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CHAPTER 5
ELECTRONIC MEDIA :
IMPLICATIONS FOR LIBRARIES
5.1 IMPACT ON LIBRARIES AND LIBRARY SERVICES

Traditionally libraries have been held as treasure houses of human knowledge. They promote interaction of human minds and play vital role in educating people of all walks of life. They are also known to preserve the social and cultural heritage for future generations. However, the advances in IT and e-media-related fields made it necessary to change the traditional image and adapt to the threats and challenges posed by these technologies. The growing and ready availability of personal computers at affordable prices to institutions, universities, colleges, schools and individuals made them tools for accessing information. The laborious, time-consuming conventional publishing is giving way to the instant e-publishing resulting in digital and online publications. The technologies are increasingly leading to the infringement of copyright. The all pervasive Internet is leading to non-conventional learning and training.

These developments resulted in a paradigm shift in the functions of libraries such as:

(a) Dealing with multiple media against a single (print) medium,

(b) Changing form just in case to just in time in collection development,

(c) Meeting users' demands from out-sourcing rather than in-sourcing, and

(d) Providing online access to remotely located resources rather than holding own collections in own building, that is, from local reach to global reach.

The functions of the librarians also shifted from that of custodian of books to provider of service-oriented information and to a person having knowledge in copy-
right and licensing regimes. Some of the new approaches made and steps taken by librarians to cope up with the changing situation include the shift from possessing documents to providing access to information, appropriation of budget to infrastructure creation and maintenance, gradual increase in the electronic/digital component in the library collections, training staff in handling new technologies, increasing use of e-mail, fax, Internet, etc. There is little doubt that the libraries are changing, and changing for better. In the face of price escalation of publications, growing number of users, explosive growth of documents, decreasing budgetary support (in view of inflation coupled with fluctuation of dollar exchange rates and prices of documents), libraries had to take hard decisions. This Chapter discusses various implications of e-media (excluding impact of Internet which was dealt in Chapter 4) for libraries.

5.1.1 Library Resource Sharing

The libraries, for effective resource sharing, must fulfil two important requirements, viz., having good resource base and an efficient mechanism to share the resources. Resource sharing is possible only when resource locating tools like databases and union catalogues and necessary infrastructure for acquiring and providing the document to the user are available. Providing access to information/documents through networking and supplying through a suitable document delivery mechanism such as fax, e-mail, file transfer or through interlibrary loan are the modes generally followed by libraries for resource sharing to meet the requirements of the users. If the distance between lending and receiving library or a user is large, it would take more time for providing the document. E-media and communication tools play a crucial role here.

It is needless to say that the databases of library book holdings (individual or a group of libraries) and union catalogues of periodicals would greatly help in quickly locating the required document. If these are hosted on a network, the whole process takes still less time. Whenever library automation is planned, some sort of database development, mostly of library book and periodical holdings are attempted simultane-
-ously. It may be noted here that databases, when well-developed, would not only enhance the use of library collections as well as resource sharing, but also generate resources if access to the information contained in them is provided to outside users.

5.1.2 Electronic Document Delivery

Electronic document delivery does not require the sender and receiver of information available at the same time. These systems can offer a wide variety of options, which include creating, editing, sorting, storing, retrieving, transmitting and receiving the stored information when needed. Persons working on the same project spread over a large area can communicate with each other. Electronic transfer of information reduces preparation and delivery costs compared to the traditional services such as telex, letter or courier.

One of the important functions of an information system is to provide material requested by its users. When the required material is not available in-house, the system may try to obtain the same from other information centres or document supply centres. An electronic document delivery system can provide immediate access of the needed information to the user provided that the system is connected to the document supply centre and the required information is stored in e-media. Magnetic tape, video tape, videodisc, CD-ROM, etc can effectively be used in an electronic document delivery system to offer instant and convenient access to the electronic documents. Even when a required document is available in a document supply centre, due to communication shortcomings and the time taken for supplying, it may take a couple of days before the required document is supplied to the user. Electronic document delivery is a faster mechanism; it eliminates the delays in the supply of documents by conventional means. When the information is already in machine-readable form, through a conversion program, this can be digitised. Transmission of information is achieved by several means. Telefax or facsimile transmission can be used to transmit both textual and graphical material over telecommunication links. When the material
is downloaded from CD-ROM databases or Internet or taken from hard disc drive, the same can be transmitted through e-mail or FTP. Even pictures, scanned images and pages of a document can be sent as separate files dove-tailed with e-mail messages. Computers can transmit electronic information to fax machines using a suitable fax modem card/software.

Electronic document delivery systems offer several innovative features useful to a library. These include: dissemination of contents lists of periodicals, books and monographs; supply of full-text of documents required; easy online document ordering and delivery; automatic document delivery of pre-specified documents on standing order, on regular basis; and selective dissemination of information (SDI) through profile matching. In a networked environment, when SDI profiles are matched with CD-ROM databases, the downloaded information can be sent to the respective mail boxes of the individual users. This facilitates quick transmission and timely receipt of information besides reducing the time taken for sending the printed output by conventional means.

5.1.3 Qualitative Improvements

Many factors led to the improvement of information services which include (i) the ever increasing number of users of information, (ii) the large geographic distances that make information acquisition slower, (iii) the developments in the field of IT, (iv) the increasing role of information in shaping the economy of a society, and (v) the changing notion of the information from something to know to something to have as any other commodity. E-media came in handy for librarians to overcome these hurdles. The benefits of e-media in general and e-publications in particular in libraries is four-fold. These facilitate easy searching, enable faster information access, offer savings in storage, space, maintenance, etc. and are more useful due to their inherent characteristics. These offer a variety of capabilities to enhance the quality and effectiveness of services offered by the libraries.
(a) Accessing Information

Unlike printed documents which offer unlimited personal access, the e-publications facilitate simultaneous, multiple access to users distributed over local, regional, national and international boundaries as well as varied time zones. In a campus or LAN environment, access and dissemination of information is instantaneous. Electronic publications provide both direct access by individuals as well as access through intermediaries. This is mainly because of training needed by end-users for handling a variety of retrieval software, search strategy formulation, and security; in the case of online resources, cost considerations also make intermediaries access the information rather than the end-users. The (paradigm) shift from printed to electronic publishing is expected to continue in spite of the preference to and benefits of the printed versions. Value additions like hypertext links to references cited or data referred (cutting the barriers of publishers) or related documents may enhance the acceptability and preference of e-media.

(b) Currency and Quality of Information Services

As printing and distribution is instantaneous on Internet, the e-journals are available much faster on the Net. Because e-publications are precursors to the printed journals, they would be available before the actual printing process is undertaken. This enables publishers like American Chemical Society 'publish' (post) individual papers (as against a full issue) on their Web site as soon as publishable and early dissemination of information as much as 11 weeks in advance. Another impact of electronic information is the exhaustiveness and the quality of information provided. In future, the libraries would continue to provide access to information after locating in databases rather than having comprehensive acquisitions. Personalised, mission or project-oriented databases will be developed by downloading information from electronic publications. The downloaded information can be edited, revised or repackaged as per the user requirements. Electronic media facilitate (i) faster and better quality of
services including value-added products, (ii) enhancement in the number of clientele served with little or no extra inputs, (iii) marketability of information services, and (iv) networking and remote log-in for geographically distributed users. These factors certainly will enhance the image of the library.

(c) Electronic Clipping Services

On the lines of SDI, many database vendors are offering electronic clipping services for providing professional news both in real-time and with periodic updates. Users can set up profiles on most major databases to monitor customised and customer-directed news including current events, company and industry news, evolving issues and other topics of interest (Bates, 1994). These include P.A.S.S.PORt of DataTimes, AlertService of Dialog (Knight-Ridder), CLIP of Dow Jones/Retrieval, News Flash of NewsNet, Eclipse of Nexis, etc. A few of these search all the databases held by the vendor. Some are daily services covering over 100 e-zines. The World News Connection is an online customised, daily foreign news alert service (wnc.fedworld.gov) developed by NTIS (National Technical Information Service) using open source information from government, private industry and academia, tapping thousands of non-US media sources which is delivered through e-mail (Guthrie II, 1998). As a result of such services, the users are able to get comprehensive information at the push of the button leading to positive impact on the information services offered by the libraries. The customisable news services like Custom Clips, Farcast, Internet News Alert, NewsHound, Journalist, HeadsUp, etc provide only that news which is important and filter the noise to rescue the user from information overloading. These carry subscription charges as well as connect hour charges (Muchmore, 1996).

(d) Electronic Reference Services

Some virtual reference collections have been developed and made available on Internet (for example, the University of Michigan-Dearborn’s Virtual Reference Desk
Based on whether the resource is freely accessible or fee-based, a library can develop its own virtual reference collection with free electronic reference sources available on the Internet. There are many free sources available on the Net; many are being created and offered free. These help small and medium libraries with limited resources that can make use of these resources (of course, expenditure on computers and communication facilities is unavoidable). For example, for those who cannot afford Books-in-Print, Amazon.com (www.amazon.com) is an excellent source of current evaluative information on publishers and prices of books which can be useful for determining interlibrary loan needs, collection development policies, etc. As Internet is gaining popularity, even commercial reference sources are becoming increasingly available to subscribers or authorised users through a variety of passwords and authorisation systems (Snavely, 1997). Many authors have listed Internet sites of librarians’ interest (see for example, Snavely, 1997; Stewart, 1996 and Wolinsky 1996) for a librarian to choose appropriate sites for offering these services.

Electronic media helps in organising online reference services. Libraries can either utilise their own electronic reference sources like directories, encyclopaedias, etc on CD-ROMs in a LAN environment or create virtual electronic reference libraries with hyperlinks to electronic information resources available over Internet. For example, since 1993, the Atlanta-Fulton Public Library is offering an electronic reference service called PASSPORT which provides access to the library’s online catalogue, commercial databases and electronic reference sources such as MasterFile (a collection of 350 full-text magazines), Facts On File, Company Profile, and Academic American Encyclopaedia. From 1995, dial-up access was provided to all the patrons who can access all the library’s databases from their homes, offices and work places. The library also provides connectivity to Internet (Agnew, 1996).
Information Centre of the Administrative Staff College of India, Hyderabad; and Electronic Information Centre for Aerospace at the National Aerospace Laboratories, Bangalore are examples of the second category of libraries who created virtual electronic information centres around the electronic resources available on Internet. These are developed by hyperlinking the frequently-used Web sites of institutions, e-journals, reference sources, digital/virtual libraries, newspapers, magazines and home pages using software like MS Front Page. Such virtual information centres serve as a single window for various types of information needs of users and help the reference librarian in providing information. This phenomenon is going to increase in future.

(e) Services in a Virtual Library Environment

In a virtual library environment, apart from the services offered in traditional libraries, new types of services are possible. A brief scan of literature would give many innovative services offered utilising virtual libraries. Corporate and business information headlines are searched, retrieved and e-mailed to the desktops of individual clients who, on opening their e-mail box, will find them. NewsFlash was found very popular, cost-effective and does not violate copyright laws (Raymond, 1994). Toshiba Business Information Centre operates Information Centre News by using OCR technology for creating database of news, government reports; merge with relevant file transferred data selected and downloaded from commercial databases (Mori, 1994). An in-house developed virtual library came to the rescue of a corporate librarian to satisfy the information needs of customers in the face of drastic reduction (90 per cent) of library staff (Matarazzo, 1994). A virtual library product, Business Sources on the Net (BSN) was conceived by seven academic business librarians to be a solution and guide to the Internet users to cope up with the vast business resources available over the Net (Westerman, 1994). Many resource guides have been designed and developed around the electronic resources available over Internet in several subject fields to help Net surfers to locate relevant information (Kumar and Vashishth, 1999; Lakshmana Moorthy and Karisiddappa, 1998).
5.2 COPYRIGHT-RELATED ISSUES

Over the past decade, there has been a steady growth in the e-publications in general and CD-ROM titles in particular. This led to gradual increase in the electronic/digital information component in the libraries all over the world. There is a growing dependency on electronic resources in the S&T as well as the academic libraries. More and more academic, R&D and other institutions are turning to CD-ROM technology replacing some of the conventional publications and entering into license agreements which were not necessary till now. The number electronic databases of secondary periodicals is growing (most of them are available on CD-ROMs) and retrospective/bibliographic searches and reference queries are exclusively conducted using them. Also, during the past few years, there was a quantum jump in the electronic/digital information resources made available through networks. Digital information poses various concerns and problems (Lakshmana Moorthy and Karisiddappa, 1996 & 1997). The proliferation of personal computers and the decreasing costs of primary and secondary mass storage media all made it possible to download, store, display and print electronic information. Further, the downloaded documents can be forwarded to others without the knowledge of its rightful owner. Also, the digital information systems are easy targets for tampering, and incorporating or uploading unwanted, unauthorised and objectionable information. The rights issues of digital information include copyright, ownership, pricing and rules and regulations governing multiple usage.

5.2.1 Copyright Regulations and Legislations

Copyright is generally understood as a right or license to free copying. However, in reality it is a legal right to prevent others from illegal copying. Copyright is an economic system for ensuring the creation of new knowledge by rewarding their creators and their agents; (it provides) an assurance that the creator can determine, if, how, where, when and in what form his or her creation can be used (Garrett, 1991). Copyright provides the creators of literary or artistic works rights of ownership and
legal protection against unlawful reproduction of their works. Besides recognising their right to the benefits accrued by the usage of their creative work by others, the law also assures and encourages authors in pursuit of artistic, scientific or literary works.

Copyright issues are the most important concerns in the digital environment. The ease with which digital works can be duplicated, copied, re-distributed and used by multiple users coupled with their compactness and relative invisibility have made the producers of digital media products to focus their attention on controlling the use of digital works. Some control them through licensing agreements. Many countries are reviewing the current copyright laws to protect the digital media from infringements. Many developed countries such as the USA, Japan, European Commission, Canada, Australia, etc have already enacted tough regulations to overcome the challenges posed by the digital technologies. The e-Lib programme of UK envisages spending of 16 million pounds (US$ 25 million) over 3 years on a series of projects concerning copyright and rights management, usage of electronic resources and multimedia electronic journals. The US Copyright Law covers digitised works under derivative works (Wilf, 1994). The European Union 1992 Copyright Directive on Rental and Lending Rights (92/100/EEC) extends exclusive right to all copyrighted work. It treats public library lending of computer programmes (software) and CD-ROMs an infringement of copyright unless there is a permission or license for doing so (Copyright Queries, 1995).

The Anti-Electronic Racketeering Act of 1995 of the US makes it unlawful to use any computer or computer network to transfer unlicensed computer software and to distribute computer software that encodes or encrypts electronic or digital communications to computer networks knowingly or unknowingly regardless of whether such software is designated as non-exportable. It is also unlawful to damage or threaten to damage electronically or digitally stored data. The Digital Era Copyright Act and the No Electronic Theft (NET) Act, being enacted by the USA aims at curbing rights violations on Internet. The NET Act proposes a penalty of US$ 25,000 with a five-year
imprisonment for those who distribute illegal copies of material greater than the value of US$ 2,500. WIPO is also taking steps to cope up with the creation, adoption, transmission and distribution of digital media. Three draft treaties of WIPO were discussed by the member countries which would come into force after ratification (Verma, 1999).

5.2.2 Copyright of Electronic Information

Anything can be stored in electronic form using various techniques including digitisation, scanning, images, and inputting text. The storage media may be magnetic discs and tapes, and compact discs like CD-ROM, videodisc, DVD, CD-R, CD-RW, DVD-RAM, etc. The vulnerability of electronic information causes concerns for all those involved, especially authors, publishers and librarians. Many concessions enjoyed by librarians while dealing with printed documents are not available in the case of e-documents. The tough legislations to protect digital information makes electronic transmission of copyrighted material illegal if done by anyone other than the copyright owner. Even browsing an electronic document is a violation of fair use and amounts to infringement as the existing fair use is applicable only to printed works. The online service providers will be held strictly liable for all user infringement irrespective of whether they knew it or taken any preventive steps against it. It is illegal to supply equipment, software, or services, which are capable of circumventing the technological protection of intellectual property rights. This puts manufacturers at risk even if they have no ulterior motive in developing a system or device that can be used by some 'ingenious' user for decryption or circumventing the copyright mechanism. Image and photograph search engines can only provide details of the images, but they cannot display digital pictures even though for merely helping the users to assess their usefulness. E-mail is a communication between the sender and receiver; access to e-mail by anyone other than those for whom it is meant, is infringement.

Many authors attempted to discuss the ramifications of the copyright laws in the light of the new technology and explain various issues involved as well as the
intricacies for the benefit of users and librarians (see for example, Berghel, 1997; Guthrie II, 1998; Lakshmana Moorthy and Karisiddappa; 1997, 1998, & 2000; Norman, 1995; Rump. 1997; Samuelson, 1995; Wall, 1992 & 1998; Wilf, 1994 and so on). Duggan (1991) dealt with the issues of copyright of electronic information including changing electronic environment, patterns of use, the role of electronic information networks, building local databases and license agreements for electronic information, printing multiple copies of copyrighted electronic information, downloading, local networking of electronic information on CD-ROMs, and electronic transmission of copyrighted material. Rutstein, et al (1993) dealt the impact of copyright law on the electronic environment and the latter's impact on libraries including issues of electronic access, possible solutions, user's expectations, budgeting problems, the question of who will pay for the access, and resource sharing.

Storing a work in electronic form by anyone other than the rights owner is treated as infringement. It is not permitted under the copyright laws of UK, USA or India even for research purposes or private use. Some national copyright laws may be old and electronic storage and copying may not be explicitly forbidden. For example, the French Copyright Law does not prevent the electronic copying and storing of information although it prevents electronic delivery to third parties (Norman, 1995). Some countries' policies deny export approvals of secure encryption products to other countries (for example, the USA); some do not allow usage of encryption techniques. Unless the encryption key and algorithm is provided to the authorities, encryption of civilian communications in France is prohibited. Taiwan and South Korea request companies to remove encryption from voice, data, and facsimile telephone connections (Schneiner, 1997, p. 277). Some harmonisation in the intellectual property right laws is necessary to make them universally applicable, as such disparities affect transborder flow of information.

5.2.3 Copyright in Cyberspace

Internet facilitates easy mass distribution of digital material and is being used
for a variety of crimes. Uploading fraudulent matter—encrypted or hidden—on to remote hosts, spreading computer viruses, importing unwanted and obscene material, software bootlegging and hacking activities are some of them (Barrett, 1997, p. 9). The most important issue is the protection of copyright in cyberspace. Existing copyright laws have not caught up with the technological developments in cyberspace. At present there is no clarity about whether the content of electronic resources on Internet are free or priced. Although the copyright statements appear in many cases, they are elusive to locate in some cases. One can see copyright notices even on advertising and marketing material confusing the situation further. It can be argued that publishers of promotional material, especially advertising and marketing material, on the Web implicitly encourage downloading, printing and copying the material for redistribution to more than one in the same organisation (Ardito and Eiblum, 1998).

Even if an electronic resource is free, there is no clear cut law to allow forwarding these items to third parties (colleagues, friends) through e-mail or listservs. Many electronic papers on Internet allow personal and fair use; many more lack explicit statements. Further, it is a copyright violation to e-mail a Web page by an intermediary to a colleague or a user, even in the absence of any financial gain. Providing information about the URL where the piece of information appears is the best way in such cases. Even downloading e-mail is an offence under copyright law. A number of case studies in cyber law have been reported (Rosenoer, 1997). As we move further towards cyber village, we may see more and more authors and publishers turning to legal redressal. This is one reason that the copyrighted books and other material are not expected to be readily available in cyberspace as they are available in traditional libraries.

Cyber laws can include individual laws pertaining to the use of digital signatures, cryptography, privacy, digital intellectual property rights, digital money laundering, and many related issues. As a first step towards enacting cyber laws, the United Nations International Trade Law in December 1996 drafted a Model Law on Elec-
tronic Commerce. This has become the basis for the adoption of cyber laws by many countries like USA, Germany, Malaysia and Singapore which have already started the process of enacting such laws (Verma, 1999). A Consumer Protection Act for Digital Products has been proposed in USA to control the increasing abuse and lack of security over information highways (Hampel, 1996). Recently UK introduced the Electronics Communications Bill under which the police can demand decryption keys that allow encoded material to be read, to bring criminal prosecution against those who use e-mail and Internet for illegal and criminal activities. UK is contemplating an aggressive e-mail surveillance and interception policy to restrict the growing use of Internet by criminals and terrorist organisations (The Indian Express, 1 November 1999, p. 9).

5.2.4 Copyright of Databases

A computer database generally is not a computer generated work and most of the databases are created by keying in information on a predetermined format or by using optical character recognition (OCR) techniques. It is a collection of records of data stored in or on computer media in the form of a computer-readable file. The European Commission’s Directive on Copyright of Databases defines a Database as a collection of works, data, or material arranged in a systematic and methodical way and capable of being accessed by electronic or other means. A database may contain information relating to names and addresses of clients or subscribers (such as telephone directories, yellow pages, address lists, etc); a list of bibliographic references; full text of documents or periodicals (such as patents or full-text databases); documents with mixed text and graphics (such as multimedia directories, works); or a compilation of drawings (such as engineering and architectural drawings). The creator/developer of the database is generally treated as its author. Besides copyright laws, the databases are protected under contracts and licensing agreements between the owner of the database and the subscriber (library or institution).
The intellectual 'inputs' for selection and arrangement of the contents in a database are the basic features which identify a database as original, and these are protected through copyright. However, the data or material included in a database is not copyrightable. The originality and intellectual work in databases include the content selection, internal coordination between the structural elements, the arrangement of all elements of a database, and the contents itself. Under Berne Convention, WIPO Copyright Treaty, TRIPS Agreement of World Trade Organisation, and also in many countries including US, copyright rules are applicable to computer databases and are treated as compilations for this purpose. The GATT agreements include protection of computer software and databases under copyright laws. The UK law extends the copyright protection to computer databases, treating them as literary works. The European Union Directive on Legal Protection of Databases (introduced from January 1998) extends protection to the structure of the database and covers non-electronic (printed) databases also. It enables a database owner to forbid or control the extraction or re-use of material taken from a database. Under the US Copyright Law, compilations of pre-existing material or data are non-copyrightable; the database copyright is provided for under collective works and derivative works.

By running a computer programme on one or more databases, a new database can be created. For example, an SDI profile can be matched with a number of machine-readable databases and a subject- or user-specific database can be created. The computer-generated database thus created can be original only if there exists sufficient skill and judgement in the programme and innovation in the database created. Although the contents of the constituent items are not original, because a reasonable amount of judgement in the selection of items has been used in creating it, the newly created database can be considered as compilation or directory for the purposes of copyright.

Many database producers and vendors allow users, through license agreements, to download a portion of the database on to a 'temporary file' for research.
purposes under fair use principle. However, there are no clear cut guidelines as to how much data can be downloaded at a time. In the case of printed documents, depending upon the size of the original, up to 5-10 per cent of the original document can be photocopied under fair use. The same fair use principle cannot be applied in the case of databases as even 5 per cent material would be large when cumulative and large databases are used. CD-ROM databases are used in providing SDI services to the institution's research community. When SDI profiles are large in number, data downloaded for printing will be substantial, although there will be considerable repetition of downloaded data due to the overlapping subject interests of users working on similar projects. Though this is being done strictly for research purposes and under fair use, it is not clear if it violates copyright. And, when downloading is made regularly over a period, say 2-3 years, then the resulting database would be considerably large. These issues would become more frequent since users would like to keep the useful downloaded data in their personal library, much the same way they retain and maintain photocopies of articles in areas of their interest for re-use.

Sometimes, downloaded data against an SDI profile is sent by e-mail to save time. This is illegal as transmission of electronic information over communication networks amounts to infringement and is prohibited by all database owners. However, it is not clear if it is an infringement if the user downloads information of his/her research interest from more than one database over a period of time and compiles a subject specific personal database in a modified format.

Bibliographic databases contain abstracts of mostly copyrighted material which are already published articles or documents. If these abstracts are short and condensed, report the facts in and do not substitute the original articles, there can be no infringement of rights. If, on the other hand, the abstracts act as substitutes, to original text by reproducing them, then they are likely to be treated as copyright violation. In other words, abstracts should be surrogates leading the readers to the original articles to avoid copyright infringement.
5.2.5 Copyright of Multimedia Works

Like their digital counterparts, multimedia works are also prone to the infringement of copyright. The availability of high bandwidth networks makes it too easy to illegally duplicate and disseminate multimedia documents without any loss of quality. Legislations by various nations do not clearly address the legal status of multimedia works which are covered and classified under audio visual works by the USA and UK laws. When multimedia works are commissioned under contract, they are treated as works made for hire where the copyright owner will be the person/institution who commissioned the work. However, mere payment for the work does not amount to ownership unless it is clearly distinguished in writing as work made under contract. This also applies to software developed by another sub-contractor as a part of a multimedia work (Wilf, 1994).

The growth of networked multimedia calls for image copyright protection. To make networked multimedia commercially viable and success, it is necessary to protect the owners' rights. This can be achieved using signal processing, data compression, and encryption and system level security protection. Another way is the incorporation of an invisible watermark (or a digital signature). However, it is easily identified by a computer programme, which decodes the key used to affix the watermark in a particular location on a part of the document and retrieve it. These invisible watermarks are of two types: those which are destroyed when subjected to manipulations and those which cannot be destroyed. Visible watermarks can also be used as deterrents to multimedia piracy (Garofalakis, et. al, 1997). Usage of watermarks can identify the legal owner (for example the creator) of the multimedia work, the recipient of an authorised single user copy, and when the multimedia work is modified or tampered (Civanlar and Reibman, 1997). The Multimedia Protection Protocol (MPP) is another convenient way of ensuring copyright of all types of digital data (Rump, 1997). Wolfgang and Delf (1996) described two techniques of invisible watermarking of multimedia images which can detect all but the minutest changes in the image.
5.2.6 Copyright and Computer Software

A computer programme (software) is defined as a set of instructions expressed in words, codes, schemes or in any other form including a machine readable medium, capable of causing a computer to perform a particular task or achieve a particular result. Software can be copied any number of times. Unlike photocopies, the second generation copies (i.e., illegal copies of illegal copies made from original) of software can be used without any loss of 'quality'. One cannot distinguish between the pirated software that is illegally sold or freely distributed and could be used as original ones. Each year the software industry is losing billions due to theft or piracy or illegal copying of software.

A number of nations had interpreted their copyright laws to include computer programmes for protection. The European Commission and Council took a leading role to protect computer programmes, and derivative and digital works. Prior to the adoption in 1991 of the European Directive on the protection of computer programmes, there was a general acceptance in Europe of copyright as a form legal protection of computer software. The Council Directive of 1992 (92/100/EEC) provides legal protection of computer software throughout the European Community. France protects computer software and categorises it under industrial art. German law requires demonstration of the software to satisfy the originality standard of copyright law. Japan is the first nation to consider adoption of a *sui generis* approach to the protection of computer programmes. While some countries amended existing laws to extend copyright protection of computer software, a few countries provide patent protection.

A number of methods have been in use for making computer software difficult to copy. These include hardware and software locks or dongles. A computer program is run only if the lock (or dongle) is in place. Some used the scrambling of program code on the magnetic disc or alterations to the disc directory. However, no sooner the protection mechanisms appear in the market, than the devices designed to overcome
these have appeared. Even the dongles have been defeated. But the law controls by treating the deliberate acts of designing devices to circumvent the copyright protection mechanisms as illegal. The Copyright, Designs and Patents Act 1988 of UK (section 296) provides protection from making, incorporation, sale or hire etc of devices or means specifically designed or adapted to circumvent copy protection of works in electronic form by treating such acts as infringement of copyright (Bainbridge, 1993, p.188).

5.2.7 Copyright Enforcement

Until the Copyright Clearance Centre, Inc (CCC) was established in the USA, separate law suits were being filed by individual authors and publishers against individual users (infringers). To facilitate compliance with the US Copyright Law, a group of users, publishers and authors together established the CCC in 1977 as a non-profit organisation to operate a centralised authorisations and payment system for the use of copyright publications, and to serve both the foreign and domestic copyright owners. The CCC has undertaken several projects which resulted in rejecting per-transaction license fee based on the feedback preference of both publishers and users who preferred fixed price license fee for title as it offered greater predictability and control (Garrett, 1991). Copyright Agency Limited of Australia, Canadian Copyright Licensing Agency of Canada, Kopinor of Norway, Her Majesty’s Stationery Office of the United Kingdom are some of the other copyright clearing centres similar to the CCC of the USA.

5.2.9 Indian Scenario

The Copyright (Amendment) Act 1994 (came in to force from May 1995) extends protection to electronic and digital works. The scope of the term ‘author’ was enlarged to mean ‘in relation to any literary, dramatic, musical or artistic work which is computer generated, the person who causes the work to be created.’ This makes the creators of the computer generated literary, artistic, dramatic and musical works covered under the ambit of copyright. The definition of ‘literary work’ was amended to include the computer programmes, tables and compilations including computer databases.
Storing a copyrighted work in electronic form and transmission of digital information over communication networks is treated as infringement under the Indian law. While computer databases are treated as literary works, Indian copyright law covers the multimedia works classed under audio visual works. Copyright enforcing provision was made under Sections 33 to 36 of the Indian Copyright (Amendment) Act, 1994, which enumerates registration of Copyright Societies, administration of rights of owners, payment of remuneration, control over the Society by the owners of rights, submission of returns and reports, and rights and liabilities of performing rights societies. If an infringement of copyright is established in a civil or criminal court of law, the defaulter is liable for punishment with imprisonment up to three years or a fine of an amount up to Rs 2 lakh or both. The law also makes provisions for claiming actual and statutory damages by the copyright holders. Although the procedure for taking suitable action against the infringements has been simplified in the amended Act, a number of problems persist in enforcing the law (Kumar, 1997).

A few Bills are pending with the government for protection of various IPRs. These include Patents (Amendment) Bill, Trademark’s Bill and Designs Bill, Geographical Indication of Goods (Registration and Protection) Bill and E-commerce Bill. Enactment of legislation in these areas will enable the nation to discharge the commitments under the trade-related IPRs (TRIPS) agreement (The Indian Express, 20 November 1999, p.11). The Union Cabinet has recently approved the Information Technology Bill proposed by the Department of Electronics (DOE) to facilitate electronic communications and e-commerce, and to curb computer crimes. The Bill proposes amendments to the Indian Evidence Act (Section 2); and the RBI Act 1934. Salient features of the IT Bill include,

(a) Expressing acceptance of contract by electronic means of communications (unless otherwise agreed),

(b) Facilitating electronic recourse in trade and commerce,

(c) Eliminating barriers to e-commerce resulting from uncertainties over writing and signature requirements,
(d) Promoting the legal and business infrastructure development necessary to implement e-commerce,

(e) Proposing a legal framework for authentication electronic record or communication through digital signature, and

(f) Appointing certification authorities for licensing, certifying and monitoring.

The Bill has been passed by the parliament in May 2000. It also imposes penalties for computer crimes such as unauthorised access to computer networks and databases, damaging or disruption of computer systems and services, illegal copying of software and tampering with computer source documents, electronic forgery, spreading computer virus, etc. In the interest of sovereignty, integrity and security of the state, the Bill proposes to empower the government to prevent acts of inciting. The penalties for damaging computer systems is put at Rs 1 crore, where as hackers would face jail term upto 3 years and a fine of Rs 2 lakh. Those who publish obscene literature on Internet will get 5 years jail term and Rs 1 lakh fine for the first time; for subsequent times, it will be double the jail term and fine. The law also made a provision for a regulatory regime to supervise digital signature system, and the proposal to use and accept electronic records and digital signatures in government offices and agencies (The Deccan Chronicle, 16 May 2000, p.12).

5.3 SECURITY OF ELECTRONIC INFORMATION

It is easy to create digital or digitised copies of the text, photographs, music and video and this results in revenue losses to the copyright owners. Further, digital information is highly vulnerable to manipulations like additions, deletions, etc resulting in plagiarism, authorship conflicts and impersonation. Unlike the case of printed journals, close monitoring and restriction of usage of digital documents is difficult. Denning (1995) reported a few cases of plagiarism of already published electronic material. Lynch (1994) suggested solutions like dedicated server, document digest algorithms, and cryptographic signatures to overcome some of these problems. Although efforts such as SCAM—Stanford Copy Analysis Mechanism—have been made to prevent
fraudulent acts from digital libraries, such incidents are becoming common due to difficulties in their detection.

The most popular way to protect rights and provide secure access to electronic journals over networks such as Internet is through the usage of passwords. Many electronic journal publishers and vendors use this time-tested (by database vendors) mechanism. The Security and Rights Management System of ISI Electronic Library Project (Anderson and Lotspiech, 1995) employs password for providing secure viewing at the client level. Blackwell offers Electronic Journal Navigator service and allows subscribers/end-users log on and browse journals regardless of the storage format or location. The access is through user name and password. Elsevier Science introduced ScienceDirect service, a full text electronic information resource service of nearly 1000 journals, which also is operated through user name and password.

Several electronic copyright management systems have been undertaken by many academic institutions and publishers to deliver electronic information to users in a network environment. These include Performing Arts Teaching Resources Online (Patron) at the University of Surrey, Electronic Reserve Copyright Management System (Ercoms) of De Montford University, and the Electronic Library and Information Retrieval Online Project (ELINOR) of Milton Keynes (all from UK); Project Cited of the European Commission; RightPages Service of Bell Laboratories, TULIP of Elsevier, Security and Rights Management System of the ISI, and OCLC and Copyright Clearance Centre (all from USA).

Security of information in a network environment involves three different aspects: authentication, that is, knowledge of the identity of sender to the receiver (and vice versa); confidentiality, that is, the message sent has not been intercepted by a third person; and integrity that the message is not tampered during transmission. One way to discourage illegal and illicit copying and distribute over the networks is the electronic marking and identification technique. In this, the system automatically gen-
erates and puts a unique and indiscernible mark on each of the document copies and registers its recipient. If any one receives an illicit copy (by illegal copying), the system detects the unique mark from the copy and identifies the illegal recipient. The marking is such that it is difficult for an illegal user to discover the unique marking pattern in the user's document. This technique can be used to protect copyright in e-publishing where a document is printed, copied or faxed (Low, et al, 1995) through electronic means. Employment of encryption protocols (public, private and split-key) wherein every bit of information is encrypted at the server end and decrypted at the recipient's end is another technique. Under these protocols the document server encodes, encrypts and compresses the electronic document before sending to a bona fide user. The copyright server authenticates the requests from the user for obtaining documents. A software provided by the publisher at the user's terminal decrypts, displays and prints the document received from document server. The privacy of the user is ensured by encrypting the requests made by the user, and the document server authenticates the request with a variety of passwords, public encryption keys, etc (Choudhary, et al, 1995). Security Profile Inspector, a technique to perform real time static analyses of Unix-based clients and serves to check on their security configuration; and Network Intrusion Detector, a dynamic tool to identify weak links in a network of clients and servers, monitor and analyse activity on LAN segments and produce transcripts of suspicious user connections have been in use in the US (Feingold, et al, 1996).

5.3.1 Usage of Cryptography and Digital Signatures

In the e-commerce environment, the e-mails sent by users/customers can easily be scanned by clever hackers, eavesdroppers, system administrators or regular users while the mail passes through intermediaries before reaching destination. It would be easy to operate an automatic computer programme to collect credit card information which could be used for ulterior purposes including spoofing (impersonating others) (Schneiner, 1997, p. 275). While sporadic usage of encryption of messages by users may arouse suspicion, its widespread use would ensure security. A
Consumer Protection Act for Digital Products has been proposed in USA to support e-commerce and to control the increasing abuse and lack of security over information highways (Hampel, 1996).

One of the oldest ways to ensure security and privacy of information is the usage of cryptography. This involves scrambling (or encryption) of the information to render it unreadable or ununderstandable language which only the legitimate user can unscramble (or decrypt). This is a common technique to protect confidential information from eavesdropping, preventing computer viruses and illegal copying of software etc. Cryptography can be the envelop for information sent via e-mail and file transfers.

Signatures authenticate a deed or document. The financial and legal transactions have no meaning without them. Digital signatures affixed on electronic documents convey essentially the same meaning as hand written signatures. The Security and Rights Management System of ISI Electronic Library Project employs digitally signed finger print to guarantee document authenticity (Anderson and Lotspiech, 1995). Digital signatures of information like buyer/seller identity numbers, date, time, unique transaction number etc can be added to digital products. By using this technique it is possible to digitally mark and bind a software product for transferring to a specified customer. Digital signature is created using special techniques, the most common of them involves mathematical algorithms, encryption and certification. Biometrics, i.e., identification using inherent biological characteristics like fingerprints, eye patterns, speech and hand writing are also employed. The digital signatures ensure access to only authorised recipients and data integrity (Boransky, 1999, p. 49).

Digital signatures are already being used around the world. Some countries enacted legislation allowing use of digital signatures. International agencies like UNCITRAL and OECD are currently working on international agreements on digital signatures.
5.3.2 Usage of Digital Watermarks

A digital watermark is a digital signal or pattern inserted into a digital document. It is similar to the electronic on-screen logos used by TV channels. In this technique, a signal or a pattern or a logo, digitally included in a document, enables protection of ownership rights of digital information. Unlike encryption which warrants file transformation making it not understandable unless encrypted, digital watermarking leaves the original document intact and viewable. However, these watermarks persist during viewing, printing or retransmitting, thereby establishing ownership. These watermarks can be removed by the legal user with a predetermined algorithm. When combined with new tracking services offered by some companies that provide the watermarking technology, copyright owners can find all illegal copies of their works on Internet and take legal action. Digital watermarking technology is helpful for the Webmasters in that they can ensure only lawful image and audio files are used, thus protecting against infringements. Argent, Cognicity, Copyright, EIKNAmark, Giovanni, JK_PGS, Musicode, Digimarc, PixelTag, StirMark, SureSign, SysCoP, unZign, etc are some of the watermarking tools available in the market place for the purpose (Roy, 1999).

Apart from authentication, detection of unauthorised source of legal copies, the visible watermark also helps in discouraging illegal copying. Invisible watermarks can also perform these tasks. A detailed account of watermarking technology including counterfeiting schemes is discussed by Berghel (1997). When an illegal copy bears watermark, the source of the piracy can be established (Civanlar and Reibman, 1997). The Security and Rights Management System of Institute for Science Information Electronic Library Project (Anderson and Lotspeich, 1995) employs encryption and watermarks for secure printing. guaranteed document authenticity by means of a digitally signed finger print. Two types of watermarks are added to discourage unauthorised copying: one hidden in the image file of each page of the electronic article, and the other, a visible water mark encoding one Kbyte information in a two-dimensional bar code placed on the first page of each article. The illegal copies will not have the
5.4 ISSUES AND CONCERNS

A number of issues and concerns are associated with the usage of e-media. Many authors addressed various problems faced by the libraries in the electronic/digital/virtual library environment (for example, Berge and Collins, 1996; Collins and Berge, 1994; Chepesiuk, 1997; Crawford, 1998; Cronin and Overfelt, 1995; Jasperse, 1994; Johnston, 1994 & 1998; Lakshmana Moorthy and Karisiddappa, 1997; Lynch, 1994; Perryman, 1994; Sasse and Winkler, 1993; von Ungern-Stenberg and Lindquist, 1995; etc). The problems and concerns of publishers, librarians as well as users of e-media include issue of single articles versus full issues of e-journals, copyright, user-friendliness, pricing, incompatible hardware and software, formatting, graphics, scholarly recognition, obsolescence, credibility, accessibility, and permanence. Some of the problems concerning libraries, librarians, and users of e-media are briefly discussed in this section.

5.4.1 Accessibility

Generally the e-media will be easier to access only when the necessary communication links and computer systems are available. Incompatible hardware and software, the gap between developed and less developed countries, and geopolitical compulsions are some of the related issues which restrict the accessibility of e-publications. Further, unless the users/subscribers are trained in the mechanics of search and retrieval techniques is a must without which the e-media though 'available' will be inaccessible. This calls for establishing training facilities for the subscribers/users to access electronic information through networks. At present accessibility of data over Internet is rather slow. When the retrieved information contains figures, images and graphics, the speed is considerably reduced. And in developing countries, the unreliable telecommunication links and low transmission bandwidths make this pain-
In an ideal situation, access to the online journals by authenticated users should be possible irrespective of their location. This is possible through the use of CGI scripting/proxy servers which allow authentication of users distributed in a LAN/WAN environment. But very few publishers (such as UMI, now called BHIL) support CGI scripting. Some publishers like Elsevier and Standard & Poor follow IP addresses at an increased premium (Majka, 1999, p.45). The online journals can be utilised to their maximum potential in a distributed environment. Towards this end, the librarian can pass on/disclose passwords to remote users; but this defeats the security and may increase the financial burden. The password authentication is a good proposition, provided that the password expires after a given number of searches or at a certain time, as in the case of OCLC’s FirstSearch.

5.4.2 Awareness and Coverage in Secondary Periodicals

An important aspect which influences the accessibility of a journal is the awareness. The reader should know about the existence of the e-journal, its mode of access, and charges/tariff, if any. This calls for reference tools such as directories of e-journals and also bulletins/newsletters to announce information of such publications. Another point which greatly enhances the access of e-publications is their coverage in abstracting and indexing periodicals and databases. As of now, very few are covered by these services. This is mainly because of quality of e-publications, acceptability of e-media and integrity of Web sites. It is not uncommon now to see citations to e-documents; these are mainly to their site addresses. It is also a common phenomenon that many sites vanish without a trace after some time. However, it is difficult to locate material from e-journals due to their non-coverage in secondary publications. The reluctance of authors in submitting their papers stems from the lack of audience and uncitedness due to the non-coverage in secondary services. Coverage of e-publications by the abstracting periodicals started only in the mid-1990s. The Institute for
Science Information (ISI) began including the references to the e-publications in their services in 1994; INSPEC started it in the last quarter of 1995 and the Chemical Abstracts Service also began abstracting and indexing electronic-only documents available on Internet in 1995. Bibliographical databases like ERIC, MEDLINE, Index Medicus etc provide coverage to some e-titles, but their coverage is not complete; site addresses are conspicuous by their absence in many cases. Further as different formats (such as print, tape, CD-ROM, and online) of the same database do not provide similar coverage (see for example, Johnston, 1994 & 1998). In due course of time, as the e-journals gain wide acceptance from authors, researchers and professionals, we may see their increased coverage in the secondary periodicals.

5.4.3 Access versus Ownership

The use of e-media has resulted in a paradigm shift from acquiring printed publications (i.e., ownership of documents) to providing access to electronic information. As the back files are maintained on networks, libraries have to pay extra charges for accessing back volumes (subscribed earlier) after the expiry or cancellation of subscription, by way of access fee, password fee or renewal fee which is not the case with printed journals. This means that, even after paying subscription charges to electronic (online) journals, the library may not possess (own) them; they merely provide access to information contained in them even during the subscription period.

5.4.4 Journal Acquisitions

Periodicals are selected based on certain procedure like asking for a sample issue followed by evaluation before they are actually subscribed. In electronic environment, trial usage is the mode before deciding subscription to the service/journal. Identification, evaluation, selection and organising are the issues to be addressed before resorting to subscription of e-journals. Another concern is the decision regarding the format and the type of journal to be subscribed, i.e., whether to continue the
print version, or subscribe electronic version only or both or provide access on per-use or per-access basis. In case of going for an electronic version, decision regarding single-user or multi-user access or site license is also to be decided.

5.4.5 Acceptability

Surveys have established the acceptance of e-journals as well as use of articles in their research work by readers and scholars (see for example, Berge and Collins, 1996, p. 708). E-media, particularly e-journals, offer greater freedom to scholars to disseminate results of their research directly to other scholars bypassing the cumbersome conventional publishing route. No doubt, this has the advantage of expeditious dissemination of information but is lacking peer-reviewing and associated quality control. However, scholars prefer to publish in print journals because of their reputation stringent refereeing processes, strict quality control measures adopted and the universal acceptance of such publications for appointments, promotions, research grants and financial assistance. Even if e-journals save time, have no page charges, are less expensive, easier to access and distributed on to the desk tops of the users, scholars may be reluctant to publish their research work in them.

Many authors have dealt with the fears and concerns of research scholars and authors for not considering submitting their best work for publication in e-journals although peer-reviewed e-journals available on Internet are on the rise. The fear that tenure committees may not consider the quality of articles published in e-journals on par with those published in reputed print journals (Berge and Collins, 1996; Collins and Berge, 1994; OCLC Newsletter, 1994; Wilson, 1991); the reluctance of academic establishments to value contributions to e-publications to scholarship (Harnad, 1993; Kelly, 1992); the failure of e-journals in yielding expected rewards of scholarly publication (Butler, 1994); quality and credibility of e-publications (Collins and Berge, 1996; Cronin and Overfelt, 1995); and integrity of intellectual content of digital information (Lynch, 1994) are some of the important issues and concerns of authors. As publica-
tion of research results is linked to promotion, tenure and pay decisions, and also as the e-publications have not achieved the same level of prestige and acceptability as their counterparts, these will be viewed as no more than self-publications (Aluri, 1996).

Librarians have not yet fully accepted the e-media to replace print versions. Also, having used print versions comfortably for so many years, readers also take some time to accustom with the new media. Given a choice between electronic and printed journals, the readers prefer conventional, prestigious printed journals to consult because of their inherent advantages and familiarity with them. In an evaluative study of the electronic issue of *The New Zealand Journal of Marine and Fresh Water Research*, doubts about universal access to information, preference to hard copy over screen displays, and disappointment with the quality of graphics were expressed. The respondents described that electronic publication must supplement and not replace the printed journals (Jasperse, 1994). Moreover, the technology has not percolated to the required level to make the e-publications acceptable on par with their printed counterparts. However, the research community is using, and will continue to do so in future too, e-publications, bulletin boards and discussion forums for scientific communication.

### 5.4.6 Accountability

The question of cataloguing electronic (online) journal issues, volumes and back volumes needs to be answered. Issues like the agency to oversee stability and authenticity of material, maintain the collection including archival, long-term storage and access, and granting equal access to the information are to be addressed in depth (von Ungern-Stenberg and Lindquist, 1995).

### 5.4.7 Preservation, Archiving and and Accessing Back Files

Selection, acquisition, organisation, provision and preservation of back volumes
are the functions of libraries and not of the computer centres or networks which are at present providing access to the electronic publications. Currently there are no set procedures or guidelines for ensuring the form or format or agency who can make a copy available through networks. CD-ROMs, videodiscs, magnetic tapes, and online databases are some of the forms which can be used for archiving the e-journals. But how many of these technologies will last so long as the printed word? From a purely procedural perspective, preserving and retrospectively accessing e-publications will be difficult since the hardware and software which created that information will be obsolete quite quickly and no one is clearly sure of the longevity of e-media (Aluri, 1996). Agencies like the National Academy of Public Administration of USA are taking steps to develop standards for preservation of e-journals. This may influence their nature of availability and preservation (Sasse and Winkler, 1993).

Subscription of print journals entails access to back files (old volumes which were subscribed) even if future subscription is stopped. In the case of e-journals, a user automatically gets access to back volumes earlier subscribed. But if the subscription is stopped due to any reason, the subscriber is denied archival access of the previous subscription unless the access and password charges are paid. OCLC offers 'perpetual archiving' for subscribers of Electronic Collection Online (ECO); but in case a subscriber stops the subscription to the journal for any reason, it would allow access to back files if the subscriber renews the journal within 5 years. OCLC's ECO will maintain the subscription details of the institutions to online journals by title and duration. As long as the institution subscribes to ECO, the institution will have access to the archived journals for the subscription period, via ECO, even if the subscription is discontinued subsequently. Such arrangements entail additional expenditure for libraries which was not needed in the case of printed journals.

Further, there are major differences between the archiving programmes of non-profit and for-profit vendors of online journals. Non-profit vendors like OCLC and JSTOR have committed themselves for making available always their archives for
accessing, of course under certain assumptions. Blackwell, a for-profit vendor, has also indicated similar plans. However, one issue which remains to be answered is that just because of the infrequent access to old files (as compared to current files), the publishers will not discontinue the archival files due to sheer economics. This brings up the thorny issue of responsibility for archiving of back files. The amount of disc space needed for back files, current and future issues of e-journals is anybody’s imagination. Although storage capacities are increasing and costs are going down, it still may be difficult to cope with as online maintainance of back files costs are considerable. Even in the event of some one takes the responsibility of storage and archiving, they have to take care of upgradation of the hardware and software due to the ever changing technological advances. Caution is to be the watchword as no aggregator has expressly committed for providing archival storage and long-term access as well as protection from publisher interventions on the current and archival content.

Printed word is permanent where as electronic information is ‘volatile’ and amenable for manipulations. This brings out one of the important issues of permanency of e-journals. At present, there is no guarantee that network management centres will preserve e-journal archives indefinitely. The ephemeral nature of e-documents concerns authors as well as librarians and makes scholars suspicious of them. Reliability in the archiving of e-journals is crucial to make scholars contribute standard research work to e-publications (Collins and Berge, 1994).

5.4.8 Readability

Even computers with the best resolution cannot match the print equivalent for reading. Further conventional publications allow continuous, uninterrupted reading. Computers cannot hold a full page at a time and need scrolling of screen every few minutes for browsing which may detract the attention of the readers. The quality of figures in the computer printed output, even using laser printers, cannot match that of print publications because of resolution and many a time grey scales merge and are
This in addition to the lack of pagination (for example, IPCT), ease of usage, and the transportability of publication for a leisurely reading at a convenient place and time still make the printed journal preferable over the electronic journal.

5.4.9 Ethical Factors

One important concern of electronic information is its vulnerability to manipulations, additions, deletions, etc. Any user can search databases, download information of interest, incorporate in his work or modify or revise and re-publish it. This may raise problems such as integrity, authenticity and stability of the published data. This may be one of the important reasons for the authors' unwillingness to publish in the electronic/online journals. Further, these cannot be closely monitored or their use cannot be restricted as in the case of printed journals. These may result in plagiarism, authorship conflicts and impersonation.

5.4.10 Pricing

It is a major issue for publishers as they make substantial investments and so naturally wish to protect their financial interests. All publication aspects like manuscript processing, peer review, editing, layout and design are common for both print and electronic versions except printing and distribution. As printing, binding, transporting and mailing the printed copies to the subscribers is labour intensive, and also as the electronic versions are by products in the process, when electronic versions only are subscribed, it should have been cheaper than the printed publications. As Woolfrey (1993) observed, elimination of printing and postage reduces journal cost up to 24-36 per cent. But this savings is not transferred to subscribers as of now. Further, as Internet is providing a way to cheaply distribute their products, it is expected that the publishers pass the resulting cost savings to subscribers, thereby bringing back some of those who resorted to cancellation due to price escalations and budgetary deficiencies.
But contrary to these expectations, publishers generally charge electronic versions almost equal (around 95 per cent) to the subscription rates of the printed journals. Some publishers offer electronic versions free of charge along with print subscriptions; some charge 10 to 60 per cent extra for dual subscriptions. It can be observed that some electronic products are cheaper than their printed counterparts, some are of the same price and some more expensive. It is difficult to find any rationale behind such pricing structures as many publishers view the digital environment as an opportunity to enhance their revenues. Many publishers insist dual subscriptions; only a few publishers offer e-journals alone on subscription. E-journal subscriptions delivered through intermediaries/aggregators such as ECO service of OCLC, Electronic Journal Navigator service of Blackwell, etc. involve additional access/archival charges, over and above the full subscription prices. Such pricing structures made library consortia (for example, International Coalition of Library Consortia) issue press releases on the subject (www.library.yale.edu/consortia/statement.html). This situation should change for the benefit of both libraries and publishers.

**Monopolistic Digitisation Practices**

In moving from print to electronic format, publishers follow different routes. Many follow dual publication schedule till such time the electronic version stabilises and the subscribers get accustomed to the new environment. Some publishers resort to partial digitisation (for example, Gale Research which digitised only parts of 4 volumes of their 105-volume *Contemporary Literary Criticism*, Yale University which offered online access to 60 files of 360 ancient and modern cultures of the *Human Relations Area Files*) making libraries to subscribe/retain both print and electronic versions. Some publishers (like the GartnerGroup) converted to digital format and completely abandoned print versions forcing libraries either cancel or migrate to other titles. In the digitisation process, publishers sometimes resort to content shuffling and pricing changes which make it difficult to determine whether the new electronic version is comparable with the old print version (Majka, 1999, p. 45).


5.4.11 Standardisation

At present the e-journals are available in various forms, formats and through different access points. This is a problem for the reader for accessing. Some of the e-journals do not include page numbers as the size of the page in different computers (VDUs) is different. This raises citation problem when the same material to be cited can appear in different pages. The hardware and software are also to be standardised to enable the end-user to retrieve information irrespective of the make of the machine and the retrieval software used. At present a user has to get familiarised with a plethora of retrieval software associated with the various CD-ROM databases. A common command information retrieval language which can work with any computer and retrieval software may be useful in such situations.

There is multiplicity of formats available for converting text files, graphics and images. These include ASCII, PDF, TIFF, HTML, SGML, TEX, PostScript, etc. Many publishers have developed proprietary software (for example, Guidon by OCLC, Link by Springer-Verlag, etc) and these make librarians to be acquainted with them for accessing the e-journals offered by these publishers. This also necessitates training of library staff and users and will take considerable time and efforts.

5.4.12 Compatibility of Hardware/Software

The players in the e-publication industry keep changing due to various reasons. There is no problem if such a change does not create concerns to the libraries and librarians. However, it is not so in all cases. For example, the change of vendor/distributor in the case of full-text CD-ROM database of IEL has resulted in incompatibility, change of hardware and adjustment to new software. The subscribing institutions have to suffer due to this who were forced to buy new computer systems suitable to the new situation.

Also, due to the breathtaking innovations in computer hardware and software,
although backward compatibility is ensured by manufacturing firms, it is to be seen if the computer program which used to create digitised files will still be available a decade from now and still be compatible with the computer configuration at that time. This problem is serious if we consider the closures, sellouts or mergers of many firms dealing in the computer hardware, software and peripherals.

5.4.13 Bibliographic Control

At present there are no suitable comprehensive bibliographic control mechanisms available for e-media. Although there are different directories to cover different formats such as e-journals (The Directory of Electronic Journals, Newsletters and Academic Discussion Lists of the ARL), CD-ROMs (The Directory of CD-ROMs and Online Databases and the CD-ROM Directory both published by TFPL, London; CD-ROMs-in-Print of Meckler, Westport and CD-ROM Finder of Learned Information, Medford); DVDs (The DVD Directory of the Waterloo New Media Information), their scope and coverage are limited. Each of these directories has a different focus and so there is no unanimity among these publications in the number of titles published in a year. Unlike the Ulrich's International Periodicals Directory or The Serials Directory: An International Reference Book of EBSCO which have comprehensive coverage of all print journals, there is no single source to get details of all e-serials. Even though Ulrich's covers some of the e-journals, their coverage is limited and the details of site and electronic subscription addresses are not included; EBSCO's directory (1996 edition) covers about 5,000 online and CD-ROM titles providing site addresses where available (Johnston, 1998, p. 11). This lack of bibliographic control of e-media results in duplicity of efforts. The reference librarian is forced to make separate searches for conventional and electronic formats. This is time consuming and avoidable.

5.4.14 Sociological and Psychological Issues

Traditionally libraries are meeting places of teachers, students and researchers supporting formal, interdependent and collaborative learning and research. However,
virtual libraries facilitate individual, independent and informal learning. Users can access the electronic resources irrespective of their location from anywhere—from office desk, home or even from the rooms of the researchers.

Libraries are important treasure houses of knowledge for preservation. They act as information resource centres both for the individuals and the community alike. The old statement that ‘libraries are the hearts of educational institutions’ will no longer hold true if nobody have to go to the library and if the libraries are indistinguishable from computing centres (Gross and Borgan, 1995). Preserving, organising and providing access to scholarly and cultural record, which is the primary and historical role of libraries, is threatened in the face of library without walls. Already there is a shift in the objectives and internal operations of a library such as collection development, interlibrary lending, and reference services (Aluri, 1996). The issue of sociological and psychological impact on the profession and the traditional role of the libraries in the event of the researcher accessing information resources through networks without actually entering into a library is difficult to understand and address at present. When publishers introduce pay-per-use or pay-per-article modes and more and more users get connected to Internet, individual subscribers may increase and may result in the reduced role of libraries (Kumbar and Sangam, 1997).

5.4.15 Shelf Life

Another concern is the storage life of e-media. As against a print-on-paper (acid-free) document or a microfiche/film which have a much longer shelf life, floppy disks and hard disks lost only a few years. Comparatively computer tapes and the sturdy CD-ROMs survive longer. But whereas tapes necessitate frequent transferring data as and when new technologies come to play, the big question is whether the technologies that created CD-ROM or DVD will be around a few years from now? No one is sure.
5.4.16 Other Issues

Classification and cataloguing of e-media will drastically change. The nature of details these entries would have and whether links will be provided to the publishers' sites are to be decided. Already OCLC and other agencies have taken steps in this direction. Print publications facilitate user and use studies including usage, citation, circulation and interlibrary loan studies. The e-media will change this scenario and may call for entirely new methods for such studies.

Issues like developing electronic catalogues that can retrieve information scattered across digital libraries over a network (say, Internet), finding a cost-effective way to digitise the material without spoiling the original in the process, and making the digital material available while protecting the literary rights of writers and publishers (Chepesiuk, 1997) are also to be addressed. There are enormous economic and ecological disadvantages to the all-digital library as users tend to print anything that is more than 500 words, and a typical library would spend much more on printing and licenses than its current budget and would use at least 50 times as much paper as at present. A critical yet realistic view of omnipresent electronics, the death of printed text, universal conversion of collections into digitised form, digital communications and computer hardware, copyright vis-à-vis publishers and libraries are to be taken care (Crawford, 1998).

Browsing digital documents is an infringement. It is impossible to browse through a digital document without accessing it. This makes the users to pay some sort of fee, even for ascertaining whether it is useful. If potential users of a digital document are expected to pay a fee, then they must be in a position to determine, in advance, the usefulness of the document and the price tag. This is one of the most important issues, which concerns the users and librarians alike. Site licences at a reasonable cost would allow institutions to do their services as well as research without complexity.

Other concerns of libraries while transforming in to digital libraries include ad-
dition of more and more electronic and digitised information, development and maintaining proper infrastructure facilities for access, and re-appropriation of budgets in the changing information technology environment. Further, techniques for using electronic information for training, teaching and learning are to be mastered.

5.6 CONCLUSION

In recent times the local, city, regional and the national networks have been growing steadily. The latest additions to this field are the Internet and intranets. Millions of people are connected through these networks and many more millions are expected to join. Plans are on the anvil to introduce a wide variety of commercial and other information services over these networks. Already users of electronic information experienced some disputes relating to intellectual property rights (IPRs) and as the computer networks expand, such problems would increase further. This is only because most of the content distributed over the networks is copyrighted or is under some sort of control regime including contractual licensing. The users, especially in third world countries, do not as yet recognised the implications of these regimes.

Although some recognise copyrighted material, they tend to think that non-commercial distribution is fair use and that it does not amount to rights violation. This leaves the network managers/administrators in a tight spot over the liability of such infringements. Content liability is another related issue. Who is to be held responsible for the access of the pornographic, seditious, and violent material accessed by users? Especially in the face of rising terrorism and the increasing access of Internet by children. However, no country has done anything in this respect. When the digital content over the Net is distributed commercially, users will encounter all together a new set of problems.

The impact of e-media on the research users is such that they expect access to information from wherever they are, free of any charges and wish to get not merely
Users perceive the Internet as an information goldmine and the answer to all their information problems. However, when they attempt to use electronic resources, they sometimes change their perspective. Quite often they realise that to exploit these resources effectively they need training. The users do not really get the benefits from the technology unless they are trained to have a right perspective and understanding of the electronic resources. Because of these and various associated factors, many experts have advised caution. According to Crawford (1998) libraries will and must convert to digital distribution as a more effective way to carry out their missions only (i) when reading from digital devices is as comfortable, effective, and fast as reading from printed books and serials (or more so), (ii) when digital reading and storage devices are omnipresent, (iii) when digital distribution replaces print publishing for all new materials because it is cheaper, faster, and better, (iv) when all existing library materials are converted to digital form, (v) when digital communications facilities are so fast and inexpensive that transmission of publication equivalent is essentially instantaneous and free, and (vi) given that publishers would not stand in the way of institutions making single purchased or converted publications simultaneously available throughout the institution, nation, or world. Taking into consideration the technological breakthroughs that are taking place around the world many of these would become available in a few years. Some of them may be covered under licensing agreements to safeguard the interests of publishers, libraries and users.

In the face of technological developments, the present copyright laws will not be able to prevent piracy or infringement of rights. The present copyright laws are not able to cope up with the developments in the e-media. Copyright is a social construct and not a predestined, static law of humankind; there has been some leakage in the system (that is, some unauthorised copying) and as long as the leaks do not become haemorrhages tolerating some leakage, may be of interest to publishers in the long run (Samuelson, 1995). Small scale violations which do not conflict with owners rights may have to be accepted as a part of fair use for at least some more time. Also, the
current notions about copyright will have to be heavily modified to suit to the electronic environment. It is envisaged that the electronic file transfer would replace interlibrary loan and photo-duplication in near future (Basch, 1991).

Copyright owners of digital media will be against the proliferation of derivative works. They would also resist others getting benefit out of the derived works. However, for a niche in the market, the value-added providers of derivative works and information services and products would be competing with each other and also with their lawful owners. At the moment, unless a sizeable portion of the digital work is incorporated in a derivative work, the latter is not regarded as an infringement of copyright (Samuelson, 1993, p.316).

The library professionals in developing countries have not yet been able to appreciate the full ramifications of copyright in the fast changing technological developments. While networks in general and Internet in specific are perceived as panacea for all information-related problems, their implications on copyright-related aspects are little understood. It is therefore necessary to that all library schools include at least some aspects of intellectual property rights, their relevance, and protection to make the library professionals discharge their duties more efficiently.

Many of the issues and concerns discussed in Section 5.5 need attention of all those involved, libraries and librarians, publishers, aggregators, vendors and distributors, network management centres, policy makers, authors, scholars, and so on. Many of these are merely teething problems which should disappear in due course of time. When the e-publications are recognised on par with print journals, proper bibliographical control, indexing and abstracting will be taken care automatically thus improving awareness and accessibility. Once e-journals are recognised and accepted by academics and tenure committees for appointments, promotions, etc, the reluctance of authors to submit their research contributions will disappear. These in turn my result in possible reduction in cost for [academic] libraries; speed in submission of contributions,
avoiding waiting for issues (particularly quarterly issues) as submissions can be ‘pub-
lished’ any time; and should academic and research institutions as well as authors
become involved in publishing, then copyright by originators may no longer be an

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