analyse the factors for this.

The first factor is lack of financial resources. Except for a few participating members, many could not afford to create the necessary infrastructure. These members were using conventional, manual means to share resources for a long time, before they could obtain financial support from parent organisation or from other funding agencies. Another point of concern here was the management support for networking activities. No out side government agency is prepared for fully funding these initiatives through out its existence. This is the case with NISSAT, which after initial set-up and sustaining for a few years' expenses asked the networks to generate revenues for their future continuance and sustenance. INFLIBNET too adopts this principle which provides initial funding to create infrastructure in libraries and recurring grants for 5 years towards certain activities. As the library services were traditionally thought to be free, the market has not yet fully developed. And when users are ready to pay (for example, ADINET), they demand quality and precision.

The unskilled manpower was the second factor. As no need was felt till the infrastructure was created, there were hick-ups in getting the existing manpower trained
as many of these are old and not motivated to learn new technologies to upskill their abilities. Further, many libraries are either understaffed or are having staff who are not suited to the rigours of the technologies. The library schools were not equipped to train the manpower. The syllabus was old and the new and emerging fields like database creation/development, networking and Internet could not find their entry until recently. This left the professional associations and institutions like UGC and NISSAT to offer training. Institutions like DESIDOC took initiative through professional associations and developed the database creation and development market.

Another factor that affected the impact of networks is the non-availability of standards and procedural guidelines. This is perhaps a major factor as databases created using different standards (including local standards) and varying depths of indexing posed a lot of problems while merging them to create a single database for resource sharing in terms of quality and uniformity. The resultant databases conform to the standards only partially with some of the mandatory fields missing. Further there is no national agency to look into the standardisation and quality control aspects. As a result the country suffers from lack of databases of indigenous information and lack of content. Yet another factor is the fact that the library and information science professionals are unable to rise to the situational demands. They feel that the computer and communication professionals have to look into the network management. But the latter usually do not look into the needs of library services. This causes a general disagreement and possible failure in achieving the set objectives and goals.

The study reveals that some of the efforts to create databases of indigenous information by agencies like Centre for Monitoring India Economy, Federation of Indian Chambers of Commerce and Industry, and Bio-Technology Information System have paid dividends as users are willing to pay for accessing these databases because of their contents. It is imperative that there is a necessity to create market for use of information and a mechanism to identify what is relevant to the users. This is possible only when skilled, proficient manpower is positioned to capture, consolidate,
authenticate and convert information useful to users both from India and abroad.

It is observed that the approach of centralising activities and services followed by CALIBNET failed due to necessity of huge funds, whereas a decentralised approach of DELNET, MYLIBNET, PUNENET and some others are starting to pay dividends. The library networks met with success of varying degrees. Where value added services are provided and where the users are ready to pay, the services are being sustained and improved. ADINET is an example of such a network, which is offering better services than other networks, as the users are from business community.

8.3.5 INTERNET

It is observed from the study that the monopoly of VSNL for providing Internet services resulted in a poor growth of Internet hosts and users in the country. With the participation of private ISPs, the situation is expected to change. NICNET and ERNET played key role in providing access to Internet. However, the Internet nodes in the country are not able to sustain the increased interest of users in Internet. The falling prices of computers and the telecom charges coupled with increased competition from private industry is expected to see the Internet hosts and users grow manifold in the coming years. The study reveals that a proper communication backbone with adequate bandwidth to sustain the growing Internet demand is not available in the country. However, the positive steps taken by the government through the IT Action Plan of the National Task Force including the establishment of a 10 Gbps high-speed national backbone Sankhya Vahini is a welcome step in this direction. The various Policy frameworks of the Action Plan, when fully realised as per the schedule, would lead to all round development in computers and communication infrastructure, establishment of digital and virtual libraries, easy accessibility of Internet and ushering in a new era in e-commerce. The plan has made several Policy recommendations to introduce new legislations or to amend the existing laws to strengthen the various activities.
The study revealed that mail and Web browsing are the most widely used services of Internet followed by FTP and mailing lists. E-commerce is slowly gaining momentum with the participation from public and private sectors. Library-specific Web sites and bookstores have already been in operation with more players in the process of launching their Web sites. In a couple of years all major publishers and booksellers from the country will be having their presence felt on Internet.

8.3.6 Education and Training

The study reveals that curricula of library and information science in India need to be revised keeping the developments taking place. It is time to include papers on Internet, information technologies, communication and networking technologies, copyright and cyber laws. More emphasis should be given to hands-on training. Library and information science as a discipline will be increasingly dominated by new technology oriented topics. There is an urgent need to provide adequate financial assistance to the library and information science departments for acquiring necessary infrastructure so as to train the students in the current technologies related to electronic media and applications. There is also a need to train the library staff in these areas through continuation education programmes, seminars, workshops, and so on to enable them serve the readers effectively. To move up in the profession, library science specialists must develop expertise in outsourcing, electronic resources development and maintenance, database creation and maintenance, intellectual property rights and Internet technologies.

8.4 SURVEY OF LIBRARY PROFESSIONALS

The survey reveals that there is no relation between the degree possessed by the librarian and the use of e-media and availability of infrastructure, since many libraries headed by librarians possessing MA degree are using e-media besides possessing good infrastructure in terms of computers, CD-ROMs, Internet, etc. However,
It has been observed that the librarian and staff of the libraries using e-media and possessing IT infrastructure have attended training programmes. This is obvious because, training is necessary for optimal utilisation of resource and unless one understands the intricacies, one cannot deliver goods.

It is observed from the survey that slightly more than three-fourths of the libraries are using computers among which more than half using them for more than 5 years and more than 67 per cent have CD-ROM drives, most of these belonging to the S&T organisations. The survey also revealed that there is a link between financial strength interims of budgetary support and availability of infrastructure and use of e-media. The survey reveals that, there is a steady growth in using e-mail, Internet and CD-ROM searches and it is expected to grow further.

Many libraries are involved in automation, with a clear majority having purchased the software and about 14 percent developing it in-house. CDS/ISIS (used by 65 libraries) and LibSys (used by 23 libraries) are the popular software packages. This is also corroborated by the INFLIBNET Progress Report of 1999 which observes that these two automation software are popular and are used by 44 and 15 libraries, respectively. The level of automation differs greatly amongst libraries. Also, database development is one of the most common activities followed by about 70 percent libraries. However, retrospective conversion is not considered as important, with only one third of them engaged in it. There is an urgent need to encourage retroconversion of library holdings of major libraries. The efforts of INFLIBNET in this direction are commendable. However, participation of libraries in networks is not encouraging, with only two-fifths of them being members of library networks.

The survey reveals that a majority of the librarians are well aware the positive impact of e-media, particularly CD-ROM databases, electronic and online journals. Many of the advantages have been recorded by the respondents, the relief of overcoming missing/lost issues in transit/post, which is a serious concern in the case of...
print journals. Many of the reasons of unwillingness to subscribe online journals like the inadequate computer literacy among users and staff and lack of training are simple issues which can be solved easily by continuation education programmes. When online journals are inevitable, budgets will also be provided once their usefulness is accepted. And those who are subscribing and using CD-ROM databases are willing to embrace online journals. All these make that a large majority of the libraries are aware of the benefits of the use of e-media and would be willing to subscribe them which is a positive outcome of the study. The survey has also established the positive impact of digital libraries on libraries and their functions. Many of the respondents are aware of the advantages and the positive impact of digital libraries on the productivity library professionals, provision of services, and improved quality of services rendered. An overall positive effect in improving library services, has been the outcome of the survey.

The availability of infrastructure for dissemination of information is just satisfactory as observed from the survey. The survey also revealed that many libraries do not get adequate funds for creating IT infrastructure. These libraries wish to spend 20-40 per cent of the budget on IT infrastructure to meet the requirements. Further, Internet use is growing as also the number of home pages/Web sites of the libraries, particularly in the academic field. INFLIBNET has already taken up the home page creation of the university libraries covered under its programme. At present the many premier institutions including IITs, IISc, IIMs, central universities, S&T institutions, and a score of university libraries funded by INFLIBNET have their home pages on the Web.

8.5 SUMMARY

The study thus far covered various objectives spelt out at the beginning of the study. It reveals that the extent of use of e-media in library and information work is steadily improving with a positive impact perceived from the use of electronic/online
journals and digital libraries on the library system and various functions. The level of library automation is also improving including the creation of databases of library holdings, thanks to the active involvement of library networks and also due to the awareness and realisation, by libraries, of benefits of library automation and networking in optimal resource sharing. It is observed from the study that a majority of the libraries have IT infrastructure to meet the demands of users. Due to budgetary constraints, many could not afford it. This situation has to be improved by providing one-time grant to the libraries to create necessary IT infrastructure to use e-media and meeting the ever growing users' demands. The IT Action Plan of the government has already created an excellent atmosphere for the healthy growth of e-media in general, and IT infrastructure in specific. Funding agencies like UGC (through INFLIBNET) and NISSAT (through metropolitan library networks) have already started efforts in this direction. These efforts are to be intensified since there are a large number of libraries (which are not covered in the survey) under the state governments other institutions that are to be provided financial support. Government agencies like Ministry of Human Resource Development, AICTE, ENVIS, Department of Science and Technology, the Department of Bio-Technology, etc should come forward to fund the libraries to create infrastructure so that the benefits of e-media is enjoyed by all the users as well as the common public in the country.

Many constraints and problem areas in various domains of the study have been listed. One of the major concern is the training and computer literacy of library staff and users. Many training institutes, both in public and private sector including academic institutions, have started programmes in these areas. Institutions like INSDOC, DRTC, INFLIBNET, NISSAT and a few professional associations are imparting training to library professionals as well as others. This will improve the situation further. The one major problem to be addressed is the copyright issue. The library community is not fully aware of the ramifications of copyright in Cyberspace. Very few papers in this field are presented in conferences and much less is discussed (the researcher presented three papers on the topic, two in national level conferences and
one in FID Congress, 1998 held at New Delhi; except for the FID Congress, the number of papers presented in the other two are negligible showing the casual approach on this important issue. Thus there is an urgent need for the policy makers to conduct awareness programmes in various facets of copyright, particularly in the digital era, and intellectual property rights. Again NISSAT is taking initiative in this direction.

One more area of concern, the major finding of the study, is the improvement in the library and information science (LIS) curricula of library schools. It is only recently some aspects of IT are being covered in LIS courses. Still many LIS departments have no infrastructure to provide hands on experience to the students. As the role of librarians in the digital and virtual library era is quite different from that of traditional libraries, adequate knowledge in latest technologies is essential. There is an urgent need to provide financial assistance to the library schools (by UGC) to create or strengthen the infrastructure. Further, there is a need to include topics like Internet technologies, intellectual property rights and copyright, electronic resources development and maintenance, communication and networking technologies, and database development and maintenance in the LIS syllabi.

8.6 SUGGESTIONS FOR FURTHER RESEARCH

Libraries will continue to be the meeting and learning places to play important social, cultural, technical and pedagogic roles in the future too. Electronic media provides a number of opportunities for the librarians and information scientists for further investigations and research. Although studies have been carried out on the technological impact, very little research has been undertaken on the human values, psychological and sociological issues in the virtual library environment. Some of the areas which are peripheral to this study but are extremely important that can be taken for further research are (i) the psychological and sociological impact of libraries without walls on librarians and users; (ii) intellectual property rights and the new information technology; their relevance and implications in library; (iii) content evaluation, quality measures, and bibliographic control of electronic information resources on the
Web; (iv) role of discussion forums, bulletin boards and e-conferences as informal communication media and their impact on information gatekeeping; (v) study of users' attitude towards electronic information resources; (vi) strategies for marketing information products and services in cyberspace, and (vii) knowledge management in Internet era.

8.7 REFERENCES


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